2022

2022-2023 Graduate Bulletin

Rochester Institute of Technology

RIT

Preparing you for an

outstanding educational experience

Graduate Bulletin
2022-23

Rochester Institute of Technology
2022–23 Academic Calendar

† The Add/Drop period is the first seven class days of the fall, spring, and full summer terms, excluding Sundays and holidays.

* Tentative spring semester and summer term schedule. RIT reserves the right to update the spring and summer schedule.

Fall Semester (2221)

August 22
Day, evening, and online classes begin
First day of Add/Drop period †

August 27
Saturday classes begin

August 29
Last day of Add/Drop period †

August 30
First day to drop from classes with a grade of "W"

September 5
Labor Day–No Classes

October 10-11
Fall Break–No Classes

November 4
Last day to drop from classes with a grade of "W"

November 23
No Classes
University closes at 2pm

November 24-25
Thanksgiving Holiday
University closed

December 5
Last day, evening, and online classes

December 6
Reading Day

Dec. 7, 8, 9, 12, 13, 14
Final exams

December 16
Final grades due

December 15–January 16
Break between fall and spring semesters

Spring Semester (2225)

January 16
Martin Luther King Jr. Day (no classes)

January 17
Day, evening, and online classes begin
First day of Add/Drop period †

January 21
Saturday classes begin

January 24
Last day of Add/Drop period †

January 25
First day to drop from classes with a grade of "W"

March 12-19
Spring Break (no classes)

April 7
Last day to drop from classes with a grade of "W"

May 1
Last day, evening, and online classes

May 2
Reading Day

May 3, 4, 5, 8, 9, 10
Final exams

May 12
Final grades due

May 12-13
Convocation and Commencement Ceremonies

May 15-17
Break between spring semester and summer term

12-week Summer Term (2228)

May 18
Day, evening, and online classes begin
First day of Add/Drop period †

May 20
Saturday classes begin

May 25
Last day to Add/Drop classes †

May 26
First day to drop from classes with a grade of "W"

May 29
Memorial Day (no classes)
University closed

July 4
Independence Day observed
University closed

July 27
Last day to drop from classes with a grade of "W"

August 9
Last day, evening, and online classes

August 10
Reading Day

August 11, 14, 15
Final exams

August 17
Final grades due

August 18-27
Break between summer term and fall semester

Short Session 1 Summer Term (2228)

May 18
Day, evening, and online classes begin
First day of Add/Drop period †

May 22
Last day to Add/Drop classes †

May 23
First day to drop from classes with a grade of "W"

May 29
Memorial Day (no classes)
University closed

June 21
Last day to drop from classes with a grade of "W"

June 28
Last day of classes

June 29, 30
Final exams

July 3
Final grades due

Short Session 2 Summer Term (2218)

July 3
Day, evening, and online classes begin
First day of Add/Drop period †

July 4
Independence Day observed (no classes)
University closed

July 6
Last day to Add/Drop classes †

July 7
First day to drop from classes with a grade of "W"

August 2
Last day to drop from classes with a grade of "W"

August 9
Last day, evening, and online classes

August 10
Reading Day

August 11, 14, 15
Final exams

August 17
Final grades due

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Rochester Institute of Technology

About This Bulletin

This *Graduate Bulletin* does not constitute a contract between the university and its students on either a collective or individual basis. It represents RIT's best academic, social, and financial planning at the time of publication. Course and curriculum changes, modifications of tuition, fees, dormitory, meal, and other charges, plus unforeseen changes in other aspects of RIT life, sometimes occur after the *Graduate Bulletin* has been printed but before the changes can be incorporated in a later edition of the same publication. Because of this, Rochester Institute of Technology does not assume a contractual obligation with its students for the contents of this *Graduate Bulletin*. RIT does not discriminate. RIT promotes and values diversity within its workforce and provides equal opportunity to all qualified individuals regardless of race, color, creed, age, marital status, sex, gender, religion, sexual orientation, gender identity, gender expression, national origin, veteran status, or disability.

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Graduate Education at RIT

RIT, founded in 1829, is a privately endowed university in suburban Rochester, NY. It is comprised of nine colleges and two degree-granting units:

College of Art and Design
Saunders College of Business
Golisano College of Computing and Information Sciences
Kate Gleason College of Engineering
College of Engineering Technology
College of Health Sciences and Technology
College of Liberal Arts
National Technical Institute for the Deaf
College of Science
Golisano Institute For Sustainability
School of Individualized Study

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Office of Graduate Enrollment Services
58 Lomb Memorial Drive
Rochester, NY 14623-5604
(585) 475-2229
gradinfo@rit.edu | rit.edu/grad

A Message from Twyla J. Cummings
Associate Provost and Dean, RIT Graduate School

The core mission of the RIT Graduate School is to enable graduate students to succeed in their programs of study, research, and creative endeavors. The Graduate School operates collegially through partnerships with all units on campus involved in graduate education in support of graduate students. The colleges continue to administer their own degree programs, but the Graduate School brings a university-wide perspective to graduate education and promotes interdisciplinary endeavors. It strengthens the intellectual community of graduate students and faculty. The Graduate School partners with the colleges to maintain the highest quality of graduate education at RIT.

The graduate learning experience at RIT is focused and intensive. Our graduate programs provide a conceptual structure and organization of knowledge in the chosen subject—an understanding essential to leading technological change in the professions. They also build an educational base for life-long learning and for the generation of new knowledge and new insights through research.

The programs themselves are centered in fields that combine both theoretical knowledge and practical applications, especially those which can provide the graduate with a unique niche in the global marketplace. Research topics often relate directly to situational concerns, rather than theoretical discourse. Many programs require a dissertation, thesis, or project, and encourage other avenues for professional experience, such as cooperative education and internships in government and industry. Graduate student may also assist in undergraduate education, as teaching, research, or laboratory assistants.

Whether a dissertation, thesis, project, or professional portfolio is required of them, our students are encouraged to incorporate both independent study and experiential learning into their programs.

A philosophy supported by campus resources

RIT's mission is the education of people for work and life in a democratic, inclusive, and global society. It is integral to the university's mission to be a dynamic center of higher education—one in which technology, the arts and sciences, and other dimensions of human knowledge and civilization are valued, cultivated, and applied. RIT structures itself as an educational resource for all who seek to be competent and enthusiastic lifelong learners, whether they are young adults or professionals seeking to upgrade their skills by studying for an advanced degree.

Our goal is that all graduates will understand the ethical, humanitarian, and aesthetic challenges of a diverse workplace and an international community. The university's educational philosophy emphasizes not only theory—the natural foundation of knowledge—but also the practical workplace application of theories. This dual emphasis is prized by employers and offers graduates upward career mobility and the flexibility for changes in career direction.

History of Graduate Education

Over the past six decades, graduate education at RIT has grown from a few niche programs to more than 100 professional and research-oriented degrees and advanced certificates constituting a diverse and unique, scholarly portfolio in the visual arts, humanities, business, and science, technology, engineering and mathematics (STEM) disciplines. RIT's strong tradition of undergraduate education has laid the groundwork for the university's graduate education programming, resulting in skilled, innovative and highly desired professionals. Today, RIT has approximately 3,000 graduate students and offers MS, MBA, MFA, MST, MSE, M.Arch., and Ph.D. degrees. All graduates from these disciplines continue to push the frontiers of research, entrepreneurship and innovation. All of RIT's colleges and degree granting units exhibit continuous concern for the emerging needs of the business, industrial, and scholarly communities.

To support RIT's continuing endeavor to provide education in emerging career fields, the university offers eleven doctoral programs in the fields of astrophysical sciences and technology, color science, computing and information sciences, engineering, imaging science, mathematical modeling, microsystems engineering, electrical and computer engineering, sustainability, biomedical and chemical engineering, and mechanical and industrial engineering.

A Philosophy Supported by Campus Resources

RIT's international reputation as an applied technological university with a unique connection to the arts and humanities gives graduate students the advantage of working with sophisticated technology and in laboratories found on and off campus. For example, students in microelectronic engineering have access to clean-room facilities that meet industry standards. Students majoring in visual communication design access digital media using a variety of systems and software, including Macintosh, IBM, Silicon Graphics, and Media 100 digital video editing. Our telecommunications technology workstations have been donated by an industry eager to hire students experienced with equipment used in their own laboratories.

Technology has also brought together students in design, crafts, photography, and print and multimedia. In RIT's Electronic Still Photography Laboratory, these disciplines have merged through electronics. Regardless of the program, RIT encourages and promotes technological innovation in all areas.

Specialized and Diverse Programs

While technology is integral to all graduate programs, the essence of RIT graduate education is found in the diversity of programs, course offerings, and learning options. Our reputation as an advanced university is matched by our commitment to offering programs designed to meet the specialized needs of employers. A dozen international corporations—including Eastman Kodak Co., Konica, Agfa Gevaert, Xerox Corp., and Fuji Photo Film Co.—have sponsored the building of laboratories in the Chester F. Carlson Center for Imaging Science, which houses the nation's most comprehensive imaging science programs. Enriched by the perspective provided by the National Technical Institute for the Deaf, one of RIT's colleges, we offer full access to deaf and hard-of-hearing students seeking graduate-level academic programs.

Graduate students across campus engage in exciting research and stimulating dialogue with faculty and distinguished visitors such as George Bush, Bill Clinton, Joe Torre, Jesse Jackson, Annie Leibovitz, Jerry Uelsmann, Cornel West, and Greg Heisler.

The university continues to receive international recognition for the quality of its graduate programs. In a recent ranking of national graduate programs, U.S. News & World Report named the MFA in photography tied for 6th place in graduate studies. The industrial design MFA ranked 8th and the MFA in multimedia/visual communications ranked 12th.

Convenient, Flexible Programs

RIT's diversity also extends to the manner in which courses and programs are scheduled. Many of our graduate programs are available on a part-time or online basis and are designed for working professionals. Examples of programs offered through online learning include networking and systems administration; environmental, health and safety management; telecommunications engineering technology; imaging science; microelectronics manufacturing engineering; and health systems administration. These programs allow students access to an RIT education without attending classes on campus.

In addition, RIT's executive MBA program offers professionals an opportunity to earn a master's degree by studying on campus Friday and Saturday, every other week, or through online learning. Professionals from California to England visit RIT every year for executive leader master's degree programs in service management, hospitality and tourism management, health systems administration, and packaging science, which combine on-campus residencies with classes using distance-learning technology.

Sponsored Research Projects

Externally sponsored projects are a vital and integral component of RIT's educational and research activity. Faculty and students undertake sponsored projects for a variety of important reasons: to add to the body of knowledge, for professional development, and to strengthen academic programs. Sponsored projects enhance the university's academic programs, broaden its research resources, and provide opportunities for student participation in research, strengthen university-industrial partnerships, and serve the wider community.

Moreover, grants and contracts enhance existing resources and provide new opportunities for faculty, staff, and students. External funding comes from federal and state agencies, private foundations, and corporations. RIT's major sponsors include the National Science Foundation, the National Institutes of Health, the U.S. Department of Education, the Department of Defense, the National Aeronautics and Space Administration, and New York State.

Additional information is available through the Office of Sponsored Research Services at 585-475-7985, research@rit.edu, or on their website at rit.edu/research.

Accreditation

RIT is chartered by the New York state legislature and accredited by:

The Commission on Higher Education
Middle States Association of Colleges and Schools
3624 Market Street
Philadelphia, PA 19104-2680
215-662-5606

and

New York State Education Department
Office of College and University Evaluation
5 North Mezzanine
Albany, NY 12234
518-474-2593

In addition to institutional accreditation, many of RIT's academic programs have been granted accreditation by appropriate professional accreditation bodies. Where applicable, specific mention of accreditation is included in program descriptions. Students wishing to review documents describing accreditation should contact the Office of the Senior Vice President for Academic Affairs.

The Graduate Bulletin provides comprehensive information on all graduate programs at RIT. I encourage you to explore its contents to find the educational and research opportunities you seek. I look forward to welcoming you to our campus, and wish you success in your chosen program of study.

Twyla J. Cummings
Associate Provost and Dean, RIT Graduate School

Graduate Programs of Study		Degree and HEGIS Code							
		Adv. Cert	Ph.D.	MBA	ME	MFA	MS	MST	M. Arch
Art, Design, and Architecture									
Architecture‡	Institute for Sustainability								0202
Ceramics	Art and Design					1009			
Fine Arts Studio	Art and Design					1002			
Furniture Design	Art and Design					1009			
Glass	Art and Design					1009			
Industrial Design	Art and Design					1009			
Integrative Design	Art and Design						1009		
Media Arts and Technology	Art and Design						0605		
Medical Illustration	Health Sciences and Technology					1299			
Metals and Jewelry Design	Art and Design					1009			
Non-toxic Printmaking	Art and Design	1009							
Visual Arts–All Grades (Art Education)	Art and Design							0831	
Visual Communication Design	Art and Design					1009			
Business, Management, and Leadership									
Accounting and Analytics	Business						0502.00		
Accounting and Financial Analytics‡	Business		0703.00						
Business Administration	Business		0501.00	0506					
Business Administration–Executive	Business			0506					
Business Administration–Online Executive‡	Business			0506					
Business Analytics‡	Business						0599		
Construction Management‡	Engineering Technology						0599.00		
Data Science‡	Computing and Information Sciences						0701.00		
Engineering Management	Engineering				0913				
Environmental, Health and Safety Management‡	Engineering Technology						0420		
Finance	Business						0504		
Global Supply Chain Management	Business						0513.00		
Health Care Finance‡	Health Sciences and Technology	1202							
Health Systems Management‡	Health Sciences and Technology						1202		
Hospitality and Tourism Management	Business						0510.1		
Lean Six Sigma‡	Engineering	1702							
Manufacturing Leadership‡	Engineering						0599		
Media Arts and Technology	Art and Design						0605		
Organizational Leadership and Innovation‡	Business						0599.00		
Product Development‡	School of Individualized Study						0599		
Project Management‡	School of Individualized Study	0506							
Technology Entrepreneurship	Business	0506.00							
Technology Innovation Management and Entrepreneurship	Business						0506.00		
Workplace Learning and Instruction‡	Engineering Technology	0515							
Communications and Digital Media									
Communication	Liberal Arts						0601.00		
Communication Networks	Engineering Technology						0925.00		
Health Care Interpretation‡	National Technical Institute for the Deaf						1199		
Media Arts and Technology	Art and Design						0605		
Print and Graphic Media Science	Engineering Technology						0699		
Visual Communication Design	Art and Design					1009			
Computing and Information Sciences									
Artificial Intelligence in Computer Science	Computing and Information Sciences	0701.00							
Big Data Analytics	Computing and Information Sciences	0702							
Bioinformatics	Science						0499		
Computer Engineering	Engineering						0999		
Computer Science‡	Computing and Information Sciences						0701		
Computing and Information Sciences	Computing and Information Sciences		1701						
Computing Security	Computing and Information Sciences						0799		
Cybersecurity	Computing and Information Sciences	0799							
Data Science‡	Computing and Information Sciences						0701.00		
Electrical and Computer Engineering			0909.00						
Game Design and Development	Computing and Information Sciences						0799		
Health Informatics‡	Computing and Information Sciences						1217.00		
Human-Computer Interaction‡	Computing and Information Sciences						0799		
Imaging Science‡	Science		1999.20				1999.20		
Information Technology and Analytics‡	Computing and Information Sciences						0699		
Media Arts and Technology	Art and Design						0605		
Software Engineering	Computing and Information Sciences						0999		
Visual Communication Design	Art and Design					1009			
Web Development	Computing and Information Sciences	0699							
Engineering and Engineering Technology									
Architecture‡	Institute for Sustainability								0202
Biomedical and Chemical Engineering	Engineering		0905.00						
Communication Networks	Engineering Technology						0925.00		
Computer Engineering	Engineering						0999		
Electrical and Computer Engineering	Engineering		0909.00						
Electrical Engineering	Engineering						0909		
Engineering Management	Engineering				0913				
Engineering	Engineering		0901						
Environmental, Health and Safety Management‡	Engineering Technology						0420		

‡ Online option available.

Graduate Programs of Study		Degree and HEGIS Code							
		Adv. Cert	Ph.D.	MBA	ME	MFA	MS	MST	M. Arch
Imaging Science‡	Science		1999.20				1999.20		
Industrial and Systems Engineering	Engineering						0913		
Lean Six Sigma‡	Engineering	1702							
Manufacturing and Mechanical Systems Integration	Engineering Technology						0913		
Manufacturing Leadership‡	Engineering						0599		
Materials Science and Engineering	Science	0915					0915		
Mechanical and Industrial Engineering	Engineering		0910.00						
Mechanical Engineering	Engineering				0910		0910		
Microelectronic Engineering‡	Engineering		0999				0999		
Packaging Science	Engineering Technology						4999		
Product Development‡	Engineering						0599		
Software Engineering	Computing and Information Sciences						0999		
Sustainable Engineering	Engineering						0999		
Sustainable Systems	Institute for Sustainability						4904		
Vibrations	Engineering	0910							
Environmental Studies and Sustainability									
Architecture‡	Institute for Sustainability								0202
Environmental Science	Science						0420		
Environmental, Health and Safety Management‡	Engineering Technology						0420		
Packaging Science	Engineering Technology						4999		
Sustainability	Engineering Technology		4904						
Sustainable Engineering	Engineering						0999		
Sustainable Systems	Institute for Sustainability						4904		
Game Design, Development, and Arts									
Game Design and Development	Computing and Information Sciences						0799		
Health Professions and Medical Sciences									
Bioinformatics	Science						0499		
Health and Well-being Management	Health Sciences and Technology						1299.00		
Health Care Finance‡	Health Sciences and Technology	1202							
Health Care Interpretation‡	National Technical Institute for the Deaf						1199		
Health Informatics‡	Computing and Information Sciences						1217.00		
Health Systems Management‡	Health Sciences and Technology						1202		
Medical Illustration	Health Sciences and Technology					1299			
Humanities, Social Sciences, and Education									
Criminal Justice	Liberal Arts						2209		
Engineering Psychology	Liberal Arts	2099							
Environmental Science	Science						0420		
Environmental, Health and Safety Management‡	Engineering Technology						0420		
Experimental Psychology	Liberal Arts						2099		
Health Care Interpretation‡	National Technical Institute for the Deaf						1199		
Professional Studies‡	School of Individualized Study						4999		
Science, Technology and Public Policy	Liberal Arts						2102		
Secondary Education of Students Who Are Deaf or Hard of Hearing‡	National Technical Institute for the Deaf						0803		
Visual Arts–All Grades (Art Education)	Art and Design							0831	
Photography, Film, and Animation									
Film and Animation	Art and Design					1010			
Media Arts and Technology	Art and Design						0605		
Photography and Related Media	Art and Design					1011			
Science and Math									
Applied and Computational Mathematics	Science						1799		
Applied Statistics‡	Science	1702					1702		
Astrophysical Sciences and Technology	Science		1912				1912		
Bioinformatics	Science						0499		
Chemistry	Science						1905		
Color Science	Science		1999.20				1999.20		
Data Science‡	Computing and Information Sciences						0701.00		
Environmental Science	Science						0420		
Environmental, Health and Safety Management‡	Engineering Technology						0420		
Finance	Business						0504		
Imaging Science‡	Science		1999.20				1999.20		
Materials Science and Engineering	Science						0915		
Mathematical Modeling	Science		1799						
Packaging Science	Engineering Technology						4999		
Physics	Science						1902.00		
Sustainability	Institute for Sustainability		4904						
Sustainable Systems	Institute for Sustainability						4904		
Undeclared and Individualized Study									
Professional Studies‡	School of Individualized Study						4999		

‡ Online option available.

Doctoral Study at RIT

Doctoral programs at RIT are multidisciplinary, cutting-edge, and unique. Our highly interdisciplinary programs were developed out of RIT's unique areas of strengths in imaging, computing, science, engineering, mathematics, and sustainability. Our long history of providing education focused on emerging technologies has led to the development of doctorate level programs that draw upon our expertise and experience in these dynamic disciplines of study.

Our 12 doctorate programs focus on the discovery and application of technology to solve problems in society. The interdisciplinary nature of the programs means students will work alongside more than 100 Ph.D. faculty members who are experts in a wide range of fields that are influenced by imaging, computing, science, engineering, and sustainability.

Doctoral programs of study

RIT offers 12 doctoral degrees in areas where RIT shares national and international recognition.

Astrophysical sciences and technology: Students in the astrophysical sciences and technology program experience a comprehensive curriculum and a broad range of research opportunities that span forefront topics, such as cosmology and large scale structure, detectors and instrumentation, galaxy structure and evolution, gravitational waves, star and planet formation, supermassive black holes, and numerical general relativity. This program not only focuses on discovery and analysis, but also on the development of the technologies—including the instruments, analysis, and modeling techniques—that will enable the next major strides in astrophysics.

Biomedical and chemical engineering: The biomedical and chemical engineering Ph.D. program provides you with the knowledge, training, and expertise to tackle important problems in industry, academia, government, and health care. You will graduate as a higly skilled researcher well positioned to be a leader in the next generation of engineers who will tackle the challenging and complex problem facing our society.

Business administration: The Ph.D. in business administration is designed to inspire and train scholars to identify, investigate, and solve novel business challenges that influence business and society, particularly, those that are triggered by technological changes. Our program has a sharp emphasis on the effects of technological innovation on discipline-based theories and research. Our faculty adopt an apprenticeship model in working with students to become independent scholars, cutting-edge researchers, and well-trained educators at research-oriented universities.

Color science: Color science is the understanding and quantification of color and its perception. It is used in the design and production of most man-made materials including textiles, paints, and plastics, and to specify the properties of diverse natural materials such as skin, plants, and soil. It also provides the scientific foundation for color imaging and has enabled advances in digital photography, electronic display systems, and color printing. The degree program revolves around the activities of the Munsell Color Science Laboratory, the pre-eminent academic laboratory in the U.S. devoted to the study of color science. For more than 30 years its faculty and staff have educated students and conducted cutting-edge research in the field. Since the inception of the program, graduates have been in high demand and enjoy a 100 percent placement rate in industrial and academic positions.

Computing and information sciences: This use-inspired basic research degree is designed to produce independent scholars, well-prepared educators, and cutting-edge researchers poised to excel in their work within interdisciplinary environments and industries. The degree highlights two of the most unique characteristics of the Golisano College—the breadth of its program offerings and its scholarly focus on discovering solutions to real-world problems by balancing theory and practice.

The program focuses on the theoretical and practical aspects of cyberinfrastructure as applied to specific problems across multiple domains. It is a blend of the intra-disciplinary computing knowledge areas and interdisciplinary domain areas.

Electrical and computer engineering: The 21st century has witnessed such advances as the Smart Grid, ubiquitous fast internet access through wireless networks, artificial intelligence and machine learning technologies that rival humans in performance, the Internet-of-Things, cloud computing, fiber-optic networks capable of transmitting trillions of bits per second, new computing paradigms such as quantum or neuromorphic computing, and many more. None of these advances would have happened without the dedication of researchers in electrical and computer engineering. Students in the Ph.D. in electrical and computer engineering are explorers of the information age who transform the world by leading trailblazing research that expands and create knowledge.

Engineering: The doctorate program in engineering prepares the next generation of engineering leaders to tackle some of the most daunting and complex problems facing our society. The program's goal is to produce engineering graduates who are subject matter experts in a knowledge domain within an engineering discipline. Instead of restricting graduates to individual engineering fields (e.g., chemical, computer, electrical, industrial, mechanical, etc.) the program provides students with the flexibility to become subject matter experts and engineering innovators in an open-architecture environment, fostering intellectual growth along both interdisciplinary pathways and within the bounds of conventional engineering disciplines. With this approach, the program develops world-class researchers who can capitalize on the most promising discoveries and innovations, regardless of their origin within the engineering field, to develop interdisciplinary solutions for real-world challenges.

Imaging science: Imaging was named one of the top twenty engineering achievements of the 20th Century by the National Academies. Imaging has transformed our ability to see and understand a range of phenomena, keeping us healthy, protecting our security, monitoring the earth, exploring the universe, uncovering and preserving our heritage, enhancing communication, and facilitating our every day lives. The imaging science doctoral program is designed to provide a fundamental understanding of the physical, electro-optical, mathematical, computational, perceptual and statistical foundations of imaging science that are necessary to create, optimize, and apply imaging systems.

Mathematical modeling: Mathematical modeling is the process of developing mathematical descriptions of real-world systems that are used to understand and predict phenomena. Many current problems in science and technology are of such size and complexity that their solutions require sophisticated techniques drawn from computational and applied mathematics as well as the participation of mathematicians on the interdisciplinary teams of scientists that address them. This pioneering interdisciplinary program provides students the education they need to become experts in formulating complex problems mathematically, integrating data with models, devising and implementing algorithms and interpreting solutions, and communicating effectively with experts in various fields.

Mechanical and industrial engineering: The mechanical and industrial engineering doctorate program produces graduates with a depth of knowledge in mechanical or industrial engineering, while allowing students to engage in cutting-edge, cross-disciplinary research. The flexible curriculum encourages students to gain domain-specific knowledge from courses offered throughout the college's portfolio of engineering programs. The curriculum, coupled with depth of knowledge in mechanical or industrial engineering disciplines, creates graduates who are ready to tackle the world's most pressing societal and industrial challenges. The program develops world-class researchers who can capitalize on the most promising discoveries and innovations to develop interdisciplinary solutions for real-world challenges.

Microsystems engineering: The integration of entire systems into micron-scale devices and the sensing technology to interface these devices to the real world is the core emphasis of the microsystems engineering doctoral program. These systems are at the core of the next generation of technology. Within the past decade, microsystems (micro-optical, micro-electrical, and micro-mechanical systems) have emerged as a critical technology worldwide and this dynamic field is positioned for outstanding growth in the future.

Sustainability: The first program in the world to focus on sustainable production, the doctorate in sustainability focuses on sustainable production systems—systems that create goods and services using processes that are non-polluting; conserving of energy and natural resources; economically viable; and safe and healthful for workers, communities, and consumers. This program also serves to advance research and education in alternative-energy development, sustainable design, green product development, industrial ecology, and pollution prevention.

Leaders in research

Research is a driving force in the university, engaging more than 2,700 students in hands-on research opportunities in each of our colleges. These opportunities combine classroom learning with laboratory discovery, which enhances each student's education and builds powerful skills that are applicable in a wide range of career paths.

At the core of our doctoral programs is a focus on research, which is intensive and demanding. It is this successful resolution of societal problems that leads to deep professional and personal fulfillment as new discoveries are made and applications are developed. Ph.D. students from a range of academic backgrounds work with world-renowned faculty who are leaders in their fields of study. A focus on teamwork, research, and the intersection of the disciplines gives students the opportunity to collaborate with others, share ideas, and develop innovative solutions using emerging technologies.

We build on our strengths when creating doctoral programs, emphasize research across disciplines, and rely on our interdisciplinary faculty to produce the next generation of educators and researchers with the ability to develop solutions to real world problems.

RIT Research Centers and Organizations

RIT is home to more than 50 interdisciplinary research centers, institutes, and organizations that bring together faculty and students from across the university. These entities explore a wide range of topics and cover everything from business and entrepreneurship to biomedical sciences, nanolithography, printing, social computing, remanufacturing, microsystems fabrication, environmental sustainability, and visual perception. Learn more about RIT's key research centers and institutes online at rit.edu/research/centers-and-institutes.

College of Art and Design

Todd Jokl, Dean
rit.edu/artdesign

Programs of Study

The College of Art and Design offers the most comprehensive graduate imaging programs in the world, encompassing design, science, technology, engineering, management, crafts, fine arts, and art education. Six of our visual arts programs are among the top 12 in the nation. The college is a diverse, world-class collaboration of five schools: American Crafts, Art, Design, Film and Animation, and Photographic Arts and Sciences. Its scope gives students a perspective that can be found nowhere else—a place where some students create fine art using centuries-old methods while others push the edges of digital creativity. At no other university can students explore so many different aspects of the imaging fields to a high level of professional excellence. In addition, the college offers expertise in the professional operations of running a studio or gallery.

Please visit the college's website–**www.rit.edu/artdesign**–for in depth information on academics, faculty, facilities, research initiatives, advising, and more.

Admission requirements

Admission to graduate programs in the College of Art and Design requires a combination of academic performance and creative visual skills that are evaluated via a portfolio review. Faculty review each student's portfolio to evaluate creative visual skills as well as the potential for success in the student's selected program.

Portfolio requirements: The following MFA programs require the submission of a portfolio that is used to assess applicants' performance and academic capabilities: ceramics, film and animation, fine arts studio, glass, industrial design, metals and jewelry design, furniture design, photography and related media, and visual communication design. The MST in art education also requires a portfolio.

For the most up-to-date information on portfolio requirements, including requirements by program and submission information, please visit https://www.rit.edu/artdesign/portfolio-requirements.

Financial aid and scholarships

Please refer to the Financial Aid and Scholarship section of this bulletin for information regarding financial aid, scholarships, grants, loans, and graduate assistantships.

School for American Crafts

Ceramics, MFA

www.rit.edu/study/ceramics-mfa
Jane Shellenbarger, Associate Professor
jmssac@rit.edu

Program overview

The MFA in ceramics develops your intellectual and artistic thinking through an extensive curriculum. You will rigorously examine the work of historical and contemporary artists and craftspeople as you expand your knowledge of the techniques within the ceramics field. In-depth critiques give you a deep understanding of your own work as well as your peers to enhance your artistic expression and personal voice. Earning your degree in ceramics will deepen your understanding of aesthetics, forming processes, and fine art theory as it further enhances your career in ceramics.

What is Ceramics?

Ceramics is an artistic craft in which objects from earthenware, stoneware, and porcelain (including pottery, vases, bowls, sculptures, tiles, and more) are created and shapes using a mixture of clay, silica, feldspar and other materials. Once an object has been created, it is fired in a kiln, or a high temperature oven. Afterwards, may ceramic objects are then decorated with paints, glazes, and other finishing materials.

MFA in Ceramics

RIT's MFA in ceramics focuses on artistic development through an intensive teaching of the aesthetics and techniques of ceramic design. Graduate studio courses, seminar courses, and in-depth critiques, in conjunction with thesis planning and implementation, provide students with a deep understanding of not only their own work but the work of other students and their peers. Students examine the creativity, perceptions, aesthetics, and criticism of the work of contemporary artists and craftspeople in courses and discussions. Thesis reviews track students' progress towards the final thesis presentation, which is completed when a formal critique and evaluation is performed by the thesis committee.

Studio Residency Program

The School for American Crafts offers a Studio Residency Program for students in ceramics, furniture design, glass, and metals and jewelry design. Residence positions are limited and are awarded after the review of all applicants' portfolios, transcripts, and references. An interview is required. Accepted residents are required to register for one independent study credit during each semester of residence.

Accepted residents are expected to be present in their assigned studio during class hours and to contribute up to 10 hours of work per week in the main studio. These work hours are coordinated and overseen by the faculty in the resident's discipline. In exchange, the school will provide workspace, access to facilities, and supportive instruction. The resident is invited to participate in the full range of studio activities.

Participants may be those seeking additional studio experience prior to undergraduate or graduate study, early career professionals, or teachers on leave who wish to work again in an academic studio environment. The faculty in each discipline will make decisions concerning appropriate candidates.

Inquiries should be made to the Studio Residency Program, School for American Crafts, College of Art and Design, Rochester Institute of Technology, 73 Lomb Memorial Drive, Rochester, NY 14623-5603.

Experiential Learning

Cooperative Education and Internships

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Cooperative education, internships, and other experiential learning opportunities are optional but strongly encouraged for graduate students in the MFA in ceramics.

Curriculum

Ceramics, MFA degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
CCER-601	Ceramics Practice	6
CCER-611	Ceramic Processes	6
STAR-701	Technology in the Studio	3
STAR-702	Studio Art Research	3
STAR-714	Ideation and Series	3
	Open Electives	6
	Professional Elective	3
Second Year		
CCER-601	Ceramics Practice	6
CCER-611	Ceramic Processes	6
STAR-706	Business Practices for Studio Artists	3
STAR-718	Research Methods and Publication	3
STAR-790	Research and Thesis	3
STAR-890	Thesis	6
	Open Elective	3
Total Semester Credit Hours		**60**

Professional Electives

COURSE	
ARTH-600+	Any ARTH-600 level course or above
IDEA-705	Thinking About Making: The Practice of Art in a Global Society
IDEA-776	College Teaching and Learning
STAR-635	Curating and Managing Art Spaces
STAR-645	Art Exhibition Critique
STAR-758	Studio Art Critique

Admission requirements

To be considered for admission to the MFA program in ceramics, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college in a field of arts, sciences, or education.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.

- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a portfolio. Refer to Graduate Portfolio Requirements for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Furniture Design, MFA

www.rit.edu/study/furniture-design-mfa
Andy Buck, Professor
aabsac@rit.edu

Program overview

The master's in furniture design is structured to support your individual interests and aesthetic development. While engaging in the design and construction of a range of furniture objects, you will be challenged to advance your aesthetic, conceptual, and design sensibilities while simultaneously strengthening your building techniques and construction strategies. You will be exposed to a broad range of contemporary practices and creative approaches to design and art-making in support of experimentation, critical reflection, and the development of your personal aesthetic and design philosophy.

RIT's Master's in Furniture Design

The first year of the furniture design degree exposes you to a broad range of critical issues related to the conception and production of art, serves to inspire and provoke your critical reflection, and facilitates the development of your preliminary thesis topic. You will spend ample time creating work, while you strengthen your woodworking techniques, design fundamentals, and your sense of personal creative expression. In the second year, you will continue to refine your work aesthetic as you propose and fully engage in a thesis project. You will work with RIT's gallery coordinators and curators to install and exhibit a final body of work.

Furniture Design Scholarship Available

The Beth and Ira Nash Endowed Scholarship is available to qualified applicants applying to the master's in furniture design. Learn more about the Beth and Ira Nash Endowed Scholarship, including application deadlines and how to apply.

Studio Residency Program

The School for American Crafts offers a Studio Residency Program for students in ceramics, furniture design, glass, and metals and jewelry design. Residence positions are limited and are awarded after the review of all applicants' portfolios, transcripts, and references. An interview is required. Accepted residents are required to register for one independent study credit during each semester of residence.

Accepted residents are expected to be present in their assigned studio during class hours and to contribute up to 10 hours of work per week in the main studio. These work hours are coordinated and overseen by the faculty in the resident's discipline. In exchange, the school will provide workspace, access to facilities, and supportive instruction. The resident is invited to participate in the full range of studio activities.

Participants may be those seeking additional studio experience prior to undergraduate or graduate study, early career professionals, or teachers on leave who wish to work again in an academic studio environment. The faculty in each discipline will make decisions concerning appropriate candidates.

Inquiries should be made to the Studio Residency Program, School for American Crafts, College of Art and Design, Rochester Institute of Technology, 73 Lomb Memorial Drive, Rochester, NY 14623-5603.

Experiential Learning

Cooperative Education and Internships

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Cooperative education, internships, and other experiential learning opportunities are optional but strongly encouraged for graduate students in the MFA in furniture design.

Curriculum

Furniture Design, MFA degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
CWFD-601	Furniture Design Graduate Studio	12
STAR-701	Technology in the Studio	3
STAR-702	Studio Art Research	3
STAR-714	Ideation and Series	3
	Open Electives	6
	Professional Elective	3
Second Year		
CWFD-601	Furniture Design Graduate Studio	12
STAR-706	Business Practices for Studio Artists	3
STAR-718	Research Methods and Publication	3
STAR-790	Research and Thesis	3
STAR-890	Thesis	6
	Open Elective	3
Total Semester Credit Hours		**60**

Professional Electives

COURSE	
ARTH-600+	Any ARTH-600 level course or above
IDEA-705	Thinking About Making: The Practice of Art in a Global Society
IDEA-776	College Teaching and Learning
STAR-635	Curating and Managing Art Spaces
STAR-645	Art Exhibition Critique
STAR-758	Studio Art Critique

Admission requirements

To be considered for admission to the MFA program in furniture design, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college in a field of arts, sciences, or education.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a portfolio. Refer to Graduate Portfolio Requirements for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Glass, MFA

www.rit.edu/study/glass-mfa
David Schnuckel, Assistant Professor
585-208-0178, dassac@rit.edu

Program overview

Develop your personal creative voice through intensive research, discussion, critique, and experimentation in glass. In this glassblowing master's degree you are given full access to a complete glass facility and individual studio space. Graduate studio courses, seminar courses, and in-depth critiques give you a deeper understanding of the craft of glass as you design pieces that flourish your personal expression.

Glassblowing Classes, and More

The MFA in glass is a two-year program of study. An individual studio space serves to strengthen your technique and practice in designing glass artwork that reflects your personal expression of the medium. Graduate studio courses, seminar courses, and in-depth critiques are offered in conjunction with thesis planning and implementation to provide you with a deep understanding of glass. In addition to course work and creative production, you are exposed to a broad range of critical issues related to the conception and production of art, to inspire and provoke critical reflection and facilitate the development of a thesis exhibition and supporting documentation.

World-Class Glass Hot Shop and Facilities

You'll spend time creating in a range of top facilities designed for you to explore, learn, and develop your glass blowing and flameworking techniques. Many glassblowing classes take place in the Glass Hot Shop, where you will physically work with glass in its molten state in solid working, glass-blowing, and hot casting. In the Glass Flameworking Studio you'll work intimately with glass rod and tubing at the torch. The Glass Cold Shop is a studio designated for processes that alter glass after it has been annealed. Each student is also assigned a Glass Workspace, designated areas for our advanced-level glass majors to have their own personal studio space to support the development of their individual research interests and creative work.

Studio Residency Program

The School of Art and the School for American Crafts are seeking candidates interested in pursuing glass-related research while contributing to the creative community of the glass program and the College of Art and Design. Learn more about the Glass Studio Residency Program, including details on how to apply.

Experiential Learning

Cooperative Education and Internships

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Cooperative education, internships, and other experiential learning opportunities are optional but strongly encouraged for graduate students in the MFA in glass.

Curriculum

Glass, MFA degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
CGLS-601	Glass Graduate Studio: Concepts	6
CGLS-602	Glass Graduate Studio: Practice	6
STAR-701	Technology in the Studio	3
STAR-702	Studio Art Research	3
STAR-714	Ideation and Series	3
	Open Electives	6
	Professional Elective	3
Second Year		
CGLS-601	Glass Graduate Studio: Concepts	6
CGLS-602	Glass Graduate Studio: Practice	6
STAR-706	Business Practices for Studio Artists	3
STAR-718	Research Methods and Publication	3
STAR-790	Research and Thesis	3
STAR-890	Thesis	6
	Open Elective	3
Total Semester Credit Hours		**60**

Professional Electives

COURSE	
ARTH-600+	Any ARTH 600 level course or above
IDEA-705	Thinking About Making: The Practice of Art in a Global Society
STAR-635	Curating and Managing Art Spaces
STAR-645	Art Exhibition Critique
STAR-758	Studio Art Critique
IDEA-776	College Teaching

Admission requirements

To be considered for admission to the MFA program in glass, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college in a field of arts, sciences, or education.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a portfolio. Refer to Graduate Portfolio Requirements for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Metals and Jewelry Design, MFA

www.rit.edu/study/metals-and-jewelry-design-mfa
Juan Carlos Caballero-Perez, Professor
585-475-2654, jcc2390@rit.edu

Program overview

The MFA in metals and jewelry design is a professional degree for practicing artists, craftspeople, or designers who desire to leave a lasting impression on their fields through devotion to their work and the high standards of discipline and artistic ideals. By immersing yourself in soldering, fabrication, stone setting, silversmithing, forging, and casting, this jewelry design degree will develop your knowledge and deepen your experience working with different theories and materials while you are challenged to think unconventionally in order to redefine industry standards.

RIT's Jewelry Master's Degree

The MFA in metals and jewelry design is generally a two-year, full-time degree that involves the presentation of a thesis. You will spend ample time creating work as you strengthen your metals techniques, design fundamentals, and personal expression while also exploring the process of critical analysis of your studio work. You will also gain deep knowledge in gallery administration and operations, and you'll participate in gallery and museum visitations and research.

Jewelry Design Courses

The jewelry design degree provides you with broad exposure to metalworking techniques, expands your knowledge of applied design, strengthens perceptual and philosophical concepts, and develops your individual modes of expression. This sequence leads to a master's thesis, where you will work with RIT's gallery coordinators and curators to install and exhibit a final body of work you created over the course of the program. You will also learn the business side of art, including portfolio management, pricing, marketing strategies, and public relations–all skills needed by artists who embark on a professional career as a studio artist.

Studio Residency Program

The School for American Crafts offers a Studio Residency program for students in ceramics, furniture design, glass and metals and jewelry design. Residence positions are limited and are awarded after the review of all applicants' portfolios, transcripts, and references. An interview is required. Accepted residents are required to register for one independent study credit during each semester of residence.

Accepted residents are expected to be present in their assigned studio during class hours and to contribute up to 10 hours of work per week in the main studio. These work hours are coordinated and overseen by the faculty in the resident's discipline. In exchange, the school will provide workspace, access to facilities, and supportive instruction. The resident is invited to participate in the full range of studio activities.

Participants may be those seeking additional studio experience prior to undergraduate or graduate study, early career professionals, or teachers on leave who wish to work again in an academic studio environment. The faculty in each discipline will make decisions concerning appropriate candidates.

Inquiries should be made to the Studio Residency Program, School for American Crafts, College of Art and Design, Rochester Institute of Technology, 73 Lomb Memorial Drive, Rochester, NY 14623-5603.

Experiential Learning

Cooperative Education and Internships

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Cooperative education, internships, and other experiential learning opportunities are optional but strongly encouraged for graduate students in the MFA in metals and jewelry design.

Curriculum

Metals and Jewelry Design, MFA degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
CMTJ-601	Metals and Jewelry Design Graduate Studio	12
STAR-701	Technology in the Studio	3
STAR-702	Studio Art Research	3
STAR-714	Ideation and Series	3
	Open Electives	6
	Professional Elective	3
Second Year		
CMTJ-601	Metals and Jewelry Design Graduate Studio	12
STAR-706	Business Practices for Studio Artists	3
STAR-718	Research Methods and Publication	3
STAR-790	Research and Thesis	3
STAR-890	Thesis	6
	Open Elective	3
Total Semester Credit Hours		**60**

Professional Electives

COURSE	
ARTH-600+	Any ARTH-600 level course or above
IDEA-705	Thinking About Making: The Practice of Art in a Global Society
IDEA-776	College Teaching and Learning
STAR-635	Curating and Managing Art Spaces
STAR-645	Art Exhibition Critique
STAR-758	Studio Art Critique

Admission requirements

To be considered for the MFA program in metals and jewelry design, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college in a field of arts, sciences, or education.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a portfolio. Refer to Graduate Portfolio Requirements for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.

- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

School of Art

Fine Arts Studio, MFA

www.rit.edu/study/fine-arts-studio-mfa
Denton Crawford, Senior Lecturer
585-475-2649, denton@rit.edu

Program overview

The MFA in fine arts studio is committed to collaboration and interdisciplinary approaches both within the four major fine arts areas of study (painting, printmaking, sculpture, or expanded forms) and the entire College of Art and Design.

What is Fine Arts?

Fine arts refers to creating artwork through painting, sculpture, printmaking, illustration, expanded forms, and other visual arts. Those earning an MFA in fine arts work as artists, art educators, art instructors, curators, gallery directors, archivists, or administrators of arts and cultural institutions.

RIT's Master's in Fine Arts

The MFA in fine arts studio is a rigorous two-year program comprised of major studio courses; studio electives such as glass, ceramics, film, and photography; theory and research seminars; as well as thesis credits. The program's structure allows for personal growth, experimentation, collaboration, and unique, non-discipline-specific results to occur in the thesis, which is a public exhibition of the student's work. Courses are meant to concentrate on creative visual work while also thinking about making and sustaining a dialogue.

Experiential Learning

Cooperative Education and Internships

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Cooperative education, internships, and other experiential learning opportunities are optional but strongly encouraged for graduate students in the MFA in fine arts studio.

Curriculum

Fine Arts Studio, MFA degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
STAR-701	Technology in the Studio	3
STAR-702	Studio Art Research	3
STAR-714	Ideation and Series	3
	Major Studio Courses*	12
	Open Electives	6
	Professional Elective	3
Second Year		
STAR-706	Business Practices for Studio Artists	3
STAR-718	Research Methods and Publication	3
STAR-790	Research and Thesis	3
STAR-890	Thesis	6
	Major Studio Courses*	12
	Open Elective	3
Total Semester Credit Hours		**60**

* Students may choose any combination of the following major studio courses: Painting (PAIT-601), Printmaking (PRNT-601), Sculpture (SCUL-601), or Expanded Forms (SCUL-611).

Professional Electives

COURSE	
ARTH-600+	Any ARTH 600 level course or above
IDEA-705	Thinking About Making: The Practice of Art in a Global Society
IDEA-776	College Teaching and Learning
STAR-635	Curating and Managing Art Spaces
STAR-645	Art Exhibition Critique
STAR-758	Studio Art Critique

Admission requirements

To be considered for admission to the MFA program in fine arts studio, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college of fine arts.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a portfolio. Refer to Graduate Portfolio Requirements for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Non-toxic Printmaking, Adv. Cert.

www.rit.edu/study/non-toxic-printmaking-adv-cert
Elizabeth Kronfield, Professor
585-475-5762, edkfaa@rit.edu

Program overview

Technical training and retraining for artists and printmaking professionals seeking a comprehensive working knowledge of non-toxic printmaking techniques, including a study of methodology and aesthetic applications. In the advanced certificate in non-toxic printmaking, you'll learn the fundamentals of print creation, and applied skills for current and emerging industry and career demands. Students incorporate industry best practices and principles through the design and production of printmaking projects.

What is a Graduate Certificate?

A graduate certificate, also called an advanced certificate, is a selection of up to five graduate level courses in a particular area of study. It can serve as a stand-alone credential that provides expertise in a specific topic that enhances your professional knowledge base, or it can serve as the entry point to a master's degree. Some students complete an advanced certificate and apply those credit hours later toward a master's degree.

Curriculum

Non-toxic Printmaking, advanced certificate, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
PRNT-601	Printmaking I	6
PRNT-602	Photo Print Processes	3
STAR-678	Screenprinting	3
Total Semester Credit Hours		**12**

Admission requirements

To be considered for admission to the advanced certificate in non-toxic printmaking, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a BFA or MFA, or be recognized as a master printer or professional print maker.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Three letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a portfolio. Refer to Graduate Portfolio Requirements for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional

admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Visual Arts–All Grades (Art Education), MST

www.rit.edu/study/visual-arts-all-grades-art-education-mst
Lauren Ramich, Lecturer
585-475-7140, larfaa@rit.edu

Program overview

When does an artist become a teacher? The MST in visual arts-all grades (art education) prepares you to teach the next generation of artists and to create art experiences while honing your own artistic skills.

An Accelerated Visual Arts Education Program

RIT's art education master's degree is an accelerated visual arts education program. You will get a year of hands-on experience that will heavily mirror your life as an art educator. The program prepares you for a teaching career by embedding certifications and job placement support right into the curriculum. You will work with regional schools to find the best fit for your personality, talents, and teaching goals.

RIT's Art Education Master's Degree

In the MST degree, you'll complete course work in:

- child development in art and education,
- differentiated learning techniques for effective instruction in the diverse learning needs of all students,
- a range of perspectives on multicultural issues in the visual arts and education fields,
- the process of teaching art in the school classroom, including curriculum development and student assessment, and
- explore a range of perspectives on contemporary theories in art and education.

In addition, you will complete a student teaching practicum designed to provide you with in-depth pedagogical experiences, real-world challenges, and rich learning opportunities.

RIT's art education master's degree leads to initial/professional New York State certification in visual arts for grades K through 12. This certification allows applicants to teach in New York state public schools. The program prepares students to meet the national, state, and regional need for teachers of the visual arts and is designed for accomplished art educators and advocates for art and learning in all grades. The program is nationally accredited and is for teachers in art education who hold a BFA or BA (art major) degree. Classes begin each August and conclude in May. Graduates of RIT's MST degree have a 96 percent pass rate on the New York State Teacher Certification Examinations.

Curriculum

Visual Arts-All Grades (Art Education), MST degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
ARED-701	Child Development in Art	3
ARED-702	Inclusive Art Education: Teaching Students with Disabilities in the K-12 Art Classroom	3
ARED-703	Multicultural Issues in Art and Education	3
ARED-704	Methods in Teaching and Learning	3
ARED-705	Methods II: Studio Thinking	3
ARED-711	Professional Practices in Art Education	3
ARED-790	Student Teaching	9
ARED-890	Graduate Seminar in Art Education	6
	CAD Studio Elective	3
Total Semester Credit Hours		**36**

Accreditation

The visual arts–all grades program maintains Initial Program accreditation from the Council for the Accreditation of Educator Preparation (CAEP). The program's most recent CAEP accreditation approval was spring 2021. Reporting outcomes and student achievement data are available for review.

Admission requirements

To be considered for admission to the MST program in visual arts–all grades (art education), candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college with a major concentration in art, art education, arts technology education, photography, or new media.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a portfolio. Refer to Graduate Portfolio Requirements for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

School of Design

Industrial Design, MFA

www.rit.edu/study/industrial-design-mfa
Alex Lobos, Professor
585-475-7417, Alex.Lobos@rit.edu

Program overview

Form, function, and experience tell a story of considered design and the best possible outcome. The industrial design master's will enhance your career success by further developing your knowledge in design processes and technology. This project-based program allows you to explore design theory, design history, and human-centered design. You will conduct unique research on various topics of interest, which will further your understanding of the industry and society. As you conclude your studies, you will obtain hands-on experience in technical competence, analytical thought, sustainability, and transdisciplinary collaboration, all key to fueling your career.

RIT's Master's in Industrial Design

The industrial design MFA is for career enhancement or redirection. The educational experience is project-oriented, requiring research into design methods and technologies. Cross-disciplinary collaboratives provide an experiential dimension.

The first year of study includes seminar courses in design history and research, which are common to all graduate students in the School of Design. In addition, studio courses involve extensive design work with respect to sustainability, design process, the meaning of artifacts, and critical analysis. Additional course work using three-dimensional software for modeling and fabrication fills out the program.

In the second year students conduct research and develop a thesis project, which is presented in a graduate thesis exhibition or presentation, and is documented in a written thesis report.

Experiential Learning

Cooperative Education and Internships

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Cooperative education, internships, and other experiential learning opportunities are optional but strongly encouraged for graduate students in the MFA in industrial design.

Creative Industry Day

RIT's Office of Career Services and Cooperative Education hosts Creative Industry Day, which connects students majoring in art, design, film and animation, photography, and select computing majors with companies, organizations, creative agencies, design firms, and more. You'll be able to network with company representatives and interview directly for open co-op and permanent employment positions.

Curriculum

Industrial Design, MFA degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
IDDE-607	Technology Studio	3
IDDE-701	Design Laboratory I	3
IDDE-702	Design Laboratory II	3
IDDE-703	Function of Form	3
IDDE-704	Form of Function	3
IDDE-705	2D Ideation and Visualization	3
IDDE-706	Integrated Design Visualization	3
IDDE-710	Industrial Design History, Theory and Culture	3
IDDE-711	Design Research and Proposals	3
	Open Elective	3
Second Year		
IDDE-671	Graduate ID Studio I	3
IDDE-672	Graduate ID Studio II	3
IDDE-790	Thesis: Research and Planning	6
IDDE-890	Thesis: Implementation and Evaluation	6
	Open Electives	9
	Art History Elective*	3
Total Semester Credit Hours		**60**

* Art History Elective refers to any graduate level non-studio course searchable in SIS with the Art History attribute of ARTH.

Admission requirements

To be considered for admission to the MFA program in industrial design, candidates must fulfill the following requirements:

- Complete a graduate application.
- Hold a baccalaureate degree (or equivalent) from an accredited university or college.
- Submit official transcripts (in English) of all previously completed undergraduate and graduate course work.
- Submit a portfolio of work that demonstrates strong design skills, visual sophistication, and aesthetic awareness. (Refer to Graduate Portfolio Requirements for more information.)
- Submit a personal statement of educational objectives detailing the professional goals the candidate wishes to achieve, and the attributes the candidate brings to graduate study.
- Submit three letters of recommendation from academic or professional sources.
- Submit a current resume or curriculum vitae.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Integrative Design, MS

www.rit.edu/study/integrative-design-ms
Stan Rickel, Associate Professor
585-475-4745, srrfaa@rit.edu

Program overview

The integrative design program enables students with artistic, technical, engineering, and management backgrounds to study and successfully engage with creative development teams. This one-year design master's degree develops your understanding of the theories, methods, and processes of design and their application in product and service development.

A Design Master's Degree

The MS in integrative design establishes a variety of creative design thinking techniques in areas such as systems thinking, brainstorming, immersions, contextual relevance, and empathy–all of which will be used to develop an in-depth understanding of the design process, the product/service life cycle, product/service feasibility, and the integration of social responsibility in product/service design. The program enables students with artistic, technical, engineering, and management backgrounds to study and successfully engage within creative development teams.

Experiential Learning

Cooperative Education and Internships

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Cooperative education, internships, and other experiential learning opportunities are optional but strongly encouraged for graduate students in the MFA in integrative design.

Curriculum

Integrative Design, MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
INGD-721	Elements and Methods	3
INGD-722	Emotion and Implementation	3
INGD-726	Visualization I: Development	3
INGD-727	Visualization II: Communication	3
INGD-731	Design Studio I: Concepts	3
INGD-732	Design Studio II: Capstone	3
	Open Electives	12
Total Semester Credit Hours		**30**

Admission requirements

To be considered for admission to the MS in integrative design program, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Visual Communication Design, MFA

www.rit.edu/study/visual-communication-design-mfa
Adam Smith, Associate Professor
585-475-4552, aesfaa@rit.edu

Program overview

This visual communication degree offers a comprehensive opportunity to investigate the intersection of graphic, interaction, and motion design. You will focus on conceptualizing and creating user-centered design wherever there is a screen or digital experience. This can include mobile phones, automotive instrument panels, medical devices, wearables, and more. This major reinforces the importance of user experience design by combining insight from all areas of design. Choose to focus your studies or combine course sequences from communication design, interaction design, motion design, and design studies. By combining historical, communication and aesthetic theory, principles, and creativity, your work will anticipate design evolution and lead innovation.

The MFA in visual communication design focuses on all areas of design, including graphic design, user experience/interaction design, design studies, motion graphics, and 3D digital design. The changing landscape of people's everyday interactions has blurred the lines between respected design fields, giving designers new responsibilities to shape experiences. The MFA program embraces this new technology through its curriculum, which addresses these merging skill sets.

An Integrated Visual Communication Design Degree

The MFA in visual communication design provides a learning environment for the advancement in innovative research, user-centered design, and professional practice by focusing on the creative potentials of visual communication through a full spectrum of media. You will advance your design knowledge and technical skills by choosing an option in communication design, interaction design, or motion and 3D digital design.

The cross-disciplinary nature of the program offers a greater potential to foster innovation and creativity in visual communication design. The program reflects the current views and changes occurring in the professional design field. The skill sets required of graphic, interactive, and digital design have now crossed over and are interrelated.

Experiential Learning

Cooperative Education and Internships

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Cooperative education, internships, and other experiential learning opportunities are optional but strongly encouraged for graduate students in the MFA in visual communication design.

Creative Industry Day

RIT's Office of Career Services and Cooperative Education hosts Creative Industry Day, which connects students majoring in art, design, film and animation, photography, and select computing majors with companies, organizations, creative agencies, design firms, and more. You'll be able to network with company representatives and interview directly for open co-op and permanent employment positions.

Curriculum

Visual Communication Design, MFA degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
VCDE-701	Design History Seminar	3
VCDE-706	3D Modeling and Motion	3
VCDE-707	Web and UI Design	3
VCDE-708	Typography	3
VCDE-709	Digital Design in Motion	3
VCDE-712	Design Studies Seminar	3
Choose one of the following:		3
VCDE-718	Project Design and Implementation	
VCEE-722	Design Praxis I	
	Professional Electives	6
	Open Elective	3
Second Year		
VCDE-746	Professional Practices	3
VCDE-790	Thesis Research and Planning	3
VCDE-890	Thesis: Implementation and Evaluation	6
	Professional Electives	9
	Open Electives	9
Total Semester Credit Hours		**60**

Professional Electives

COURSE	
IGME-609	Programming for Designer
VCDE-617	Experimental Workshop
VCDE-621	Character Design and Rigging
VCDE-622	3D Environment Design
VCDE-626	Physical Interface Design
VCDE-627	Real Time Design
VCDE-628	3D Particles and Dynamics
VCDE-633	Hard Surface Modeling
VCDE-636	3D Motion Design
VCDE-702	Material and Methods for Advanced Graphics
VCDE-717	Design Systems
VCDE-723	Interaction Design
VCDE-726	Design Praxis II
VCDE-728	Motion Graphics
VCDE-731	3D Visual Design
VCDE-732	Branding and Identity Design
VCDE-733	Digital Media Integration
VCDE-736	Design Systems Intensive
VCDE-737	UX Design Strategies
VCDE-741	Experiential Graphic Design
VCDE-742	Information Design
VCDE-799	Visual Communication Design Independent Study

Admission requirements

To be considered for admission to the MFA program in visual communication design, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a portfolio. Refer to Graduate Portfolio Requirements for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Portfolio

The portfolio, along with written records of achievements and recommendations, serves to inform the faculty of the applicant's readiness for advanced graduate study. It provides understanding into the applicant's performance to date, ability to create advanced, self-directed work and his/her aesthetic development and maturity. Please visit the Graduate Portfolio Requirements page to learn more about portfolio requirements and submission information.

School of Film and Animation

Film and Animation, MFA

www.rit.edu/study/film-and-animation-mfa
Kevin Bauer, Lecturer
585-475-7403, kmbpph@rit.edu

Program overview

The film and animation MFA is supported by highly specialized faculty from RIT's photography, imaging science, computer science, information technology, and design programs. This program is offered by the School of Film and Animation which houses state-of-the-art facilities, including full production facilities.

While achieving your master's in film and animation, you will join a collaborative environment with highly-trained faculty and state-of-the-art production facilities. The program is connected to MAGIC Spell Studios, which offers you industry and commercial experience as you pursue your degree.

RIT's Film and Animation Master's Degree

The MFA in film and animation offers four options:

1. 2D Animation: Concentrate on both traditional or digital animation as well as stop-motion animation. Courses focus on teaching the fundamentals of animation, 2D mechanics, all aspects of pre-production, and stop-motion fabrication techniques.
2. 3D Animation: Learn all aspects of the 3D animation pipeline. Courses focus on 3D animation, modeling, lighting, texturing, and rendering. You may also explore working in VR or with virtual production techniques.
3. Production: Develop and refine your creative approach to fictional narrative, documentary, and experimental live-action filmmaking. Courses focus on directing, sound recording, screenwriting, cinematography, and editing.
4. Screenwriting: Learn the craft of storytelling in relation to feature, short, and series-length screenplays. Courses focus on short-film production, history, theory, and writing techniques.

All four options require two years of course work and a third year focused on a thesis film or script. All students create and screen finished films in their first two years.

Electives: Elective courses are available in animation, film, video, multimedia, screenwriting, printmaking, painting, sculpture, communication design, museum studies, crafts, bookmaking, typography, color photography, new media, studio photography, advertising photography, perception, gaming, computer graphics, art history, and archival preservation and conservation. There are also opportunities for independent studies, internships, and concentrations.

Thesis: Specific instructions pertaining to the thesis are available in the "MFA Guide for Students and Faculty: Policy Regarding Student Work." The School of Film and Animation reserves the right to retain copies of student-produced films to be used for educational purposes, to show to prospective students, and as examples of student productions.

Screenings: Screenings are required for all student-produced films and are coordinated through the professor or the thesis chair.

Experiential Learning

Cooperative Education and Internships

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Cooperative education, internships, and other experiential learning opportunities are optional but strongly encouraged for graduate students in the MFA in film and animation.

Curriculum

Film and Animation (2D animation option), MFA degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
SOFA-603	2D Animation I: Fundamentals	3
SOFA-605	Basic Sound Recording	3
SOFA-610	Graduate Seminar	2
SOFA-611	History and Aesthetics of Animation	3
Choose one of the following:		3
SOFA-615	3D Animation Fundamentals	
SOFA-617	Stop Motion Puppet Fundamentals	
SOFA-622	30 Second Film	3
SOFA-625	Animated Acting Principles	3
SOFA-627	Pre-Production for Animators	3
SOFA-628	Animation Writing and Visual Storytelling	3
Choose one of the following:		3
SOFA-623	Stop Motion Master Class	
SOFA-748	Concept and Character Design	
SOFA-630	Animation Film Language	2
Second Year		
Choose one of the following:		3
SOFA-604	2D Animation II: Mechanics	
SOFA-652	Alternative Frame by Frame	
SOFA-618	Business and Careers in Animation	3
SOFA-676	After Effects for Animators	3
SOFA-717	Animation Workshop	4
SOFA-780	Thesis Preparation Seminar	1
	Open Electives	6
	Professional Electives	6
Third Year		
SOFA-790	Research and Thesis I	4
SOFA-890	Research and Thesis II	4
Total Semester Credit Hours		**65**

Professional Electives

COURSE	
SOFA-620	3D Modeling Mastery
SOFA-638	Complete 3D Character Creation
SOFA-644	Cinematic Compositing
SOFA-652	Alternative Frame by Frame
SOFA-665	Creative Research Workshop
SOFA-684	Animation Gesture
SOFA-616	Virtual Production I
SOFA-629	Experimental Animation

Film and Animation (3D animation option), MFA degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
SOFA-605	Basic Sound Recording	3
SOFA-610	Graduate Seminar	2
SOFA-611	History and Aesthetics of Animation	3
Choose one of the following:		3
SOFA-603	2D Animation I: Fundamentals	
SOFA-617	Stop Motion Puppet Fundamentals	
SOFA-615	3D Animation Fundamentals	3
SOFA-622	30 Second Film	3
SOFA-625	Animated Acting Principles	3
SOFA-627	Pre-Production for Animators	3
SOFA-628	Animation Writing and Visual Storytelling	3
SOFA-630	Animation Film Language	2
SOFA-695	Advanced 3D Animation	3
Second Year		
SOFA-618	Business and Careers in Animation	3
Choose one of the following:		3
SOFA-675	3D Lighting and Texturing	
SOFA-652	Alternative Frame by Frame	
SOFA-676	After Effects for Animators	3
SOFA-717	Animation Workshop	4
SOFA-780	Thesis Preparation Seminar	1
	Professional Electives	6
	Open Electives	6
Third Year		
SOFA-790	Research and Thesis I	4
SOFA-890	Research and Thesis II	4
Total Semester Credit Hours		**65**

Professional Electives

COURSE	
SOFA-620	3D Modeling Mastery
SOFA-638	Complete 3D Character Creation
SOFA-644	Cinematic Compositing
SOFA-652	Alternative Frame by Frame
SOFA-665	Creative Research Workshop
SOFA-681	Particle Effects and Dynamics
SOFA-684	Animation Gesture
SOFA-616	Virtual Production I
SOFA-629	Experimental Animation

Film and Animation (production option), MFA degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
SOFA-602	Production Processes	6
SOFA-605	Basic Sound Recording	3
SOFA-606	Graduate Directing	3
SOFA-610	Graduate Seminar	2
SOFA-613	Graduate Screenwriting	3
SOFA-621	Spring Film	3
SOFA-626	Writing the Short	3
	Professional Elective	3
	History and Aesthetics Elective	3
Second Year		
SOFA-614	Business and Careers in Film	3
SOFA-678	Cinematography and Lighting I	3
SOFA-721	Fall Film	3
SOFA-733	Hybrid Forms: Theory and Practice	3
SOFA-780	Thesis Preparation Seminar	1
	History and Aesthetics Elective	3
	Professional Electives	6
	Open Electives	6
Third Year		
SOFA-790	Research and Thesis I	4
SOFA-890	Research and Thesis II	4
Total Semester Credit Hours		**65**

History and Aesthetics Electives

COURSE	
ARTH-600+	Any ARTH-600 level course or above
PHGR-701	Histories and Aesthetics of Photography I
PHGR-702	Histories and Aesthetics of Photography II
SOFA-642	History and Aesthetics: Animation Stories
SOFA-660	Documentary Film History
SOFA-661	New Documentary Issues
SOFA-662	Film History
SOFA-691	Film Sound Theory Music
SOFA-692	Film Sound Theory: Effects
SOFA-693	Film Sound Theory:Voice

Professional Electives

COURSE	
SOFA-607	Advanced Directing
SOFA-635	Acting for Film
SOFA-641	Advanced Sound Recording
SOFA-644	Cinematic Compositing
SOFA-652	Alternative Frame by Frame
SOFA-655	Film Practice
SOFA-657	Digital Color Correction
SOFA-665	Creative Research Workshop
SOFA-670	30 Second Commercial Production
SOFA-671	Advanced Production Immersion
SOFA-672	Mixing and Sound Design
SOFA-678	Cinematography and Lighting I
SOFA-682	Underwater Cinematography
SOFA-683	Advanced Editing
SOFA-689	Cinematography and Lighting II
SOFA-616	Virtual Production I

Film and Animation (screenwriting option), MFA degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
SOFA-602	Production Processes	6
SOFA-605	Basic Sound Recording	3
SOFA-606	Graduate Directing	3
SOFA-610	Graduate Seminar	2
SOFA-613	Graduate Screenwriting	3
SOFA-621	Spring Film	3
SOFA-626	Writing the Short	3
	History and Aesthetics Elective	3
	Professional Elective	3
Second Year		
SOFA-614	Business and Careers in Film	3
SOFA-663	Writing the Feature	3
SOFA-664	Writing the Series	3
SOFA-721	Fall Film	3
SOFA-733	Hybrid Forms: Theory and Practice	3
SOFA-780	Thesis Preparation Seminar	1
	History and Aesthetics Electives	6
	Open Electives	6
Third Year		
SOFA-790	Research and Thesis I	4
SOFA-890	Research and Thesis II	4
Total Semester Credit Hours		**65**

History and Aesthetics Electives

COURSE	
ARTH-600+	Any ARTH-600 level course or above
PHGR-701	Histories and Aesthetics of Photography I
PHGR-702	Histories and Aesthetics of Photography II
SOFA-642	History and Aesthetics: Animation Stories
SOFA-660	Documentary Film History
SOFA-661	New Documentary Issues
SOFA-662	Film History
SOFA-691	Film Sound Theory Music
SOFA-692	Film Sound Theory: Effects
SOFA-693	Film Sound Theory:Voice

Professional Electives

COURSE	
SOFA-607	Advanced Directing
SOFA-635	Acting for Film
SOFA-641	Advanced Sound Recording
SOFA-644	Cinematic Compositing
SOFA-652	Alternative Frame by Frame
SOFA-655	Film Practice
SOFA-657	Digital Color Correction
SOFA-665	Creative Research Workshop
SOFA-670	30 Second Commercial Production
SOFA-671	Advanced Production Immersion
SOFA-672	Mixing and Sound Design
SOFA-678	Cinematography and Lighting I
SOFA-682	Underwater Cinematography
SOFA-683	Advanced Editing
SOFA-689	Cinematography and Lighting II
SOFA-616	Virtual Production I

Admission requirements

To be considered for admission to the MFA in film and animation, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a portfolio. Refer to Graduate Portfolio Requirements for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Students who are evaluated to have MFA potential but need additional study in preparation for graduate courses will be advised to take such courses either prior to entrance or during their first year of study.

All correspondence concerning application materials as well as all submissions deadlines should be addressed to the Office of Graduate and Part-time Enrollment.

Transfer Credit

Graduate-level course work taken prior to admission should be submitted for approval upon entrance into the program. Up to 8 semester credit hours of graduate work with a grade of B or better is transferable and may be counted toward the MFA degree, with the approval of the graduate faculty.

School of Photographic Arts and Sciences

Media Arts and Technology, MS

www.rit.edu/study/media-arts-and-technology-ms
Bob Rose, Assistant Professor
rmrpph@rit.edu

Program overview

Graphic communication increases a business's effectiveness in communicating ideas, instructions, and concepts. Today's organizations need professionals who understand the value of information design and recognizes the many ways it can be used to positively impact the bottom line. In the media arts and technology program, you will learn to leverage emerging digital technologies to your advantage. With a management focus, technical expertise, and comprehensive knowledge of how to drive the graphics process from concept through completion, you will be an attractive prospect in a wide range of industries, including education, engineering, marketing, research science, human resources, public relations, and more.

A Media Master's Degree Designed for Today's Digital Environment

Media arts and technology is a one-year media master's degree in which you will develop relevant knowledge and skills with a technical emphasis and a business-oriented approach. You will learn to recognize new ways of operating and identifying emerging technologies to meet and exceed evolving market demands, and you'll become a leader in the improvements of cross-media products and processes. The program provides you with the ability to create meaningful and measurable changes in graphic communications through applied cross-media initiatives. The degree requires a capstone project that allows you to develop and demonstrate in-depth knowledge in a specific topic area. Led by senior faculty, the capstone project is designed to prepare you to showcase your knowledge of innovation in today's rapidly evolving media landscape.

Digital Media Courses

The media arts and technology degree includes a curriculum that concentrates on the latest digital technologies, processes, and strategies that allow you to employ a deep knowledge of print, web, mobile, and social media workflows to solve communication problems. You will:

- understand the creation, workflow, and output of digital media files, using a range of media devices including digital cameras, smartphones, 2D/3D scanners, and audio and video recording devices;
- gain an overview of critical trends and issues related to the graphic communications and imaging industries;
- explore and understand digital asset and content management;
- learn concepts in project management as they apply to leading cross-media projects and teams; and
- examine how media has evolved and how it has responded to changes in digital technology and social habits.

Elective courses enable you to explore additional areas of interest in graphic communication, media arts and sciences, and digital technologies. The diverse expertise of our faculty assures a breadth of relevant experience on issues and trends across the graphic communications field. The program aims to create a collaborative environment where you will combine course work with access to faculty expertise, staff support, and extensive facilities to extend your current knowledge base.

As part of RIT's media master's degree, you'll complete a capstone project, which enables you to design, develop, and demonstrate your extensive knowledge in a specific topic related to graphic communications. You'll complete original work through experiments, comprehensive case studies, surveys, focus groups, and research analysis. Outcomes from the capstone experience result in tangible solutions, such as the innovation of a process, recognizing unmet customer needs, solving cross-media issues, or identifying resources required for business transformation or media solutions.

Experiential Learning

Cooperative Education

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Cooperative education is optional but strongly encouraged for graduate students in the MS in media arts and technology.

Curriculum

Media Arts and Technology, MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
PHMS-611	Media Foundations: The Digital File	3
PHMS-623	Leadership in Creative Spaces	3
PHMS-711	Industry Issues, Trends, and Opportunities	3
PHMS-721	Implementing Imaging Business Change	3
PHMS-731	Digital Content Management	3
PHMS-743	Contemporary Media and Communications	3
PHMS-746	Capstone I	3
PHMS-747	Capstone II	3
PPRT-703	Cross Media Workflow	3
	Open Elective	3
Total Semester Credit Hours		**30**

Admission requirements

To be considered for admission to the MS program in media arts and technology, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Photography and Related Media, MFA

www.rit.edu/study/photography-and-related-media-mfa

Ahndraya Parlato, Lecturer
adpppph@rit.edu

Program overview

RIT's graduate degree in photography emphasizes an expansive interpretation of photography as a conceptual art form, with the intention of engaging and nurturing the individuality of each student in their continued development as innovative, critical artists in the world. Successful completion of the MFA in photography enables you to become a successful visual artist and to seek careers in education, archives, museum or gallery work, and as a professional photographer.

MFA in Photography

RIT's MFA in photography is among the best photo schools in the country. We are ranked 6th by U.S. News & World Report (2022) as one of the best fine arts school for a graduate degree in photography.

In the photography MFA, you'll refine your technical and artistic photographic skills while you create a new body of work. Ample time is spent creating work and refining your personal artistic vision. Elective courses are available in dynamic areas such as video, printmaking, painting, sculpture, communication design, crafts, bookmaking, graphic design, new media, computer graphics, art history, and archival preservation and conservation. Students also have opportunities to enhance their studies through independent studies and internships.

Graduate Photography Thesis

Your MFA in photography culminates in a graduate thesis exhibition, where you will install and exhibit an original body of work. The thesis publication is documentation of the thesis project, which must be submitted in digital form. It must contain an extended artist statement and a presentation of the majority of thesis artwork. The thesis defense is a public presentation made by the student, in explanation of the thesis project, creative research, and exhibition.

Photography Faculty

Eleven full-time faculty members, all critically regarded for their artistic work in exhibition and publication, contribute to the MFA in photography. The faculty brings individual expertise and dedication to their work with graduate students, encouraging intellectual inquiry of contemporary art-making practices and aesthetics. The MFA in photography is supported by a staff of 30 full-time faculty members from the RIT's School of Photographic Arts and Sciences and School of Art; adjunct faculty members from George Eastman Museum; as well as noted regional, national, and international practitioners, critics, and historians.

World-Class Photography Studios and Facilities

You'll spend time creating in a range of top facilities designed for you to explore, learn, and develop your photography skills and techniques. The William Harris Gallery supports the exhibition of graduate thesis work, student work, and the works of contemporary image-makers. It maintains a calendar of exhibitions, public lectures, and receptions. Importantly, it also provides real-world experience for graduate students to learn firsthand about gallery operations, installation, and marketing and communications as a gallery manager or staff member.

The Photo Cage puts state-of-the-art photography equipment right at your fingertips. It includes a range of equipment you can checkout for your use, including cameras (DSLR, film, medium- and large-format), video cameras, and camera accessories including lights, audio recorders, computers, monitors, tripods, rigs, cine rails, and more.

In addition to gallery spaces, students have open access to dedicated studio spaces and world-class imaging equipment, including:

- Professional gallery spaces
- Kreonite analog color processor
- Lambda digital chromogenic processor
- Alternative process facilities and chemicals
- Black and white and color darkrooms
- Lighting studios
- 35mm, medium, and large format film cameras
- 35mm and medium format digital cameras
- Video equipment, such as Ronin stabilizers, dollies, and more
- Sound equipment and dedicated recording studio
- Access to printmaking, glass, woodshop, and other art-making facilities

Experiential Learning

Cooperative Education and Internships

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Cooperative education, internships, and other experiential learning opportunities are optional but strongly encouraged for graduate students in the MFA in photography and related media.

Curriculum

Photography and Related Media, MFA degree, typical course sequence

COURSES		SEMESTER CREDIT HOURS
First Year		
PHGR-701	Histories and Aesthetics of Photography I	3
PHGR-702	Histories and Aesthetics of Photography II	3
PHGR-703	Studio Core I	6
PHGR-704	Studio Core II	6
PHGR-716	Integrated Practices I	3
	CAD Studio Elective*	3
	Professional Elective**	3
	Open Elective	3
Second Year		
PHGR-721	Research Core I	3
PHGR-723	Research Core II	3
PHGR-724	Professional Development for the Emerging Artist	3
PHGR-890	Thesis	12
	Open Electives	9
Total Semester Credit Hours		**60**

* CAD Studio Elective refers to any graduate level course in the College of Art and Design that includes a studio component.
** Professional Elective refers to graduate studio courses offered in the Photography and Related Media program (PHGR).

Accreditation

The MFA program in photography and related media is accredited by the National Association of Schools of Art and Design (NASAD).

Admission requirements

To be considered for admission to the MFA program in photography and related media, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Three letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a portfolio. Refer to Graduate Portfolio Requirements for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- Participate in an individual interview.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Applicants who are capable of graduate level academic work, as well as artistic visual expression, and who demonstrate an interest in the exploration of new artistic ideas and experiences will be recommended.

Transfer Credit

Graduate-level course work completed prior to admission should be submitted for approval upon entrance into the program. Up to 12 semester hours of graduate work with a minimum grade of a B (3.0) or higher is transferable toward the degree, with the approval of the graduate director.

Scholarships and Graduate Assistantships

All accepted applicants are awarded a university scholarship. Level of scholarship support is based on merit of application materials. Concurrently, the MFA program faculty grants graduate assistantships to accepted applicants. Assistantships include a variety of positions, including team teaching introductory photography courses, faculty assistantships in the classroom and with research projects, gallery management, and working in an archive. Upon acceptance into the MFA program, applicants are notified by the MFA director as to level of support for both the university scholarship and the graduate assistantship. Both scholarship and assistantship are renewable in the second year of graduate study if students remain in good standing with the university.

Faculty

Dean's Office

Todd Jokl, BA, Yale University; MFA, University of Connecticut; Ed.D., Southern Connecticut State University—Dean, Professor

Chris B. Jackson, BFA, Alfred University; MFA, Rochester Institute of Technology—Senior Associate Dean; Professor

Christine Shank, BFA, Miami University; MFA, Texas Woman's University—Associate Dean of Undergraduate Studies; Associate Professor

School for American Crafts

Andy Buck, BA, Virginia Commonwealth University; MFA, Rhode Island School of Design—Graduate Director, School for American Crafts; Professor

Juan Carlos Caballero-Perez, BFA, MFA, Rochester Institute of Technology—Professor

Héctor Carmona-Miranda, AAS, Austin Community College; BFA, University of Texas at Austin; MFA, Texas Tech University—Visiting Lecturer

Robin Cass, BFA, Rhode Island School of Design; MFA, State University of New York College of Ceramics at Alfred University—Professor

Rolf Hoeg, AOS, BS, Rochester Institute of Technology; MFA, Vermont College of Fine Arts—Lecturer

Albert Paley, BFA, MFA, Temple University; Ph.D. (honorary), University of Rochester—Artist-in-Residence, Charlotte Fredericks Mowris Chair in Contemporary Crafts

Suzanne Peck, BA, The Colorado College; MFA, Rhode Island School of Design—Lecturer

David Schnuckel, BA, Anderson University; MFA, Rochester Institute of Technology—Assistant Professor

Jane Shellenbarger, BFA, Kansas City Art Institute; MFA, Southern Illinois University at Edwardsville—Undergraduate Program Director, Studio Arts; Associate Professor

School of Art

Donald Arday, BFA, Cleveland Institute of Art; MFA, Syracuse University—Professor

Eileen Feeney Bushnell, BFA, University of Massachusetts at Amherst; MFA, Indiana State University—Professor

Denton Crawford, BFA, University of South Florida; MFA, University of Georgia—Graduate Director, Fine Arts Studio; Senior Lecturer

Robert Dorsey, BFA, Rochester Institute of Technology; MFA, Syracuse University—Professor

Allen Douglas, BFA, Syracuse University; Illustration Master Class, Amherst College—Lecturer

Craig Foster, BFA, University of Michigan; MS, Medical College of Georgia at Augusta University—Undergraduate Program Co-Director, Medical Illustration; Assistant Professor

Emily Glass, BFA, State University College at Potsdam; MFA, Kansas State University—Senior Lecturer

Chad Grohman, BFA, Rochester Institute of Technology; MFA, University of Hartford—Undergraduate Program Director, Illustration; Assistant Professor

Jeff Harter, BFA, State University of New York at Buffalo; MA, Syracuse University—Assistant Professor

Glen R. Hintz, BA, Lafayette College; MS, The Medical College of Georgia—Undergraduate Program Co-Director, Medical Illustration; Associate Professor

Elizabeth Kronfield, BFA, Bowling Green State University; MFA, University of Georgia—School Director, School of Art and School for American Crafts; Professor

Christina Leung, BA, Miami University of Ohio; MFA, Cornell University—Visiting Assistant Professor

Heidi Nickisher, BA, University of California at Santa Barbara; MA, California State University, Fullerton; Ph.D., University of Buffalo—Principal Lecturer

Peter Pincus, BFA, MFA, New York State College of Ceramics at Alfred University—Assistant Professor

Lauren Ramich, BFA, MST, MFA, Rochester Institute of Technology—Graduate Director, Visual Arts—All Grades; Lecturer

Luvon Sheppard, BFA, MST, Rochester Institute of Technology—Professor

Nicholas Sweet, BFA, California Institute of the Arts; MA, University of Alaska Fairbanks—Visiting Lecturer

Sarah Thompson, BA, University of California at San Diego; MA, Ph.D., University of California at Santa Barbara—Associate Professor

Henry Uhrik, BA, Kenyon College; MFA, Washington University in St. Louis—Visiting Lecturer

Daniel Worden, BA, Texas Christian University; MA, Ph.D., Brandeis University—Associate Professor

Clifford Wun, BFA, Rhode Island School of Design; MFA, Maryland Institute College of Art—Associate Professor

School of Design

Jason Arena, BS, University of Buffalo; MFA, Pratt Institute—Undergraduate Program Co-Director, New Media Design; Associate Professor

Bryce Beamer, BS, MS, Philadelphia University—Assistant Professor

Deborah Beardslee, BFA, Syracuse University; MFA, Virginia Commonwealth University—Associate Professor

Peter Byrne, MFA, York University (Canada)—School Director, School of Design; Professor

Melissa Dawson, BS, Cornell University; MFA, Rochester Institute of Technology—Assistant Professor

Daniel DeLuna, BFA, Ball State University; MFA, Pratt Institute—Associate Professor

Carol Fillip, BS, State University of New York at Buffalo; MFA, Rochester Institute of Technology—Undergraduate Program Director, Graphic Design; Associate Professor

Shaun Foster, BBA, University of Wisconsin; MFA, Rochester Institute of Technology—Undergraduate Program Director, 3D Digital Design; Professor

Lorrie Frear, BFA, MFA, Rochester Institute of Technology—Professor

Samantha Haedrich, BFA, Carnegie Melon University; MFA, Yale University—Assistant Professor

David Halbstein, BA, MA, William Patterson University—Associate Professor

Joyce Hertzson, BFA, Rhode Island School of Design; MFA, Indiana University—Professor

Chris B. Jackson, BFA, Alfred University; MFA, Rochester Institute of Technology—Senior Associate Dean; Professor

Gary D. Jacobs, BFA, University of Northern Colorado; MFA, Pennsylvania State University—Assistant Professor

Lorraine Justice, BFA, Edinboro University; MFA, Ph.D., The Ohio State University—Dean Emerita; Professor

Mark Kinsgley, BFA, Rochester Institute of Technology—Melbert B. Cary Jr. Professor

Alex Lobos, BA, Universidad Rafael Landivar (Guatemala); MFA, University of Notre Dame—Graduate Director, Industrial Design; Professor

Mindy Magyar, BS, Cornell University; MFA, Cranbrook Academy of Art; MBA, University of Pennsylvania—Associate Professor

Ihab Mardini, BA, International University of Science and Technology (Syria); MFA, Rochester Institute of Technology—Assistant Professor

Gary Molinari, BFA, Rochester Institute of Technology; MS, Nazareth College of Rochester—Senior Lecturer

Juan Noguera, BS, Colegio Lehnsen (Guatemala); BID, Universidad Rafael Landivar (Guatemala); MID, Rhode Island School of Design—Assistant Professor

College of Art and Design

Josh Owen, BA, BFA, Cornell University; MFA, Rhode Island School of Design—Director, Vignelli Center for Design Studies; Massimo and Lella Vignelli Distinguished Professor In Design

Alejandro Perez Sanchez, BS, Art Institute of California; MFA, Academy of Art University—Assistant Professor

Mariana Pinheiro, BA, Universidade Fransciscana (Brazil); MFA, Rochester Institute of Technology—Visiting Lecturer

Stan Rickel, BID, Pratt Institute; MID, Syracuse University—Undergraduate Program Director, Industrial Design; Graduate Director, Integrative Design; Associate Professor

Joel Rosen, BFA, Virginia Commonwealth University; MFA, Rochester Institute of Technology—Lecturer

Amos Scully, BFA, Rochester Institute of Technology; MFA, California College of Arts and Crafts—Associate Professor

Kim Sherman, BS, State University College at Cortland; MFA, Rochester Institute of Technology—Principal Lecturer

Adam Smith, BFA, MFA, Rochester Institute of Technology—Undergraduate Program Co-Director, New Media Design; Graduate Co-Director, Visual Communication Design; Associate Professor

Michael Strobert, BFA, MFA, Rochester Institute of Technology—Graduate Co-Director, Visual Communication Design; Senior Lecturer

Marissa Tirone, B.Arch, University of Kentucky; M.Arch, Cornell University—Senior Lecturer

Isabella Trindade, B.Arch, M.Arch, Universidade Federal de Pernambuco (Brazil); Ph.D., Universitat Politècnica de Catalunya (Spain)—Lecturer

School of Film and Animation

Amy Adrion, BA, Georgetown University; MFA, University of California, Los Angeles—Assistant Professor

Vashti Anderson, BA, University of Wisconsin-Madison; MFA, New York University—Assistant Professor

Ambarien Alqadar, BA, Jamia Millia University (India); MFA, Temple University—Associate Professor

Meghdad Asadilari, BSc, MSc, Shiraz University (Iran); MFA, Rochester Institute of Technology—Assistant Professor

Christine A. Banna, BFA, Boston University; MFA, Tufts University—Lecturer

Kevin Bauer, BFA, State University College at Oneonta; MFA, Rochester Institute of Technology— Graduate Director, Film and Animation; Principal Lecturer

Jack Beck, BA, Denison University; MFA, University of Iowa—Undergraduate Program Director, Production; Professor

Mari Jaye Blanchard, BFA, Massachusetts College of Art & Design; MFA, University of Pennsylvania—Associate Professor

Michael Boas, BA, State University College at Geneseo—Visiting Lecturer

Frank Deese, BA, MFA, University of California, Los Angeles—Assistant Professor

Ricardo Figueroa, BS, MS, University of Puerto Rico at Mayagüez; Ph.D., Rochester Institute of Technology—Undergraduate Program Director, Motion Picture Science; Associate Professor

Tom Gasek, BFA, Rochester Institute of Technology; MFA, Art Institute of Boston at Lesley University—Professor

Brian Larson, BFA, Colorado State University; MFA, Miami International University—Undergraduate Program Director, Animation; Associate Professor

David Long, BS, University of Texas; MS, University of Rochester—Director, RIT MAGIC Center and MAGIC Spell Studios; Associate Professor

Peter Murphey, BFA, Massachusetts College of Art; MFA, The Art Institute of Boston—Senior Lecturer

Atia Newman, BFA, National College of the Arts, Lahore (Pakistan); MFA, Pratt Institute—Associate Professor

Jesse O'Brien, BS, The Art Institute of Pittsburgh; MFA, The Academy of Art University—Assistant Professor

Mark Reisch, BFA, Savannah College of Art and Design; Certificate in Advanced Studies of Animation, AnimationMentor.Com; MFA, Rochester Institute of Technology—Assistant Professor

Jonathan Seligson, BFA, Rhode Island School of Design; MFA, California Institute of the Arts—Lecturer

David Sluberski, BA, State University College at Fredonia—Principal Lecturer

Vanessa Sweet, BFA, The University of the Arts; MFA, California Institute of the Arts—Assistant Professor

Shanti Thakur, BA, Ottawa University; BA, Concordia University; MFA, Temple University—School Director, School of Film and Animation; Professor

Munjal Yagnik, BFA, MFA, Syracuse University—Lecturer

School of Photographic Arts and Sciences

Kristy Boyce, BFA, Ryerson University (Canada); MFA, OCAD University (Canada)—Assistant Professor

Meredith Davenport, BFA, Rochester Institute of Technology; MFA, Hunter College—Undergraduate Program Director, Photojournalism; Associate Professor

Dennis Delgado, BA, University of Rochester; MFA, City College of New York—Visiting Lecturer

Rachel Ferraro, BFA, Rochester Institute of Technology; MFA, Visual Studies Workshop—Associate Professor

Gregory Halpern, BA, Harvard University; MFA, California College of the Arts—Associate Professor

Dan Larkin, BFA, Rochester Institute of Technology; MFA, Bard College—Associate Professor

Laurie O'Brien, BA, San Francisco State University; MFA, California Institute of the Arts—Undergraduate Program Director, Visual Media; Associate Professor

Juan Orrantia, MFA, University of Hartford; Ph.D., Yale University—Assistant Professor

Willie Osterman, BFA, Ohio University; MFA, University of Oregon—Professor

Ahndraya Parlato, BA, Bard College; MFA, California College of the Arts—Graduate Director, Photography and Related Media; Dr. Ronald Francis/Mabel Francis Chair in Silver-Halide Imaging Systems; Senior Lecturer

Michael R. Peres, BA, Bradley University; BS, MS, Rochester Institute of Technology—Gannett Distinguished Professor

Robert Rose, BS, Rochester Institute of Technology; M.Ed, American InterContinental University—Graduate Director, Media Arts and Technology; Associate Professor

Christine Shank, BFA, Miami University; MFA, Texas Woman's University—Associate Dean of Undergraduate Studies; Associate Professor

Christye Sisson, BS, MS, Rochester Institute of Technology—School Director, School of Photographic Arts and Sciences; Professor

Josh Thorson, BA, University of Minnesota-Twin Cities; MFA, Bard College; Ph.D, Rensselaer Polytechnic Institute—Associate Professor

Carole Woodlock, BFA, Alberta College of Art (Canada); MFA, Concordia University—Professor

Catherine Zuromskis, BA, Harvard College; MA, University of New York at Stony Brook; MA, Ph.D., University of Rochester—Undergraduate Program Director, Fine Art Photography; Associate Professor

Saunders College of Business

Jacqueline R. Mozrall, Dean
rit.edu/business

Programs of Study

🖱 Online learning option available.

Success in the 21st century business environment requires leadership and management attuned to rapid changes in technology and increasingly vigorous global competition. Astute problem solvers who have gained a systems perspective must be able to convert product development and management challenges into competitive advantages. Saunders College of Business offers a portfolio of comprehensive, vigorous programs of study. Our innovative, multidisciplinary curriculum—embedding an international perspective and current technology throughout—produces graduates able to convert managerial learning into pragmatic business applications.

Please visit the college's website–**www.rit.edu/business**–for in depth information on academics, faculty, facilities, research initiatives, advising, and more.

Entrepreneurship at RIT

Entrepreneurs are major drivers of economic growth. They combine original, imaginative ideas with creativity and a healthy dose of tenacity. They're resourceful, inventive, and ambitious. At RIT, entrepreneur's ideas are transformed into reality.

At the heart of the university's entrepreneurship initiatives is the Simone Center for Innovation and Entrepreneurship. The center promotes, nurtures, and expands innovation and entrepreneurship through a three-pronged approach that combines interdisciplinary entrepreneurial curriculum, experiential learning, and entrepreneurship programs. Visit the center's website–**www.rit.edu/research/simonecenter**–for more information:

Admission requirements

The college offering the program makes all decisions on graduate admission. Please refer to each individual program for information regarding specific admission criteria. For general graduate admission information, please refer to the Admission section of this bulletin.

Financial aid and scholarship

Please refer to the Financial Aid and Scholarship section of this bulletin for information regarding financial aid, scholarships, grants, loans, and graduate assistantships.

Accreditation

Saunders College of Business is accredited by the Association to Advance Collegiate Schools of Business (AACSB International).

Accounting and Analytics, MS

www.rit.edu/study/accounting-and-analytics-ms
Matthew Cornwell,
585-475-6916, mcornwell@saunders.rit.edu

Program overview

Accounting analytics can help an organization answer financial questions by looking at all the data gathered by a company (e.g., transactional data, financial data, investment analysis, etc.) and analyzing this information to gain significant insights, predict future outcomes, or even ascertain risk.

Data Analytics for Accounting: Why Financial Data Matters

There are four key types of data analytics–descriptive, diagnostic, predictive, and prescriptive–and each has a role in helping an accountant report on activity happening within an organization. All four of these types of data can be used to create a full picture of what's happening within a business, what decisions can and should be made, and where growth opportunities lie.

Descriptive analytics tell us what is happening. Descriptive analytics categorizes and classifies a range of information. Accountants can use this trove of data to report on what is happening within a company, from cash flow, revenue and expenses, and inventory, to website traffic and social media analytics.

Diagnostic analytics tell us why something happened. Accountants are skilled at using data to create forecasts and predict trends. Diagnostics analytics is the use of data to determine the causes of trends and the correlations between any number of variables. For example, diagnostic analytics can help examine market demand for a product, can provide insight into why a product's sales are up or down, or they can help explore correlation or causation between variables.

Predictive analytics tell us what's going to happen. Will a key piece of machinery break down? Will an organization have enough cash flow in nine months? Should a company anticipate different staffing needs during a specific time period? Predictive analytics helps accountants examine data to forecast a range of different scenarios that can impact drive strategic decision making.

Prescriptive analytics tell us what we should do next. Prescriptive analytics is data-driven decision-making. It's the use of data to determine a course of action. Social media applications use predictive analytics to determine what content to serve you based on your engagement with past content. Banks analyze transaction histories in order to identify fraud. Data on consumer behavior and shopping patterns can determine new product lines and product improvements. Prescriptive analytics can also point to problems that may arise or decision paths to avoid going down.

RIT's Accounting Analytics Degree

In RIT's master's in accounting analytics, you'll develop analytics skills to conduct descriptive, diagnostic, predictive, and prescriptive analysis of accounting information. The program pulls together key areas of technology, finance, strategy, analytics, data modeling, and more to help you advance your accounting career.

This innovative accounting analytics program teaches you how technologies and business analytics are used in the accounting profession, with a specific focus on:

- Hands-on experience working with data-science oriented computing languages such as R and Python
- Working knowledge of databases in Structured Query Language (SQL) and Systems Applications and Products in Data Processing (SAP)
- Data visualization skills, such as Tableau
- Understanding of essential technologies such as blockchain

As an accountant or business professional seeking career advancement, you'll benefit from the accounting analytics courses in areas that are making a significant impact on today's business operations, including big data, AI, and advanced analytics based on the foundation of accounting and auditing. You'll be taught business analytics and technology skills by faculty who teach in RIT's nationally ranked program in management information systems.

Analytics for Accountants

Accounting has become quantitative and technology-infused. As a result, an accounting analytics degree can help you manage internally- and externally-collected data, and analyze it in ways that help your organization grow, respond to change, meet consumer exceptions, make financial decisions, and predict and forecast the future. Graduates of RIT's master's in accounting analytics are in demand and work for dynamic companies in every single industry.

Experiential Learning

Cooperative Education and Internships

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Co-op is strongly encouraged in all of RIT's graduate programs. Students in the accounting and analytics MS are encouraged to participate in at least one cooperative education or internship experience.

Curriculum

Accounting and Analytics, MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
ACCT-738	Information Systems Auditing and Assurance Services	3
ACCT-745	Accounting Information and Analytics	3
ACCT-796	Accounting Capstone Experience	3
BANA-680	Data Management for Business Analytics	3
BANA-780	Advanced Business Analytics	3
FINC-780	Financial Analytics	3
MGIS-650	Introduction to Data Analytics and Business Intelligence	3
	BANA or MGIS Elective	3
	Graduate Electives	6
Total Semester Credit Hours		**30**

Admission requirements

To be considered for admission to the MS program in accounting and analytics, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate coursework, including any transfer credit earned.

- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Letters of recommendation are optional.
- Students are required to complete online preparatory coursework in R and Python prior to joining the MS in accounting and analytics program. The coursework does not need to be completed prior to applying, and will take roughly 3-4 weeks to complete.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

For further information about specific GMAT/GRE waiver opportunities, tips on personal statements, and additional guidance on how to submit a successful application, please visit Saunders College of Business Admissions Requirements.

Deferment
Accepted students can defer enrollment for up to one year. After one year, a new application must be submitted and will be re-evaluated based on the most current admission standards.

Accounting and Financial Analytics, Adv. Cert.

www.rit.edu/study/accounting-and-financial-analytics-adv-cert
Matthew Cornwell,
585-475-6916, mcornwell@saunders.rit.edu

Program overview

Today's accounting and finance professionals are now expected to serve as business partners and experts who can use data analytics to inform recommendations on business strategy. RIT's accounting analytics certificate provides you with knowledge in data science and statistical analysis so that you–as an accounting and finance professional–can mine and analyze data to apply it in ways that benefit and improve business operations and outcomes.

Financial Analytics Courses

The accounting analytics certificate provides you with the skills you need to operate effectively in today's modern data-centric business environment. A selection of advanced financial analytics courses will help you learn how to access, interpret, analyze, and report business and financial data. Courses completed in the certificate program can be applied later to RIT's master's degree in business analytics, or they may be used as a valuable add-on for students pursuing graduate degrees from RIT in fields such as finance, accounting and analytics, applied statistics, and computer science.

What is a Graduate Certificate?

A graduate certificate, also called an advanced certificate, is a selection of up to five graduate-level courses in a particular area of study. Graduate certificates can serve as a stand-alone credential that provides expertise in a specific topic that enhances your professional knowledge base, or they can serve as the entry point to a master's degree. Some students complete an advanced certificate and apply those credit hours later toward a master's degree.

Curriculum

Accounting and Financial Analytics, advanced certificate, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
ACCT-745	Accounting Information and Analytics	3
FINC-780	Financial Analytics	3
MGIS-650	Introduction to Data Analytics and Business Intelligence	3
Choose one of the following:		3
BANA-680	Data Management for Business Analytics	
MGIS-725	Data Management and Analytics	
Total Semester Credit Hours		**12**

Admission requirements

To be considered for admission to the advanced certificate in accounting and financial analytics, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.

- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Letters of recommendation are optional.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Business Administration, MBA

www.rit.edu/study/business-administration-mba
Matthew Cornwell,
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Program overview

Applications of technology and data analytics are the future of modern business. And, as organizations adapt, there is an increasing demand for business leaders to acquire skills in information systems and data analytics. RIT's MBA degree is designed to provide you with a strong focus on not only technology, but information systems, data analytics, and an exceptional foundation in the STEM fields.

RIT's MBA degree

RIT's MBA degree provides you with the flexibility to design the curriculum around your professional aspirations while also providing you with the STEM education that is increasingly in demand by today's organizations. You'll focus your learning on:

- Business Core Courses–Created to provide you with a solid foundation in business, leadership, and management, our core courses focus on organizational operations, financial proficiency, marketing concepts, commercialization, competitive strategy, and more.
- Information Systems–You'll learn to design and implement leading-edge enterprise technologies in order to collect, store, analyze, and manage vast amounts of data gathered through various customer touchpoints.
- Data Analytics–As businesses and organizations collect more and more data, there is a need to analyze and interpret this information and use it to make intelligent business decisions. RIT's MBA degree includes courses in data analytics and data management, and business intelligence to help you acquire the skills you need to harness information that generates managerial insights.

A STEM MBA Program

RIT's MBA degree is a STEM-designated program. This means you'll graduate with a solid background in the STEM fields that are impacting business today. You'll complete STEM-designated elective courses, chosen by you, in areas that include advanced data analytics, supply chain analysis, global business analytics, Lean Six Sigma, design thinking and creativity, buyer behavior, managing innovation, integrated business systems, and more.

Experiential Learning

Cooperative Education

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Cooperative education in the MBA program is optional. Academic credit is not granted, but formal recording of the co-op experience is made on the student's transcript. Students in good academic standing are eligible for co-op after completing the foundation course, and a substantial portion of their concentration courses. They also must attend a series of co-op and career services workshops. RIT does not guarantee co-op placements.

Curriculum

Business Administration, MBA degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
ACCT-603	Accounting for Decision Makers	3
DECS-743	Operations and Supply Chain Management	3
ESCB-705	Economics and Decision Modeling	3
FINC-721	Financial Analysis for Managers	3
MGIS-650	Introduction to Data Analytics and Business Intelligence	3
MGMT-740	Leading Teams in Organizations	3
MGMT-775	Ethical Decision Making and Corporate Social Performance	3
MKTG-761	Marketing Concepts and Commercialization	3
Second Year		
	STEM Electives	9
	Open Graduate Electives	6
MGIS-735	Design and Information Systems	3
MGMT-735	Management of Innovation	3
MGMT-759	Competitive Strategy	3
Total Semester Credit Hours		**48**

STEM Electives

COURSE	
ACCT-738	Information Systems Auditing and Assurance Services
ACCT-745	Accounting Information and Analytics
BANA-680	Data Management for Business Analytics
BANA-780	Advanced Business Analytics
BANA-785	Business Analytics Experience
CSCI-654	Foundations of Parallel Computing
CSCI-721	Foundations of Data Cleaning and Preparation
DECS-744	Project Management
DECS-745	Quality Control and Improvement
DECS-750	Supply Chain Analysis
FINC-742	Financial Modeling and Analysis
FINC-772	Equity Analysis
FINC-773	Debt Analysis
FINC-780	Financial Analytics
FINC-795	Computational Finance Experience
GRCS-701	Research Methods
HRDE-745	Information Systems in HRD
HSPT-740	Economic Performance Analysis for Hospitality & Tourism
INTB-710	Global Business Analytics
INTB-730	Cross-Cultural Management
ISEE-682	Lean Six Sigma Fundamentals
ISEE-682	Lean Six Sigma Fundamentals
ISEE-703	Supply Chain Management
MATH-601	Methods of Applied Mathematics
MATH-605	Stochastic Processes
MATH-711	Advanced Methods in Scientific Computing
MATH-712	Numerical Methods for Partial Differential Equations
MATH-735	Mathematics of Finance I
MATH-736	Mathematics of Finance II
MATH-741	Partial Differential Equations I
MATH-742	Partial Differential Equations II
MGIS-720	Information Systems Design
MGIS-725	Data Management and Analytics
MGIS-760	Integrated Business Systems
MGIS-761	Business Process Analysis and Workflow Design
MGMT-741	Managing Organizational Change
MGMT-755	Negotiations
MGMT-756	Power and Influence
MKTG-763	Buyer Behavior
MKTG-768	Marketing Analytics
MKTG-772	Internet Marketing: Strategy & Tactics
MKTG-773	Database Marketing
PROF-711	Advanced Project Management
SERQ-723	Service Analytics
SERQ-732	Assessment of Service Quality
SERQ-735	Data Mining in the Service Sector
SERQ-745	Social Psychology of Service
SERQ-747	Design Thinking and Creativity
STAT-611	Statistical Software - R
STAT-621	Statistical Quality Control
STAT-747	Principles of Statistical Data Mining
STAT-756	Multivariate Analysis
STAT-773	Time Series Analysis and Forecasting
STAT-784	Categorical Data Analysis

Admission requirements

To be considered for admission to the MBA program, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Letters of recommendation are optional.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- Have college level credit or practical experience in algebra and statistics
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Applications are accepted for fall, spring, and summer semesters. Students may complete their studies on a full- or part-time basis.

For further information about program specific GMAT/GRE waiver opportunities, tips on personal statements, and additional guidance on how to submit a successful application, please visit Saunders College of Business Admissions Requirements.

Completed applications for admission should be on file in the Office of Graduate and Part-time Enrollment at least four weeks prior to registration for the next academic semester for students from the United States, and up to 10 weeks prior for international students applying for student visas.

Non-degree Course Enrollment

Students with a cumulative GPA of 3.0 (B grade) or better may be eligible to apply to take up to two approved graduate courses before being fully admitted to the MBA Program. Students can complete the required non-degree application through Saunders. Graduate credits earned as a non-degree student may be applied to the student's degree program.

Waiver policy/transfer credit

The MBA normally requires 48 credit hours, however, students may be able to waive some MBA foundation courses. Prior academic preparation must be from an institution accredited by AACSB International or partner institution and the course work must be equivalent to RIT's MBA foundation courses. Prior course work must be completed within the last five years, with a grade of B (3.0) or better. Foundation courses may be waived either outright or through an examination.

A maximum of 9 credit hours may be awarded as transfer credit from other graduate programs. The courses must be relevant to the MBA program, taken within the last five years at an institution accredited by AACSB International, and the student must have earned a grade of B (3.0) or better.

Credits for waiver, transfer, or undergraduate courses are not counted in the GPA computation. Students must request transfer/waiver credit.

Deferment

Accepted students can defer enrollment for up to one year. After one year, a new application must be submitted and will be re-evaluated based on the most current admission standards.

Business Administration–Executive, MBA

www.rit.edu/study/business-administration-executive-mba
Annie Capella,
585-475-2729, acbbu@rit.edu

Program overview

RIT's executive MBA is a challenging program designed to accelerate the careers of experienced, high-performing professionals with six or more years of business experience. It is ideal for creative, innovative individuals with established careers who are looking for proven and effective methods and strategies to propel them further up the career ladder or transition into a new field.

RIT's Executive MBA: An Applied Academic and Strategic-Focused Experience

We know you want more than a simple transfer of business and management theory and concepts. You want a high level of engagement with faculty and especially with your peers. The opportunity to discuss, argue, compete, and collaborate with other seasoned managers on strategic and topical issues and projects is an essential feature of a strong executive MBA program, and of one that has direct and immediate applicability to your professional development. RIT's executive MBA program is designed to deliver these highly sought-after experiences.

In the executive MBA program, you will master executive skills such as strategic and cross-functional thinking, utilizing data to drive decision making, client consulting, and leadership. You will learn from knowledgeable and professional instructors and from the motivated and diverse peer group enrolled in the program. The executive MBA program encourages analytical thinking and problem solving and places a strong emphasis on collaboration and group interaction.

Executive MBA Courses

The curriculum in RIT's executive MBA program focuses on core business concepts that provide fundamental skills, knowledge, and perspectives in accounting, statistics, leadership, finance, negotiations, and economics. The program develops skills in cross-functional analysis with an emphasis on strategy, marketing, technology, and international business. Interdisciplinary examples, case analyses, and an applied orientation are key components of the program. The program's courses are evenly distributed across the four semesters, with some modification over the shorter summer semester. Classes are held on alternate Friday and Saturdays from 7:30 a.m. to 4:30 p.m. In addition, all students attend a three-day orientation at the start of the program and a seven-to-10-day international study trip in their last semester. There is one online course each semester. The program takes advantage of local and regional relationships with area businesses, and students have the opportunity to tour various businesses and interact with company leaders during the program, especially during the Executive Leadership course.

Curriculum

Business Administration - Executive MBA degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
Residency		
MGMT-806	Team Building and Ethics	1
First Year		
ACCT-801	Accounting and Organizational Goals	2
ACCT-802	Managerial Accounting	2
DECS-810	Statistical Analysis for Managers	2
DECS-864	Systems Support for Operations	2
DECS-875	Business Simulation	2
ESCB-840	Microeconomics & Pricing	2
FINC-845	Valuation and Capital Budgeting	2
FINC-846	Financial Planning and Analysis	2
MGMT-800	Leadership Development I	1
MGMT-801	Leadership Development II	1
MGMT-810	Leadership	2
MGMT-818	Strategic Thinking I	2
MGMT-819	Strategic Thinking II	2
MGMT-850	Negotiations and Decision-making	2
MGMT-861	Managing Technology, Innovation and Research	2
MGMT-889	Capstone Consulting Project I	3
MKTG-851	Marketing Strategy	2
MKTG-865	Managing New Product Commercialization	2
Second Year		
FINC-850	International Finance	2
INTB-820	International Business	2
INTB-825	International Study Seminar	2
MGMT-860	Executive Leadership Series	2
MGMT-890	Capstone Consulting Project II	3
Total Semester Credit Hours		**47**

Admission requirements

To be considered for admission to the executive MBA program, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Letters of recommendation are optional.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- Have at least six years of professional work experience.
- Participate in an interview with a representative of the executive MBA team.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Sponsorship

Employers sponsoring students must permit candidates to attend scheduled classes, the orientation program, and the international trip, which takes place in the student's final semester. Business owners or individuals may sponsor themselves.

Business Administration–Online Executive, MBA

www.rit.edu/study/business-administration-online-executive-mba

Annie Capella,
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Program overview

The online executive MBA is designed for mid-to-upper level professionals seeking to hone their business and leadership skills in order to enhance their performance, assume greater responsibilities, and effectively position themselves for future opportunities. The flexibility of the online format cultivates collaboration yet allows for distance learning. At RIT, we know that executives want more than a simple transfer of business and management theory and concepts. They want a high level of engagement with faculty and especially with their peers. They want the opportunity to discuss, argue, compete, and collaborate with other seasoned managers on strategic and topical issues and projects. These are the essential features of the online executive MBA, and ones that have direct and immediate applicability to student's own professional development.

The executive MBA is a challenging cohort-based program designed to accelerate the careers of mature, high-performing professionals with significant business experience. It is ideal for creative, innovative individuals with established careers who are looking for proven and effective methods and strategies to propel them further up the career ladder. Students master executive skills such as strategic and cross–functional thinking, client consulting, and leadership. They learn from knowledgeable and professional instructors and from the successful, motivated, diverse peer group enrolled in the program. The curriculum encourages analytical thinking and problem solving, and places a strong emphasis on collaboration and group interaction. Students leave the program with a solid network of influential peers.

Plan of study

The curriculum focuses on core business concepts, providing fundamental skills, knowledge, and perspectives in accounting, statistics, leadership, finance, negotiations, and economics. The program develops skills in cross-functional analysis with an emphasis on strategy, marketing, technology, and international business. Interdisciplinary examples, case analyses, and an applied orientation are key components of the program. Students attend classes for 15 months on alternate weekends (all day Friday and Saturday). In addition, all students attend a three-day orientation at the start of the program and a seven-to-10-day international study trip in their last semester. There is one online course each semester.

The program reinforces practical experience through domestic and international client consulting projects; personal coaching in career development planning, communications, and team building; a competitive business simulation model; and the international study trip.

Curriculum

Business Administration - Online Executive MBA degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
Residency		
MGMT-806	Team Building and Ethics	1
First Year		
ACCT-801	Accounting and Organizational Goals	2
ACCT-802	Managerial Accounting	2
DECS-810	Statistical Analysis for Managers	2
DECS-864	Systems Support for Operations	2
DECS-875	Business Simulation	2
ESCB-840	Microeconomics & Pricing	2
FINC-845	Valuation and Capital Budgeting	2
FINC-846	Financial Planning and Analysis	2
MGMT-800	Leadership Development I	1
MGMT-810	Leadership	2
MGMT-818	Strategic Thinking I	2
MGMT-819	Strategic Thinking II	2
MGMT-850	Negotiations and Decision-making	2
MGMT-861	Managing Technology, Innovation and Research	2
MGMT-889	Capstone Consulting Project I	3
MKTG-851	Marketing Strategy	2
MKTG-865	Managing New Product Commercialization	2
Second Year		
FINC-850	International Finance	2
INTB-820	International Business	2
INTB-825	International Study Seminar	2
MGMT-801	Leadership Development II	1
MGMT-860	Executive Leadership Series	2
MGMT-890	Capstone Consulting Project II	3
Total Semester Credit Hours		**47**

Admission requirements

To be considered for admission to the online executive MBA program, candidates must fulfill the following requirements:

- Complete a graduate application.
- Hold a baccalaureate degree (or equivalent) from an accredited university or college.
- Submit official transcripts (in English) of all previously completed undergraduate and graduate course work.
- Have a minimum of six years of professional work experience and hold advanced technical, managerial, or executive responsibilities.
- Participate in an interview with a representative of the executive MBA team.
- Have a minimum cumulative GPA of 3.0 (or equivalent).
- Submit a personal statement of educational objectives.
- Submit a current resume or curriculum vitae.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit three letters of recommendation from a current employer.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Certain countries are subject to comprehensive embargoes under US Export Controls, which prohibit virtually ALL exports, imports, and other transactions without a license or other US Government authorization. Learners from Syria, Sudan, North Korea, the Crimea region of the Ukraine, Iran, and Cuba may not register for RIT online courses. Nor may individuals on the United States Treasury Department's list of

Specially Designated Nationals or the United States Commerce Department's table of Deny Orders. By registering for RIT online courses, you represent and warrant that you are not located in, under the control of, or a national or resident of any such country or on any such list.

Business Analytics, MS

www.rit.edu/study/business-analytics-ms
Matthew Cornwell,
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Program overview

Today's businesses collect an incredible amount of data from nearly every customer touchpoint, from point-of-sale transactions, customer service interactions, social media feedback, search engine entries, market research activities, sales data, demographic information, and more. Right now, only a tiny portion of this data is analyzed and used to guide and inform business decisions. By earning a business analytics master's degree, you'll become skilled in using big data to create powerful solutions to help companies increase sales, reach new customers, develop new products, enhance customer experiences, and more. The program is available on-campus, or you may complete our online business analytics degree.

RIT's Business Analytics Master's Degree

This is a career-focused, business analytics master's degree developed in conjunction with top employers–such as Intuit, Excellus, and PriceWaterhouse–and designed to help you understand and connect contemporary analytics technologies with today's business practices. You'll develop the advanced skills needed to conduct the descriptive, diagnostic, predictive, and prescriptive analysis of information as you learn to manage data and analytics in a range of business settings

Business Analytics Courses

In RIT's business analytics master's degree, you'll acquire broad and in-depth training in multiple disciplines related to business analytics. You'll study accounting information and analytics, advanced business analytics, financial analytics, business intelligence, and marketing analytics. In addition, you will select from analytics elective courses in topics such as predictive analytics, information systems design, data management and analytics, categorical data analysis, and more.

Learn in High-Tech Analytics Labs

You'll pair your master's in business analytics with access to two high-tech labs. The Sklarsky Center for Business Analytics, a modern, interactive lab that features Bloomberg Terminals and the most advanced analytics software. The REDCOM Active Learning Collaboratory supports interactive learning and features CISCO Telepresence for connecting interactively with RIT's global campuses in China, Croatia, Dubai, and Kosovo, and our corporate partners around the world.

Careers in Business Analytics

With RIT's business analytics master's degree you'll graduate prepared to launch your career in business analytics in positions that range from marketing research, analytics, and consulting; digital analytics; web intelligence and analytics; accounting and financial analytics and risk management; supply chain analytics; customer analytics; and consulting.

Experiential Learning

Cooperative Education

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Cooperative education is optional but strongly encouraged for graduate students in the business analytics master's degree.

Curriculum

Business Analytics, MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
ACCT-745	Accounting Information and Analytics	3
BANA-680	Data Management for Business Analytics	3
BANA-780	Advanced Business Analytics	3
BANA-785	Business Analytics Experience	3
FINC-780	Financial Analytics	3
MGIS-650	Introduction to Data Analytics and Business Intelligence	3
MKTG-768	Marketing Analytics	3
	Analytics Elective	3
	Open Elective	6
Total Semester Credit Hours		**30**

Analytics Electives

COURSE	
MGIS-720	Information Systems Design
MGIS-725	Data Management and Analytics
MGIS-735	Design and Information Systems
MGIS-760	Integrated Business Systems
STAT-641	Applied Linear Models - Regression
STAT-745	Predictive Analytics
STAT-747	Principles of Statistical Data Mining
STAT-773	Time Series Analysis and Forecasting
STAT-784	Categorical Data Analysis

Admission requirements

To be considered for admission to the MS program in business analytics, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Letters of recommendation are optional.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

For further information about tips on personal statements and additional guidance on how to submit a successful application, please visit Saunders College of Business Admissions Requirements.

Finance, MS

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Matthew Cornwell,
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Program overview

Encompassing corporate finance, investment management, banking, insurance, consulting, and more, RIT's master of science in finance unlocks the world of finance and prepares you for managerial careers in corporate finance, investment analysis, and portfolio management, financial consulting, and financial institutions.

RIT's Master of Science in Finance

Top finance master's programs, like RIT's master of science in finance, prepare you to take the Chartered Financial Analyst® (CFA) exam–the most respected and recognized investment management designation in the world. In this highly flexible program, you'll complete courses in accounting for decision makers, financial analysis for managers, securities and investment analysis, options and futures, and more. In addition, you'll choose elective courses in a wide range of dynamic areas–portfolio management, financial analytics, equity analysis, stock market algorithmic trading, financial modeling and analysis, and more–that prepare you for today's dynamic careers in finance. enhance your marketability and expand your job prospects.

Finance Careers

Graduates of RIT's master of science in finance are prepared for outstanding career opportunities in a range of finance positions, including financial engineer, risk analyst, research associate, quantitative analyst, quantitative investment analyst, credit risk analyst, quantitative strategist, data analyst, and more.

Our alumni are employed at diverse financial firms such as AMG Technology, Invata Intralogistics, T3 Trading Group, LLC, TD Securities, MAI Capital Management, and more.

Experiential Learning

Cooperative Education

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Cooperative education is optional but strongly encouraged for graduate students in the finance program.

Curriculum

Finance, MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
ACCT-603	Accounting for Decision Makers	3
FINC-721	Financial Analysis for Managers	3
FINC-725	Securities and Investment Analysis	3
FINC-740	Options and Futures	3
FINC-790	Field Exam Preparatory	1
	Finance Electives	9
	STEM Electives	9
Total Semester Credit Hours		**31**

Finance electives

FINC-722	Financial Management II
FINC-732	Portfolio Management
FINC-742	Financial Modeling and Analysis
FINC-758	Seminar in Finance
FINC-760	Finance in a Global Environment
FINC-761	Stock Market Algorithmic Trading
FINC-772	Equity Analysis
FINC-773	Debt Analysis
FINC-780	Financial Analytics

STEM electives

ACCT-745	Accounting Information and Analytics
BANA-680	Data Management for Business Analytics
BANA-780	Advanced Business Analytics
MGIS-650	Introduction to Data Analytics and Business Intelligence
MGIS-725	Data Management and Analytics
FINC-742	Financial Modeling and Analysis
FINC-761	Stock Market Algorithmic Trading
FINC-773	Debt Analysis
FINC-780	Financial Analytics

Admission requirements

To be considered for admission to the MS program in finance, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

For further information about tips on personal statements and additional guidance on how to submit a successful application, please visit Saunders College of Business Admissions Requirements.

Deferment

Accepted students may defer enrollment for up to one year. After one year, a new application must be submitted and will be re-evaluated based on the most current admission standards.

Global Supply Chain Management, MS

www.rit.edu/study/global-supply-chain-management-ms

Matthew Cornwell,
585-475-6916, mcornwell@saunders.rit.edu

Program overview

Products and services increasingly rely on a globally integrated supply system and the related technologies that enable the efficient movement of these good and services around the world. In demand are supply chain management professionals who can manage the complex operations that take a product from ideation, sourcing of materials, production, storage and transportation, to purchasing, order fulfillment, distribution, and inventory management. The global supply chain needs to be efficient for companies to remain competitive internationally as they turn raw materials into consumer goods and services and deliver them to consumers. In RIT's supply chain management masters, you will gain a comprehensive understanding of the global supply chain as you gain the analytical, quantitative, and leadership skills needed to design innovative solutions, predict future trends, and become a leader in the fast-moving business landscapes found in the global supply chain system.

Rooted in the strong technology and analytical traditions of RIT's Saunders College of Business, the global supply chain management degree is an interdisciplinary program that integrates concepts from supply chain, operation management, analytics, data visualization, industrial engineering, global business, and management.

Jobs in Supply Chain Management

RIT's global supply chain management degree prepares you for exciting jobs in supply chain management, which includes careers in planning and logistics, procurement, and sourcing through comprehensive course work and real-world business projects. You'll graduate ready to pursue top positions as a transportation manager, financial analyst, logistics analyst, sourcing manager, purchasing manager, business intelligence analyst, or facilities manager.

Experiential Learning

Cooperative Education

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Cooperative education is optional but strongly encouraged for graduate students in the global supply chain management program.

Curriculum

Global Supply Chain Management, MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
DECS-743	Operations and Supply Chain Management	3
DECS-750	Supply Chain Analysis	3
INTB-710	Global Business Analytics	3
INTB-755	Export, Import, and Global Sourcing	3
MGMT-755	Negotiations	3
	Global Supply Chain Management Electives	12
Choose one of the following:		3
MGMT-791	Graduate Project	
MGMT-790	Field Exam Prep (plus one (1) Global Supply Chain Management Elective)	
Total Semester Credit Hours		**30**

Global Supply Chain Management Electives

Choose at least two of the following (6-9 credits):	
BANA-780	Advanced Business Analytics
DECS-744	Project Management
DECS-745	Quality Control and Improvement
ISEE-682	Lean Six Sigma Fundamentals
MGIS-725	Data Management and Analytics
MGIS-760	Integrated Business Systems
MKTG-768	Marketing Analytics
Choose at least one of the following (3-6 credits):	
MGMT-710	Managing for Environmental Sustainability
MGMT-735	Managing of Innovation
MGMT-740	Leading Teams in Organizations
MKTG-761	Marketing Concepts and Commercialization
MKTG-762	Strategic Marketing Management

Admission requirements

To be considered for admission to the MS program in global supply chain management, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Letters of recommendation are optional.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

* The GMAT may be waived if an applicant has a GPA of 3.25 or higher, or they can present evidence of professional work experience of six or more years. Students who cannot submit a GMAT, GRE, or one of the two waiver requirements may be considered for admission on a case-by-case basis.

For further information about program specific GMAT/GRE waiver opportunities, tips on personal statements, and additional guidance on how to submit a successful application, please see Saunders College of Business Admissions Requirements.

Hospitality and Tourism Management, MS

www.rit.edu/study/hospitality-and-tourism-management-ms
Matthew Cornwell,
585-475-6916, mcornwell@saunders.rit.edu

Program overview

- Draw conclusions about models and theories associated with hospitality and tourism in a global environment.
- Analyze, evaluate, and apply hospitality and tourism data from diverse sources.
- Identify and compare the services associated with the tourism system in the context of social, economic, cultural, and political environments.
- Create and present new hospitality and tourism services through effective interpersonal, oral, and written communication.

These are the in-demand skills you need to succeed in today's rapidly changing hospitality and tourism industry. With a master's in hospitality and tourism management, you'll be prepared for multiple mid-level service management and training director positions as you create and present new hospitality and tourism services through effective interpersonal, oral, and written communication. Graduates are ready to step into multiple service management and training director positions.

RIT's Hospitality and Tourism Degree

The master's in hospitality and tourism management is focused on hospitality business planning, branding, economic management, and development of quality processes to deliver exceptional leadership within many service and corporate settings and at post-secondary academic institutions. The program also provides research-oriented training in the theory and methodologies pertaining to hospitality and tourism to prepare you for advanced study at the doctoral level.

The program may be taken on a full- or part-time basis. The length of time required to earn a degree varies according to the student's undergraduate preparation and the number of graduate courses taken per semester. To earn the hospitality management master's degree, students must complete a minimum of 30 credit hours. The curriculum is a combination of required core courses in hospitality and tourism management and elective courses chosen by the student to meet career interests and objectives. Course offerings generally are scheduled for evenings or via online learning to facilitate part-time students.

Courses in Hospitality and Tourism

The master's in hospitality and tourism management includes core courses that explore essential hospitality and tourism business issues such as teamwork, strategic organizational change, financial and service performance metrics, development and marketing of resorts and attractions, and branding. Each course not only introduces the service philosophy but also examines the real differences in hospitality-service management outcomes necessitated by the adoption of a new service paradigm.

Elective courses provide you with an opportunity to individualize your master's degree in line with your career and professional interests. Electives are available in areas such as resorts and attractions, travel and tourism, conventions and events, technology, and human resource development, to name a few. With the approval of the department chair or program director, you may also complete a selection of elective courses from outside the program.

You will also complete a graduate project or comprehensive exam as a culminating experience allowing for demonstration of competencies in theory and applications for the discipline. Working with the program adviser and/or program faculty, you'll determine a topic and arrange a faculty mentor for a graduate project. The comprehensive exam option is open to all students.

Experiential Learning

Cooperative Education

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Cooperative education is optional but strongly encouraged for graduate students in the hospitality and tourism management program.

Curriculum

Hospitality and Tourism Management (capstone project option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
GRCS-701	Research Methods	3
HSPT-730	Strategic Hospitality & Tourism Branding	3
HSPT-740	Economic Performance Analysis for Hospitality & Tourism	3
HSPT-750	Strategic Processes and Assessment of Hospitality and Tourism Industries	3
SERQ-710	Service Design Fundamentals	3
	Electives	6
	Graduate Level Business Course*	3
Second Year		
HSPT-797	Capstone Project in Hospitality and Tourism	3
	Elective	3
Total Semester Credit Hours		**30**

Hospitality and Tourism Management (comprehensive exam option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
GRCS-701	Research Methods	3
HSPT-730	Strategic Hospitality & Tourism Branding	3
HSPT-740	Economic Performance Analysis for Hospitality & Tourism	3
HSPT-750	Strategic Processes and Assessment of Hospitality and Tourism Industries	3
HSPT-795	Comprehensive Examination	0
SERQ-710	Service Design Fundamentals	3
	Professional Electives	15
Total Semester Credit Hours		**30**

Hospitality and Tourism Management (thesis option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
GRCS-701	Research Methods	3
SERQ-710	Service Design Fundamentals	3
HSPT-730	Strategic Hospitality & Tourism Branding	3
HSPT-740	Economic Performance Analysis for Hospitality & Tourism	3
HSPT-750	Strategic Processes and Assessment of Hospitality and Tourism Industries	3
	Electives	6
	Graduate Level Business Course*	3
Second Year		
HSPT-790	Research Thesis	6
Total Semester Credit Hours		**30**

* Graduate Level Business Course will be approved by the program director.

Admission requirements

To be considered for admission to the MS program in hospitality and tourism management, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Letters of recommendation are optional.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- Applicants whose prior undergraduate work has been in areas other than hospitality or tourism may be required to complete additional courses. Students may choose elective courses with the approval of the program director.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Part Time Study

The program may be completed on a full- or part-time basis. The length of time required to earn the degree varies according to the student's undergraduate preparation and the number of graduate courses taken per semester.

Service Leadership and Innovation MS

www.rit.edu/study/service-leadership-and-innovation-ms
Matthew Cornwell,
585-475-6916, mcornwell@saunders.rit.edu

Program overview

NOTE: This program is deactivated on the main RIT campus but remains active at RIT Croatia and RIT Dubai.

Today's global economy requires visionary management, a 360-degree view of customers, and breakthrough strategies that lead to product and service innovation. The MS degree in service leadership and innovation enables professionals in any industry to transform their organizations through novel ways of thinking, efficient problem-solving, and projecting current and future needs. By learning how to see and capitalize on opportunities that others miss, graduates of the program are positioned to take employees, products and services, and their own career, to new levels of success..

Curriculum

Service Leadership and Innovation (comprehensive exam option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
GRCS-701	Research Methods	3
SERQ-710	Service Design Fundamentals	3
SERQ-712	Breakthrough Thinking, Creativity, and Innovation	3
SERQ-720	Service Scenario and Strategy Development	3
SERQ-723	Service Analytics	3
SERQ-740	Leading Innovation	3
	Concentration Course or elective	3
Second Year		
SERQ-787	Service Design and Implementation	3
SERQ-795	Comprehensive Exam	0
	Concentration Courses or Electives	6
	Elective	3
Total Semester Credit Hours		**33**

Service Leadership and Innovation (capstone project option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
GRCS-701	Research Methods	3
SERQ-710	Service Design Fundamentals	3
SERQ-712	Breakthrough Thinking, Creativity, and Innovation	3
SERQ-720	Service Scenario and Strategy Development	3
SERQ-723	Service Analytics	3
SERQ-740	Leading Innovation	3
	Elective	3
Second Year		
SERQ-797	Capstone Project	3
	Concentration Courses or Electives	9
Total Semester Credit Hours		**33**

Service Leadership and Innovation (thesis option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
GRCS-701	Research Methods	3
SERQ-710	Service Design Fundamentals	3
GRCS-701	Research Methods	
SERQ-712	Breakthrough Thinking, Creativity, and Innovation	3
SERQ-710	Service Design Fundamentals	3
SERQ-720	Service Scenario and Strategy Development	3
SERQ-740	Leading Innovation	3
SERQ-723	Service Analytics	3
	Elective	
Second Year		
SERQ-790	Research Thesis	3
	Concentration Courses or Electives	9
Total Semester Credit Hours		**33**

Admission requirements

To be considered for admission to the MS in service leadership and innovation, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent), or evidence of relevant professional performance.
- Submit a current resume or curriculum vitae.
- Letters of recommendation are optional.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- Submit a writing sample designated by the department.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English requirements. International applicants may be considered for an English test requirement waiver. Refer to Additional Requirements for International Applicants to review waiver eligibility.

Technology Entrepreneurship, Adv. Cert.

www.rit.edu/study/technology-entrepreneurship-adv-cert
Matthew Cornwell,
585-475-6916, mcornwell@saunders.rit.edu

Program overview

Today's entrepreneur faces a highly competitive and constantly changing marketplace driven by continuous innovation in technology, business models, execution, and strategy. In order to succeed, the new entrepreneur must develop an understanding of these dynamics and how this interplay creates value for a new venture.

RIT: Where Technology and Entrepreneurship Intersect

The advanced certificate in technology entrepreneurship features three required courses plus one elective. In its entirety, the curriculum provides the skills and knowledge an entrepreneur needs to successfully navigate the process of starting a new venture and managing technological innovation.

What is a Graduate Certificate?

A graduate certificate, also called an advanced certificate, is a selection of up to five graduate-level courses in a particular area of study. It can serve as a stand-alone credential that provides expertise in a specific topic that enhances your professional knowledge base, or it can serve as the entry point to a master's degree. Some students complete an advanced certificate and apply those credit hours later toward a master's degree.

Curriculum

Technology Entrepreneurship, advanced certificate, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
FINC-605	Financing New Ventures	3
MGMT-720	Entrepreneurship and Technology Entrepreneurship	3
Choose one of the following:		3
MGMT-730	Technology Entrepreneurship	
MGMT-735	Management of Innovation	
Choose one of the following:		3
MGMT-610	Global Entrepreneurship	
MGMT-765	Applied Venture Creation	
	Incubator/lab time via MGMT-799 (Independent Study Management)	
Total Semester Credit Hours		**12**

Admission requirements

To be considered for admission to the advanced certificate in technology entrepreneurship, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Letters of recommendation are optional.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Technology Innovation Management and Entrepreneurship, MS

www.rit.edu/study/technology-innovation-management-and-entrepreneurship-ms

Matthew Cornwell,
585-475-6916, mcornwell@saunders.rit.edu

Program overview

Technology innovation is a key business driver in all industries as new products and services rapidly improve our lives in significant ways. Technology innovation managers and entrepreneurs who know how to lead technological change in entrepreneurial ways are in high demand to capitalize on process and product development opportunities. As an entrepreneur and innovator, you will be part of today's innovation management as you identify problems and view them through the lens of technology innovation in an effort to develop unique and creative solutions.

The MS in technology innovation management and entrepreneurship will help you gain the skills you need to create value for your startups or entrepreneurial corporations. Through real-life business exposure and leveraging sources via RIT's integrated global network, you'll emerge as a business leader who can lead with technological entrepreneurship.

The program offers two tracks. In the technology management track, you will develop advanced product development and data analytics skills targeting organizational management and strategy needs. The technology entrepreneurship track develops skills in starting and managing new ventures that utilize research and marketing analytics to evaluate market options and build strategy. Each track consists of core courses and electives in data management and analytics and managerial skills.

Study Technology Innovation at RIT

World-renowned resources in business, science, technology, engineering, and design allow innovation and entrepreneurship to thrive at RIT. Your advantage is a rich entrepreneurial culture, with access to facilities such as the Simone Center for Innovation and Entrepreneurship, The Construct (a world-class maker space), and Venture Creations, RIT's business incubator. Teachers, industry mentors, an applied approach, and access to science, technology, engineering, and design resources prepare you to focus on entrepreneurial and innovation processes by which inventions and creative new ideas are brought to market.

Saunders College professors bring industry experience and include entrepreneurs, C-level executives, vice presidents, and leading scholars in disciplines like technology management. You will benefit from small class sizes and dedicated faculty advisors that provide one-on-one guidance. As a graduate of the program, you will have a unique combination of technical and business expertise relevant to large incumbent firms and new startup ventures.

Experiential Learning

Cooperative Education

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Cooperative education is optional but strongly encouraged for graduate students in the MS in technology innovation management and entrepreneurship.

Curriculum

Technology Innovation Management and Entrepreneurship (Technology Management Option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
DECS-744	Project Management	3
MGMT-740	Leading Teams in Organizations	3
MGMT-735	Management of Innovation	3
INTB-710	Global Business Analytics	3
MGMT-780	Technology Strategy	3
Choose one of the following:		3
MGMT-791	Graduate Project	
MGMT-790	Field Exam Prep plus an additional Managerial Skills Elective	
	Data Management and Analytics Electives	6
	Managerial Skills Electives	6
Total Semester Credit Hours		**30**

Electives

Data Management and Analytics Electives

COURSE	
MGIS-650	Introduction to Data Analytics and Business Intelligence
MGIS-725	Data Management and Analytics
BANA-680	Data Management for Business Analytics
DECS-782	Statistical Analysis for Decision Making

Managerial Skills Electives

COURSE	
MGMT-743	Advanced Topics in Technology Management
MGMT-755	Negotiations
HRDE-742	Leading Change
ACCT-603	Accounting for Decision Makers
MGMT-7##	Any other 700-level "MGMT" course

Technology Innovation Management and Entrepreneurship (Technology Entrepreneurship Option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
DECS-744	Project Management	3
MGMT-740	Leading Teams in Organizations	3
MGMT-720	Entrepreneurship and Technology Entrepreneurship	3
MGMT-780	Technology Strategy	3
MKTG-768	Marketing Analytics	3
MGMT-765	Applied Venture Creation	3
	Data Management and Analytics Electives	6
	Managerial Skills Electives	6
Total Semester Credit Hours		**30**

Electives

Data Management and Analytics Electives

COURSE	
MGIS-650	Introduction to Data Analytics and Business Intelligence
MGIS-725	Data Management and Analytics
BANA-680	Data Management for Business Analytics
DECS-782	Statistical Analysis for Decision Making

Managerial Skills Electives

COURSE	
MGMT-610	Global Entrepreneurship
MGMT-755	Negotiations
MKTG-778	Commercialization and Marketing of New Products
FINC-605	Financing New Ventures

Admission requirements

To be considered for admission to the MS program in technology innovation management and entrepreneurship, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Letters of recommendation are optional.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

For further information about specific GMAT/GRE waiver opportunities, tips on personal statements, and additional guidance on how to submit a successful application, please visit Saunders College of Business Admissions Requirements.

Faculty

Dean's Office

Jacqueline R. Mozrall, BS, Rochester Institute of Technology; MS, North Carolina State University; Ph.D., University of New York at Buffalo—Dean; Professor

Qiang (John) Tu, BS, MS, Xi'an Jiaotong University (China); Ph.D., University of Toledo—Senior Associate Dean; Professor

Shalini Khazanchi, BS, South Gujarat University (India); MBA, University of Pune (India); Ph.D., University of Cincinnati—Associate Dean for Research and Graduate Programs, Professor

Lisa Boice, BA, MBA, Long Island University; JD, Hofstra University School of Law—Assistant Dean of Student Services

Shawn Sturgeon, Ph.D., University of Cincinnati—Director of Accreditation and Assessment; Senior Lecturer

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Archana Jain, B.Comm., M.Comm., University of Rajasthan (India); MBA, Ph.D., University of Memphis—Interim Department Chair; Program Director; Associate Professor

John Curran, BA, University of Rochester; MS, Syracuse University—Lecturer

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Philip C. Gelsomino II, BS, MS, Rochester Institute of Technology; CPA, New York—Senior Lecturer

Chun-Keung (Stan) Hoi, BA, MS, North Texas State University; Ph.D., Arizona State University—Professor

Mehdi Khorram, BS, Shiraz University (Iran); MS, University of Tehran (Iran); Ph.D., Louisiana State University—Assistant Professor

Zhijian (James) Huang, B.Eng., Shanghai Jiaotong University (China); MS, Michigan State University; M.Eng., Cornell University; Ph.D., Pennsylvania State University—Associate Professor

Suzanne McCaffrey, BS, University of Maryland, College Park; MS, University of Mississippi—Lecturer

Leonid (Leo) Pugachev, Ph.D., University of Oklahoma—Assistant Professor

Ashok J. Robin, B.Comm, University of Madras (India); MBA, Ph.D., State University of New York at Buffalo—Professor

Qian Song, B.Sc ., M.Sc ., Qingdao University (China); Ph.D., Washington State University—Associate Professor

Daniel D. Tessoni, BBA, St. John Fisher College; MS, Clarkson College of Technology; Ph.D., Syracuse University; CPA, New York—Daniel D. Tessoni Endowed Professor for Accounting

Dilin Wang, BS, University of Alaska Fairbanks; MS, State University of New York at Buffalo; Ph.D., Oregon State University—Assistant Professor

Ke-an Wu, BS, Jiangxi University of Finance and Economics (China); MS, Catholic University Leuven (Belgium); Ph.D., University of Oregon—Associate Professor

Rong Yang, BS, MS, Tianjin University of Finance and Economics (China); MBA, Ph.D., Rutgers University—Professor

Hao Zhang, BA, MA, Xiamen University (China); Ph.D., State University of New York at Buffalo—Program Director; Professor

Management

Stephen Luxmore, BA, MA, University of Guelph (Canada); Ph.D.; University of Toronto (Canada)—Interim Department Chair; Principal Lecturer

Kristin Bain, BA, University of Northern Colorado; MA, University of Denver; Ph.D., University of Utah, Salt Lake City—Assistant Professor

Steven Carnovale, BS, Ph.D., Rutgers University—Associate Professor

Jeff Davis, BS, Medaille College; MBA, Rochester Institute of Technology—Director of EMBA and Executive Education Programs; Lecturer

Richard DeMartino, BA, Roanoke College; MPA, Ph.D., University of Virginia—Professor

John E. Ettlie, BS, MS, Ph.D., Northwestern University—Professor

Kenan Guler, MS, New York University; Ph.D., Rutgers University—Assistant Professor

Clyde E. Hull, BA, Yale University; MBA, Ph.D., Indiana University—Professor

Shalini Khazanchi, BS, South Gujarat University (India); MBA, University of Pune (India); Ph.D., University of Cincinnati—Associate Dean for Research and Graduate Programs, Professor

H. Andrew Lawrence, BS, EMBA, Rochester Institute of Technology—Lecturer

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dt ogilvie, BA, Oberlin College; MBA, Southern Methodist University; Ph.D., University of Texas at Austin—Professor

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Sandra L. Rothenberg, BS, Syracuse University; MS, Ph.D., Massachusetts Institute of Technology—Professor

Ettore Spadafora, Ph.D., University of South Carolina—Assistant Professor

Shawn Sturgeon, Ph.D., University of Cincinnati—Director of Accreditation and Assessment; Senior Lecturer

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MIS, Marketing, and Analytics

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Quang (Neo) Bui, BS, MS, Brigham Young University; Ph.D., Bentley University—Associate Professor

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Sorim Chung, BJ, MA, University of Missouri, Columbia; MA, Ph.D., University of California, Riverside—Assistant Professor

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Richard M. Lagiewski, BS, MS, Rochester Institute of Technology; Ph.D., Edinburgh Napier University (Scotland)—Principal Lecturer

Saiwu Lin, MS, University of Arizona—Senior Lecturer

Manlu Liu, BS, Jiangsu University (China); MS, Zhejiang University; MBA, The Hong Kong University of Science & Technology (Hong Kong); Ph.D., University of Arizona—Program Director; Professor

Jennifer Matic, BA, Grand Valley State University; MS, Rochester Institute of Technology; Ph.D., University of Bath (United Kingdom)—Principal Lecturer

Richard Mislan, BS, Rochester Institute of Technology; MS, Ferris State University; Ph.D., Nova Southeastern University—Senior Lecturer

Emi Moriuchi, BA, Manchester Metropolitan University (United Kingdom); MA, Hawaii Pacific University; Ph.D., University of Manchester (United Kingdom)—Associate Professor

Torrence E. Sparkman, BS, University of Illinois at Chicago; M.Div., Trinity Evangelical Divinity School; Ph.D., University of Illinois at Urbana-Champaign—Associate Professor

Rajendran (Raj) Sriramachandra Murthy, BE, University of Madras (India); MBA, Ph.D., Southern Illinois University—Associate Professor

Gijs Overgoor, BS, MS, Ph.D., University of Amsterdam—Assistant Professor

Victor J. Perotti, BS, MA, MS, Ph.D., The Ohio State University—Professor

Bryan A. Reinicke, BA, College of Wooster; MBA, Kent State University; Ph.D., Indiana University—Associate Professor

Jing Tang, BS, University of Science and Technology of China (China); MS, University of Chinese Academy of Sciences (China); MPhil., EMLYON Business School (France); Ph.D., Case Western Reserve University—Assistant Professor

Ali Tosyali, BS, Turkish Military Academy (Turkey); MS, Ph.D., Rutgers University—Assistant Professor

Qiang (John) Tu, BS, MS, Xi'an Jiaotong University (China); Ph.D., University of Toledo—Senior Associate Dean; Professor

Keith Weber, MS, California State University, Fullerton—Senior Lecturer

International Hospitality and Service Innovation

Edwin Torres, MS, Ph.D., Purdue University—Department Chair, Associate Professor

Edward Ganster; BS, Rochester Institute of Technology—Lecturer

Lorraine E. Hems, BS, Nazareth College of Rochester; MS, Rochester Institute of Technology; CS, CWE—Senior Lecturer

Jerrie (Yu-chin) Hsieh, BS, National Taiwan Normal University (Taiwan); MS, Ph.D., Purdue University—Program Director; Professor

Muhammet Kesgin, BSc, MSc, Akdeniz University (Turkey); Ph.D., Coventry University (United Kingdom)—Associate Professor

Distinguished Professorships

J. Warren McClure Research Professorship in Marketing

Established: 1977

Donor: Mr. and Mrs. J. Warren McClure

Purpose: To perpetuate Mr. McClure's professional interest in the field of marketing

Held by: Rajendran Sriramachandra Murthy, Ph.D.

Madelon and Richard Rosett Professorship for Research

Established: 2000

Donor: Madelon and Richard Rosett

Purpose: To support a professorship of a nationally prominent scholar in any field of business

Held by: Hao Zhang

Benjamin Forman Professorship for Collaborative Research

Established: 2008

Donor: Maurice Foreman in honor of his father, Benjamin Forman

Purpose: To support a professorship of a nationally prominent scholar in Research, Teaching, or Collaboration

Held by: Vic Perotti

Benjamin Forman Professorship for Research

Established: 2008

Donor: Maurice Foreman in honor of his father, Benjamin Forman

Purpose: To support a professorship of a nationally prominent scholar in Research

Held by: Zhi Tang, Ph.D.; Rong Yang, Ph.D.

Daniel D. Tessoni Professorship in Accounting

Established: 2015

Donor: Friends and Alumni of Dan Tessoni and Saunders College of Business

Purpose: To honor Daniel D. Tessoni for his teaching contributions and his lifelong impact on students

Held by: Daniel Tessoni, Ph.D.

Golisano College of Computing and Information Sciences

Matt Huenerfauth, Dean
rit.edu/computing

Programs of Study

🖱 Online learning option available.

The Golisano College of Computing and Information Sciences is one of the most comprehensive computing colleges in the United States. The college offers 18 baccalaureate and master's degrees in a variety of computing disciplines, as well as a doctorate in computing and information sciences. With its focus on interdepartmental and intercollege cooperation, the college directs its energy and effort toward discovering new, innovative methods and research opportunities in solving complex, present-day and future computing challenges.

The college's programs address the growing need for experts in the fields of computational science, human-computer interaction and accessibility, gaming, simulation, computing security, edutainment, management of complex information technology infrastructures,and software engineering. These programs offer the most current thinking in computing and information sciences and technology, and are supported by extensive laboratory facilities and outstanding faculty.

Please visit the college's website–**www.rit.edu/computing**–for in depth information on academics, faculty, facilities, research initiatives, advising, and more.

Admission requirements

Each college makes all decisions regarding graduate admission. Please refer to the individual program descriptions for information regarding specific admission criteria. For general graduate admission information, please refer to the Admission section of this bulletin.

Financial aid and scholarships

Please refer to the Financial Aid and Scholarship section of this bulletin for information regarding financial aid, scholarships, grants, loans, and graduate assistantships.

Artificial Intelligence in Computer Science, Adv. Cert.

www.rit.edu/study/artificial-intelligence-computer-science-adv-cert
Zachary Butler, Professor
585-475-6155, zxbvcs@rit.edu

Program overview

The advanced certificate in artificial intelligence for computer science is intended for those who want to advance their understanding of artificial intelligence. You will learn how to apply deep learning, natural language processing, and knowledge representation to solve problems that have been considered unsolvable until recently. This artificial intelligence certificate will enable you to develop the skills needed to work in the many industries currently dealing with problems in the field of artificial intelligence.

What is a Graduate Certificate?

A graduate certificate, also called an advanced certificate, is a selection of up to five graduate-level courses in a particular area of study. It can serve as a stand-alone credential that provides expertise in a specific topic that enhances your professional knowledge base, or it can serve as the entry point to a master's degree. Some students complete an advanced certificate and apply those credit hours later toward a master's degree.

Curriculum

Artificial Intelligence in Computer Science, advanced certificate, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
CSCI-630	Foundations of Artificial Intelligence	3
CSCI-635	Introduction to Machine Learning	3
	Elective	3
Second Year		
	Elective	3
Total Credit Hours		**12**

Admission requirements

To be considered for admission to the advanced certificate in artificial intelligence for computer science, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college in science, computing, or engineering, with college-level experience in probability and statistics and college-level knowledge of computer programming.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Study Options

This certificate is intended for part-time study; therefore, RIT cannot issue I-20 paperwork.

Big Data Analytics, Adv. Cert.

www.rit.edu/study/big-data-analytics-adv-cert
Hans-Peter Bischof, Professor
585-475-5568, hxbics@rit.edu

Program overview

The mass amount of data collected by industries, retailers, and organizations requires knowledgeable professionals who can collect, mine, and analyze as well as store, retrieve, and manage data. These professionals also guide the analysis, preparation, and visualization of data to aid in understanding trends, patterns, and behaviors, all of which help impact business decisions.

Big data is noted for its volume, varieties of data types, and rapid accumulation. Big data has become a catchphrase to describe data collections that are so large they are not amenable to processing or analysis using traditional database and software techniques. The advanced certificate in big data analytics is a multidisciplinary program intended for professionals with BS degrees in computing or other diverse fields–such as finance, retail, science, engineering, or manufacturing–where knowledge in data analysis is in demand.

Big Data Analytics Courses

The big data certificate features courses in the practical techniques used in exploratory data analysis and mining, as well as the approaches used to store, retrieve, and manage data in the real world. The certificate is meant for students who would like a formal qualification in big data analytics. It also allows professionals with a bachelor's degree to enhance their career opportunities and professional knowledge with targeted graduate course work in big data.

What is a Graduate Certificate?

A graduate certificate, also called an advanced certificate, is a selection of up to five graduate level courses in a particular area of study. It can serve as a stand-alone credential that provides expertise in a specific topic that enhances your professional knowledge base, or it can serve as the entry point to a master's degree. Some students complete an advanced certificate and apply those credit hours later toward a master's degree.

Curriculum

Big Data Analytics, advanced certificate, typical course sequence

COURSE		CR. HRS.
First Year		
CSCI-620	Introduction to Big Data	3
CSCI-720	Big Data Analytics	3
	Elective	3
Second Year		
	Elective	3
Total Credit Hours		**12**

Admission requirements

To be considered for admission to the advanced certificate in big data analytics, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college in science, computing, engineering, or a related major.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- Have college level credit or practical experience in probability and statistics, computer programming in a high-level language, and database systems.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Study Options

This certificate is intended for part-time study; therefore, RIT cannot issue I-20 paperwork.

Computer Science, MS

www.rit.edu/study/computer-science-ms
Hans-Peter Bischof, Professor
585-475-5568, hxbics@rit.edu

Program overview

RIT's computer science master's degree is designed for students who have an undergraduate degree (or minor) in computer science, as well as those who have a strong background in a field in which computers are applied, such as engineering, science, or business. The degree is offered on a full- or part-time basis and can be completed either on-campus or online.

Computer Science Master's Degree–On-Campus or Online

In the computer science master's degree, you'll apply theoretical principles underlying computer science, ensuring you acquire the intellectual tools necessary to keep up-to-date in this rapidly evolving discipline. With focused course work in areas such as computer graphics and visualization, data management, distributed systems, intelligent systems, programming languages and tools, and security, you'll be prepared for career advancement in a range of areas.

The on-campus and online versions of the program–from curriculum, faculty, and cluster options–are identical. You will have access to RIT's resources, including computing labs and libraries. Skilled advisors in the Office of Career Services and Cooperative Education provide advice and guidance to help you plan, prepare, and meet your career goals and aspirations. Application requirements, the admission review process, and tuition are the same for both programs. All applications are considered for scholarships, regardless of online or on-campus study.

Computer Science Master's Curriculum

Regardless of how you complete the computer science master's degree (on-campus or online), the program consists of one core course, three cluster courses, four electives, and a thesis or project. The program prepares for academic and research careers in computer science or related disciplines. It is designed for students who have an undergraduate major or minor in computer science as well as those who have a strong background in a field in which computers are applied.

Full-time students take three or four courses per semester and may be able to complete the course work in three semesters. Full-time students who are required to take additional bridge courses may be able to complete the course work in four semesters.

Part-time students take one or two courses per semester and may be able to complete the course work in four to five semesters. The time required to complete a master's project is one semester. To complete the master's thesis, two semesters is typical.

Clusters: You will select three cluster courses from the following areas:

- The computer graphics and visualization cluster provides the technical foundations for graduate studies in computer graphics and image understanding. Areas for further study include graphics programming, rendering and image synthesis, computer animation and virtual reality, image processing, and analysis, and data visualization.
- The data management cluster studies the foundational data management and knowledge discovery challenges prevalent in the design, analysis, and organization of data. The courses cover general database issues including database design, database theory, data management, and data mining.
- The distributed systems cluster studies systems formed from multiple cooperating computers, including the analysis, design, and implementation of distributed systems, distributed middleware, and computer networking protocols, including security.
- Intelligent systems encompass the study of algorithms and architectures that enable effective decision-making in complex environments. Courses cover computer vision, robotics, virtual theater, sensor networks, data mining, document recognition, and the theoretical foundations of decision-making (e.g., Markov chains and the properties of voting protocols).
- The languages and tools cluster combines language design and implementation together with architecture and the use of software development tools. Students specializing in this cluster gain a broad understanding of theoretical and applied knowledge.
- The security cluster spans topics from networking to cryptography to secure databases. By choosing different domains in which to study security students gain a broad understanding of both theoretical and applied knowledge.
- The theory cluster studies the fundamentals of computation, which includes complexity theory to determine the inherent limits of computation, communication, and cryptography and the design and analysis of algorithms to obtain optimal solutions within those limits.

Electives: Electives provide a breadth of experience in computer science and applications areas. Students who wish to include courses from departments outside of computer science need prior approval from the graduate program director. Refer to the course descriptions in the departments of computer science, engineering, mathematical sciences, and imaging science for possible elective courses.

Master's Thesis/Project: Students may choose the thesis or project option as the capstone to the program. Students who choose the project option must register for Computer Science MS Project. Students participate in required in-class presentations that are critiqued. A summary project report and public presentation of the student's project in poster form occur at the end of the semester.

Experiential Learning

Cooperative Education

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Cooperative education is optional but strongly encouraged for graduate students in the computer science MS degree.

Curriculum

Computer Science (thesis option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
CSCI-665	Foundations of Algorithms	3
CSCI-790	Computer Science MS Thesis	6
	Cluster Courses	9
	Electives	12
Total Semester Credit Hours		**30**

Computer Science (project option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
CSCI-665	Foundations of Algorithms	3
CSCI-788	Computer Science MS Project	3
	Cluster Courses	9
	Electives	15
Total Semester Credit Hours		**30**

Admission requirements

To be considered for admission to the MS in computer science, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Prerequisites

Applicants must satisfy prerequisite requirements in mathematics (differential and integral calculus, probability and statistics, discrete mathematics, and computer science theory) and computing (experience with a modern high-level language [e.g., C++, Java], data structures, software design methodology, introductory computer architecture, operating systems, and programming language concepts).

Bridge Courses

If an applicant lacks any prerequisites, bridge courses may be recommended to provide students with the required knowledge and skills needed for the program. If any bridge courses are indicated in a student's plan of study, the student may be admitted to the program on the condition that they successfully complete the recommended bridge courses with a grade of B (3.0) or better (courses with lower grades must be repeated). Generally, formal acceptance into the program is deferred until the applicant has made significant progress in this additional course work. Bridge program courses are not counted as part of the 30 credit hours required for the master's degree. During orientation, bridge exams are conducted. These exams are the equivalent to the finals of the bridge courses. Bridge courses will be waived if the exams are passed.

Computing and Information Sciences, Ph.D.

www.rit.edu/study/computing-and-information-sciences-phd

Pengcheng Shi, Professor
585-475-6147, spcast@rit.edu

Program overview

In the computing and information sciences Ph.D., you will conduct both foundational and applied research to address diverse and important challenges within and beyond computing and benefit from world-class faculty, diverse academic offerings, and modern facilities. Our graduates are poised to excel in both computing and interdisciplinary environments in academia, government, and industry.

The doctoral program highlights two of the most unique characteristics of the Golisano College for Computing and Information Sciences: its breadth of program offerings and its scholarly focus on discovering solutions to real-world problems by balancing theory and practice.

The Ph.D. in information sciences focuses on the theoretical and practical aspects of cyberinfrastructure as applied to specific problems across multiple domains. It is a blend of intra-disciplinary computing knowledge areas and inter-disciplinary domain areas.

Cyberinfrastructure

Cyberinfrastructure is the comprehensive integration of hardware, data, networks, and digitally-enabled sensors to provide secure, efficient, reliable, accessible, usable, and interoperable suites of software and middleware services and tools. The doctorate program plays a leadership role in cyberinfrastructure research by providing human-centered tools for the science and engineering communities. These tools and services focus on such areas as high-performance computing, data analysis and visualization, cyber-services and virtual environments, and learning and knowledge management.

Intradisciplinary Knowledge

There are three intradisciplinary computing knowledge areas: infrastructure, interaction, and informatics.

Infrastructure

Infrastructure comprises aspects related to hardware, software (both system software and applications), communications technology, and their integration with computing systems through applications. The focus is on the best organization of these elements to provide optimal architectural solutions. On the hardware side, it includes system-level design (e.g., for system-on-a-chip solutions) and their building block components. On the software side it covers all aspects of systems and applications software development, including specification and design languages and standards; validation and prototyping, and multi-dimensional Quality-of-Service management; software product lines, model-driven architectures, component-based development, and domain-specific languages; and product estimation, tracking, and oversight. The communications subtopic includes sensor networks and protocols; active, wireless, mobile, configurable, and high-speed networks; and network security and privacy, quality of service, reliability, service discovery, and integration and inter-networking across heterogeneous networks. At the system level, there are issues related to conformance and certification; system dependability, fault tolerance, verifiable adaptability, and reconfigurable systems; real-time, self-adaptive, self-organizing, autonomic systems. Some of the specialties available in this area are networks and security, digital systems and VLSI, software design and productivity, and systems software.

Interaction

Interaction refers to topics related to the combined action of two or more entities (human or computational) that affect one another and work together when facilitated by technology. It encompasses several subtopics relating to how people and technology interact and interface. Several common threads weave through all of these areas, many of which rely heavily and build upon foundations in the social and behavioral sciences with an emphasis on understanding human and social/organizational phenomena. To some extent, these fields follow an engineering approach to the design of interactions in which solutions are based on rules and principles derived from research and practice but require analyses that go beyond the analytical approach. From this perspective, solutions can be measured and evaluated against goals and intended outcomes. However, while efficiency and effectiveness are often the watchwords of these fields in practice, this is also where science meets art in computing. Creative design and sensitivity to human needs and aesthetics are critical. Some of the specialties available in this area are human-computer interaction, computer-based instructional systems, and access technologies.

Informatics

Informatics is the study of computational/algorithmic techniques applied to the management and understanding of data-intensive systems. It focuses on the capture, storage, processing, analysis, and interpretation of data. Topics include algorithms, complexity, and discovery informatics. Data storage and processing require investigation into tools and techniques for modeling, storage, and retrieval. Analysis and understanding require the development of tools and techniques for the symbolic modeling, simulation, and visualization of data. The increased complexity of managing vast amounts of data requires a better understanding of the fundamentals of computation. These fundamentals include complexity, theory to determine the inherent limits of computation, communication, cryptography, and the design and analysis of algorithms to obtain optimal solutions within the limits identified. Some of the specialties available in this area are core informatics, discovery informatics, and intelligent systems.

Interdisciplinary Domains

The program focuses on domain-specific computing, or the interaction between computing and non-computing disciplines, in the areas of science, engineering, medicine, arts, humanities, and business. By incorporating domain-specific computing, the research conducted in this program applies computing and information science principles to the solution of problems in application domains that lie outside the scope of the traditional computing discipline. The research requirement incorporates fundamental concepts in cyberinfrastructure that are necessary for understanding the problems commonly encountered in advancing scientific discovery and product development in cross-disciplinary domains.

Active Research Areas

Computing

- Algorithm and theory
- Artificial intelligence and machine learning
- Communication and networking
- Computer vision and pattern recognition
- Data management and analytics
- Education research
- Game design
- Graphics and visualization
- Human-computer interaction
- Natural language processing
- Pervasive and Mobile Computing
- Programming languages
- Security and privacy
- Software engineering

Domain applications
- Accessibility and inclusion
- Biomedical computing
- Cognitive sciences
- Computational astrophysics
- Computational finance
- Geographic information system
- Imaging and image informatics
- Service sciences
- Social computing

RIT's Ph.D. in Information Science

The Ph.D. in information science requires a minimum of 60 credit hours beyond the baccalaureate level comprised of graduate-level course work, including seminar attendance and research credits. Students complete required foundation and core elective courses and teaching skills courses. Elective courses provide foundation support for the student's dissertation research area. These courses come from cyberinfrastructure courses, domain courses, and other electives.

Dissertation and Research

Students are required to conduct original research that leads to peer-reviewed publications.

Assessments

Each student must pass three assessment examinations in the following order:

1. Research potential assessment: qualifying exam

Completed after the first year, this assessment evaluates the research tasks students have worked on in their first year in the program. Passing this assessment will qualify students to continue in the doctoral program.

2. Thesis proposal defense: candidacy exam

This is an oral examination completed after the thesis proposal is written. Formal admission to candidacy will be granted after successfully passing the research potential assessment requirement and having a research proposal approved by the dissertation committee. The dissertation committee will have a minimum of four members including the student's adviser.

3. Dissertation defense

This is the final examination. The dissertation defense includes the dissertation committee and an optional external reader from outside RIT. The exam consists of a formal, oral presentation of the thesis research by the student, followed by questions from the audience.

Curriculum

Computing and Information Sciences, Ph.D. degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
CISC-810	Research Foundations	3
CISC-820	Quantitative Foundations	3
CISC-830	Cyberinfrastructure Foundations	3
CISC-890	Dissertation and Research	6
CISC-896	Colloquium in Computing and Information Sciences	0
	Infrastructure Elective	3
	Interaction Elective	3
	Informatics Elective	3
Second Year		
CISC-807	Teaching Skills Workshop	2
CISC-890	Dissertation and Research	7
CISC-896	Colloquium in Computing and Information Sciences	0
	Electives	9
Third Year		
CISC-890	Dissertation and Research	18
Total Semester Credit Hours		**60**

Admission requirements

To be considered for admission to the doctorate program in computing and information sciences, candidates must fulfill the following requirements:
- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college. Since the program encompasses a wide variety of disciplines, students with diverse backgrounds (e.g.: engineering, science, humanities, fine arts, business, and disciplines with sufficient computing backgrounds) are encouraged to apply.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- Submit professional or research paper sample(s), if available.
- Have completed at least one full year of study in programming and computing concepts; strong mathematical background in subjects such as discrete mathematics, and probability and statistics; and aptitude, vision, and experience (if applicable) in computing and information sciences related research.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Interview

An interview by one or more members of the doctoral program faculty and/or admissions committee may be required for candidates considered for admission prior to final selection. This interview may be conducted virtually.

Transfer Credit

Students with previous graduate course work, or a master's degree in a computing and information sciences discipline or in a related domain-specific discipline, may be granted up to 9 credit hours towards the degree requirements. The transfer credit evaluation will not be made until after the research potential assessment. Consideration for transfer credit will include the appropriateness to the student's intra- and inter-disciplinary program of study and research interests.

Assistantships

Assistantships, which include tuition and stipend, are available and awarded on a competitive basis.

Residency Requirement

One year of full-time on-campus residency is required.

Computing Security, MS

www.rit.edu/study/computing-security-ms

Sumita Mishra, Professor
585-475-4475, sumita.mishra@rit.edu

Program overview

There is critical importance to building security and survivability into the hardware and software of computing systems as they are designed and developed, rather than trying to add it on once these systems have been designed, developed, and installed. Our master's in computer security gives you an understanding of the technological and ethical roles of computing security in today's society and its importance across the breadth of computing disciplines.

RIT's Computer Security Master's Degree

RIT's master's in computer security enables you to develop a strong theoretical and practical foundation in security computing, preparing you for leadership positions in the cybersecurity industry, academia, or research careers, or to pursue a more advanced degree in cybersecurity or another computing discipline.

The computer security master's degree is designed for students who have an undergraduate computing degree in an area such as computing security, computer science, information technology, networking, or software engineering, as well as those who have a strong background in a field in which computers are applied, such as computer or electrical engineering. The program is offered online and on campus.

Computer Security Courses

The computer security master's degree consists of core courses, technical electives, and a thesis, project, or capstone experience.

You may can develop a specialization in one of several security-related areas by selecting technical electives under the guidance of a faculty advisor.

ESL Global Cybersecurity Institute: Advancing Cybersecurity Education

The ESL Global Cybersecurity Institute is a state-of-the-art, 52,000-square-foot facility designed for advanced cybersecurity education, training, and research. You will learn from experts who have developed a world-class curriculum that covers cybersecurity to managing information systems as you build secure systems and new technologies. You'll also have access to the Cyber Range, which generates the real world feel of responding to a cybersecurity crisis for governments and industries to test their security and identify innovative/effective solutions.

Experiential Learning

Cooperative Education

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Cooperative education is optional but strongly encouraged for graduate students in the computing security MS degree.

Curriculum

Computing Security (thesis option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
CSEC-604	Cryptography and Authentication	3
CSEC-742	Computer System Security	3
	Research Electives	6
	Advanced Electives	6
Second Year		
CSEC-790	MS Thesis	6
	Advanced Electives	6
Total Semester Credit Hours		**30**

Computing Security (project option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
CSEC-604	Cryptography and Authentication	3
CSEC-742	Computer System Security	3
	Research Electives	6
	Advanced Electives	6
Second Year		
CSEC-791	MS Project	3
	Advanced Electives	9
Total Semester Credit Hours		**30**

Computing Security (capstone course option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
CSEC-604	Cryptography and Authentication	3
CSEC-742	Computer System Security	3
	Research Electives	6
	Advanced Electives	6
Second Year		
CSEC-793	Capstone for Computing Security	3
	Advanced Electives	9
Total Semester Credit Hours		**30**

Admission requirements

To be considered for admission to the MS in computing security, candidates must fulfill the following requirements:
- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college in computing security, computer science, software engineering, information technology, networking, computer engineering, electrical engineering, applied mathematics, or computer engineering technology (exceptional students from other fields may be admitted on a contingent basis).
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- One letter of recommendation is required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.

- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Prerequisites
Applicants must satisfy prerequisite requirements in mathematics (integral calculus, discrete mathematics), statistics, natural sciences (physics, chemistry, etc.), and computing (programming, computer networking theory and practice, and systems administration theory and practice).

Bridge Program
Students whose undergraduate preparation or employment experience does not satisfy the prerequisites required for the program may make up deficiencies through additional study. Bridge course work, designed to close gaps in a student's preparation, can be completed either before or after enrolling in the program as advised by the graduate program director. Generally, formal acceptance into the program is deferred until the applicant has made significant progress through this additional preparation.

If completed through academic study, bridge courses must be completed with a grade of B (3.0) or better. Courses with lower grades must be repeated. Bridge courses are not counted toward the 30 credit hours required for the master's degree. However, grades earned from bridge courses taken at RIT are included in a student's graduate grade point average.

A bridge program can be designed in different ways. Courses may be substituted based upon availability, and courses at other colleges may be applied. All bridge course work must be approved in advance by the graduate program director. For more information on the bridge program, please consult the Computer Security MS Handbook.

Cybersecurity, Adv. Cert.

www.rit.edu/study/cybersecurity-adv-cert
Sumita Mishra, Professor
585-475-4475, sumita.mishra@rit.edu

Program overview

Gain the fundamental knowledge and expertise in network security and forensics that is necessary for security in networked environments. In the advanced certificate in cybersecurity, you'll learn to make computers and networks resistant to attack by monitoring intrusions and closing off vulnerabilities.

The application of forensics allows successful attacks on computer systems to be detected. This involves gathering information on the nature and extent of the attack for presentation in a court of law, as well as assessing the extent of the damage to an organization. Courses taken as part of this certificate can transfer into the MS program in computing security.

What is a Graduate Certificate?

A graduate certificate, also called an advanced certificate, is a selection of up to five graduate level courses in a particular area of study. It can serve as a stand-alone credential that provides expertise in a specific topic that enhances your professional knowledge base, or it can serve as the entry point to a master's degree. Some students complete an advanced certificate and apply those credit hours later toward a master's degree.

Curriculum

Cybersecurity, advanced certificate, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
Choose four of the following courses:		12
CSEC-603	Enterprise Security	
CSEC-730	Advanced Computer Forensics	
CSEC-733	Information Security Risk Management	
CSEC-742	Computer System Security	
CSEC-743	Computer Viruses and Malicious Software	
CSEC-744	Network Security	
Total Semester Credit Hours		**12**

Admission requirements

To be considered for admission to the advanced certificate in cybersecurity, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- One letter of recommendation is required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.

- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Bridge Program
Based on the evaluation of an applicant's academic and relevant experience, the graduate program director may require some applicants to complete a bridge course to fulfill any gaps in the required prerequisites needed for admission to the program. The bridge course, Introduction to Computing Security (CSEC-600), is not part of the 12 credit hours required for the advanced certificate.

Study Options
This certificate is intended for part-time study; therefore, RIT cannot issue I-20 paperwork. Courses are offered on-campus and online.

Data Science, MS

www.rit.edu/study/data-science-ms
Travis Desell, Associate Professor
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Program overview

Data science is one of the hottest fields in computing. The data science degree gives you the practical and theoretical skills to handle large-scale data management and analysis challenges that arise in today's data-driven organizations. This program appeals to professionals looking to enhance their skill set, and includes opportunities for customized course work within the broad field of data science and its various application areas.

RIT's Data Science Master's

In response to the growing need to generate and analyze meaningful data across all industries, demand is on the rise for a new breed of professionals skilled in both analytics and computing. RIT's MS in data science encourages you to work with faculty experts in the fields of data science, analytics, and infrastructure who provide hands-on experience solving real problems. The curriculum includes opportunities for you to choose elective courses to pursue a variety of career paths within the broad field of data science and its various application areas. The program prepares you—regardless of your scientific, engineering, or business background—to pursue a career in data science.

RIT's colleges of Science and Computing and Information Sciences collaborated to deliver the data science master's, which combines the expertise and knowledge from faculty in both colleges to provide you with a unique understanding of math, computing, and technology. This approach enhances your learning outcomes and increases career marketability.

Experiential Learning

Cooperative Education

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Cooperative education is optional but strongly encouraged for graduate students in the data science MS degree.

Curriculum

Data Science, MS degree, typical course sequence (on-campus program)

COURSE		SEMESTER CREDIT HOURS
First Year		
DSCI-601	Applied Data Science I	3
DSCI-633	Foundations of Data Science and Analytics	3
DSCI-644	Software Engineering for Data Science	3
ISTE-608	Database Design And Implementation	3
STAT-614	Applied Statistics	3
SWEN-601	Software Construction	3
	Electives	3
Second Year		
DSCI-602	Applied Data Science II	3
	Electives	6
Total Semester Credit Hours		**30**

Data Science, MS degree, typical course sequence (online program)

COURSE		SEMESTER CREDIT HOURS
First Year		
DSCI-633	Foundations of Data Science and Analytics	3
ISTE-608	Database And Implementation	3
STAT-614	Applied Statistics	3
SWEN-601	Software Construction	3
	Elective	3
Second Year		
DSCI-644	Software Engineering for Data Science	3
DSCI-799	Graduate Capstone	3
	Electives	9
Total Semester Credit Hours		**30**

Data Science, MS degree, typical course sequence (online + edX program)

COURSE		SEMESTER CREDIT HOURS
First Year		
ISTE-608	Database Design And Implementation	3
SWEN-601	Software Construction	3
	edX Micromasters	9
	Elective	3
Second Year		
DSCI-644	Software Engineering for Data Science	3
DSCI-799	Graduate Capstone	3
	Electives	6
Total Semester Credit Hours		**30**

Admission requirements

To be considered for admission to the MS in data science, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- Have college level credit or practical experience in computer programming and statistics.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Please note: Certain countries are subject to comprehensive embargoes under US Export Controls, which prohibit virtually ALL exports, imports, and other transactions without a license or other US Government authorization. Learners from Syria, Sudan, North Korea, the Crimea region of the Ukraine, Iran, and Cuba may not register for RIT online courses. Nor may individuals on the United States Treasury Department's list of Specially Designated Nationals or the United States Commerce Department's table of Deny Orders. By registering for RIT online courses, you represent and warrant that you are not located in, under the control of, or a national or resident of any such country or on any such list.

Game Design and Development, MS

www.rit.edu/study/game-design-and-development-ms

David Simkins, Associate Professor
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Program overview

Explore the simulation, edutainment, or visualization landscape as you enhance your game design and development skills to create truly innovative games.

In the game design master's degree, you will explore the entertainment technology landscape as well as other related areas. The program simultaneously covers the breadth of the game design and development landscape through study in topics such as computer graphics, game engines, interactive narrative, and game world design. The program is characterized by a clear focus on development, but also educates developers in the design process. The degree is intended specifically for students who aspire to hold careers within the professional games industry or a related field such as simulation, edutainment, or visualization.

RIT's Game Design Master's

The curriculum in the game design master's program consists of required courses, a choice of five advanced electives, and a capstone experience. This is a two-year, on-campus, cohort-based program in which students are admitted through a portfolio review process. During the second year, students form development teams that construct a working game engine and software title as the program capstone experience. This requirement includes both individual and group expectations. The capstone culminates in a defense, public presentation, and demonstration before program faculty. Combined, these requirements provide a unique and comprehensive educational experience for individuals who aspire to a career in the game development industry.

Launch your Digital Endeavors with MAGIC

The MAGIC Center is a digital sandbox for students and faculty pushing the boundaries of technology, art and design. It includes five state-of-the-art classrooms built around delivering hands-on curriculum in game design, 2D and 3D animation, and digital design. Students learn on the same hardware and software platforms used in industry while honing their technical and creative skills. A fully outfitted sound stage and post-production studios further enhance experiential education opportunities and permit faculty to introduce real-world film, animation, and digital media workflows to the classroom.

Experiential Learning

Cooperative Education

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Cooperative education is optional but strongly encouraged for graduate students in the game design and development program.

Creative Industry Day

RIT's Office of Career Services and Cooperative Education hosts Creative Industry Day, which connects students majoring in art, design, film and animation, photography, and select computing majors with companies, organizations, creative agencies, design firms, and more. You'll be able to network with company representatives and interview directly for open co-op and permanent employment positions.

Curriculum

Game Design and Development, MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
IGME-601	Game Development Processes	3
IGME-602	Game Design	3
IGME-603	Gameplay and Prototyping	3
IGME-695	Colloquium in Game Design and Development	1
IGME-795	Game Industry Themes and Perspectives	1
	Advanced Electives	9
Second Year		
IGME-695	Colloquium in Game Design and Development	1
IGME-788	Capstone Design	3
IGME-789	Capstone Development	3
	Advanced Electives	6
Total Semester Credit Hours		**33**

Advanced electives

COURSE	
CSCI-610	Foundations of Computer Graphics
CSCI-711	Global Illumination
CSCI-712	Computer Animation: Algorithms and Techniques
CSCI-713	Applied Perception in Graphics and Visualization
IGME-621	Board and Card Game Design and Development
IGME-622	Game Balance
IGME-623	Theory and Design of Role Play and Interactive Narrative
IGME-624	Tabletop Role-Playing Game Design and Development
IGME-670	Digital Audio Production
IGME-671	Interactive Game and Audio
IGME-680	IGM Production Studio
IGME-681	Innovation & Invention
IGME-690	IGM Graduate Seminar
IGME-730	Game Design and Development for Casual and Mobile Platforms
IGME-740	Game Graphics Programming
IGME-742	Level Design
IGME-750	Game Engine Design and Development
IGME-753	Console Development
IGME-760	Artificial Intelligence for Gameplay
IGME-790	Graduate Seminar in IGM
IGME-796	Advanced Topics in Game Design*
IGME-797	Advanced Topics in Game Development*
IGME-799	Independent Study

Admission requirements

To be considered for admission to the MS in game design and development, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college in a relevant field such as information technology, computer science, software engineering, or computer graphics. Students with undergraduate degrees in related disciplines such as digital media or human-computer interaction may be considered.
- Recommended minimum cumulative GPA of 3.25 (or equivalent) or a first-class international degree with distinction. Students with a GPA below 3.25 may submit official GRE test scores.
- Submit a current resume or curriculum vitae.

- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a portfolio. Refer to Graduate Portfolio Requirements for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Prerequisites

Students are expected to have at least one year of significant programming experience in a current object-oriented language—preferably C++ or Java—and a solid working knowledge of website development and interactive multimedia concepts. If students do not have these prerequisites, additional course work may be recommended to bridge any educational gaps.

Health Informatics, MS

www.rit.edu/study/health-informatics-ms
Qi Yu, Professor
585-475-6929, Qi.Yu@rit.edu

Program overview

With an increase in the application and use of computing in the health care industry, there is an unprecedented need for professionals who can harness the creative power of information technology to make an impact on the acquisition, storage, management, and retrieval of patient data, as well as access medical data needed to improve patient care, research, and education. A health informatics masters provides professionals with an understanding of formal medical terminology, clinical processes, and guidelines; and an understanding of how information and communication systems can be used to successfully deliver patient information in various health care settings.

Plan of study

The MS in health informatics is only available online. It applies the creative power of information technology to the information and data needs of health care. The program offers two tracks: the clinician track and analyst track.

The program is designed for working professionals in diverse health care clinical and technology settings. The curriculum consists of seven core courses and concentration selections from six track courses. These track courses will focus on software development, system integration, data analysis, clinical application building, systems analysis, and project management. The MS in health informatics draws upon the interdisciplinary strengths of the colleges within RIT, along with its health care partner, Rochester Regional Health System (RRH).

Curriculum

Health Informatics, MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
HCIN-610	Foundations of Human-Computer Interaction	3
MEDI-701	Introduction to Health Informatics	3
MEDI-704	Practice of Health Care (summer)	3
MEDI-735	Clinical Information Systems	3
	Track Elective	3
Second Year		
CINT-628	Introduction to Applied Informatics	3
ISTE-764	Project Management	3
MEDI-788	Capstone in Health Informatics	3
	Track Elective	6
Total Semester Credit Hours		**30**

Admission requirements

To be considered for admission into the MS program in health informatics, candidates must fulfill the following requirements:

- Complete a graduate application.
- Hold a baccalaureate degree (or equivalent) from an accredited university or college.
- Submit official transcripts (in English) of all previously completed undergraduate and graduate course work.
- Have a minimum cumulative GPA of 3.0 (or equivalent).
- Submit two letters of recommendation from individuals who are able to assess the applicant's potential for success in the program.
- Submit a current resume or curriculum vitae.

- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- International applicants whose native language is not English must submit scores from the TOEFL, IELTS, or PTE. A minimum TOEFL score of 88 (internet-based) is required. A minimum IELTS score of 6.5 is required. The English language test score requirement is waived for native speakers of English or for those submitting transcripts from degrees earned at American institutions.
- Applicants from international universities are required to submit GRE scores.
- It is recommended that applicants have a minimum of three years of experience in a health care, health-related, or information technology organization. Applicants who do not meet this requirement may be asked to complete certain undergraduate/graduate level courses as a prerequisite.
- An interview with the program's admissions committee may also be required.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Please note: Applications should be submitted for fall admission. For priority consideration, please submit all application materials a minimum of six weeks prior to your intended start date.

Prerequisites

It is expected that prospective students who plan to pursue the analyst track will have a background in fundamental information technology concepts including object-oriented programming and statistics. Students without the necessary background should complete the prerequisites before applying to the program. However, bridge courses are available to satisfy the prerequisites.

Bridge program

Students whose undergraduate preparation or employment experience does not satisfy the prerequisites can make up these deficiencies by completing prerequisite bridge courses as prescribed by the graduate program director. The bridge courses are not part of the 30 semester credit hours required for the master's degree. Grades for bridge courses are not included in a student's GPA if the courses are taken before matriculation; they are included if completed after matriculation. Since bridge programs can be designed in a variety of ways, the graduate program director will assist students in planning and course selection.

Please note: Certain countries are subject to comprehensive embargoes under US Export Controls, which prohibit virtually ALL exports, imports, and other transactions without a license or other US Government authorization. Learners from Syria, Sudan, North Korea, the Crimea region of the Ukraine, Iran, and Cuba may not register for RIT online courses. Nor may individuals on the United States Treasury Department's list of Specially Designated Nationals or the United States Commerce Department's table of Deny Orders. By registering for RIT online courses, you represent and warrant that you are not located in, under the control of, or a national or resident of any such country or on any such list.

Human-Computer Interaction, MS

www.rit.edu/study/human-computer-interaction-ms
Qi Yu, Professor
585-475-6929, Qi.Yu@rit.edu

Program overview

Explore the design methods, evaluation, and implementation of interactive computing systems for human use. Building on decades of research in psychology and human behavior, the human-computer interaction master's degree focuses on the skills needed by user-experience researchers and computing professionals, including observing how people interact with websites and software and the design new technologies to help them accomplish their goals. With computing moving rapidly away from the traditional desktop, companies need professionals that understand how evolving technologies can be designed to be intuitive, effective, and compelling for users.

RIT's Human-Computer Interaction Masters

Human-computer interaction addresses the design, evaluation, and implementation of interactive computing and computing-based systems for the benefit of human use. HCI research is driven by technological advances and the increasing pervasiveness of computing devices in our society. With an emphasis on making computing technologies more user-friendly, HCI has emerged as a dynamic, multifaceted area of study that merges theory from science, engineering, and design—as well as concepts and methodologies from psychology, anthropology, sociology, and industrial design—with the technical concerns of computing.

The human-computer interaction master's degrees provides the knowledge and skills necessary for conceptualizing, designing, implementing, and evaluating software applications and computing technologies for the benefit of the user, whether the user is an individual, a group, an organization, or a society. Human, technological, and organizational concerns are interwoven throughout the curriculum and addressed in team- and project-based learning experiences.

HCI Courses

The core courses provide knowledge and skills in the conceptual and methodological frameworks of HCI and HCI research. Emphasis is on understanding human cognition as it applies to information systems plus interaction design, interface prototyping, and usability evaluation.

Program Electives: Students select two elective courses. In select cases, students can petition for approval to include a course complementary to the degree program as a program elective.

Application Domain Courses:To gain breadth in a technical area to which HCI concepts can be applied, students complete two courses in any of the application domain areas. A special topics option is also available, with faculty approval, for individuals with interest in other HCI-related areas.

- e-Learning Technologies–The recent boom in online learning has created a need for professionals to design such systems. Students learn the fundamentals of instructional technology and interactive courseware.
- Geographical Information Science and Technology–Research how digital technology is revolutionizing how humans view earth with topics in thematic cartography and geographic visualization.
- Self-defined Application Domain–Design your own concentration.
- Smart Device Application Design and Development–Smart devices are no longer limited to phones. Design and study human interaction with cutting-edge mobile technology.

- Web Development–Study the foundations of web technologies, enabling students to better understand how The Internet can be built to improve the experience of a diverse range of end-users.

Thesis/Capstone Project: Students may complete a thesis or capstone project. This experience is meant to be an empirical study of a HCI problem, which can be the development of a software product through user-centered design processes. The results are either published in a peer-reviewed journal or publicly disseminated in an appropriate professional venue.

Experiential Learning

Cooperative Education

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Cooperative education is optional but strongly encouraged for graduate students in the human-computer interaction program.

Creative Industry Day

RIT's Office of Career Services and Cooperative Education hosts Creative Industry Day, which connects students majoring in art, design, film and animation, photography, and select computing majors with companies, organizations, creative agencies, design firms, and more. You'll be able to network with company representatives and interview directly for open co-op and permanent employment positions.

Curriculum

Human-Computer Interaction (capstone project option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
HCIN-600	Research Methods	3
HCIN-610	Foundations of Human-Computer Interaction	3
HCIN-620	Information and Interaction Design	3
HCIN-630	Usability Testing	3
HCIN-794	MS Human Computer Interaction Capstone Proposal	3
	Application Domain Courses	6
	Program Elective	3
Second Year		
HCIN-795	MS HCI Project	3
	Program Elective	3
Total Semester Credit Hours		**30**

Human-Computer Interaction (thesis option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
HCIN-600	Research Methods	3
HCIN-610	Foundations of Human-Computer Interaction	3
HCIN-620	Information and Interaction Design	3
HCIN-630	Usability Testing	3
	Application Domain Courses	6
	Program Electives	6
Second Year		
HCIN-796	MS HCI Thesis	6
Total Semester Credit Hours		**30**

Human-Computer Interaction (directed final project option*), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
HCIN-600	Research Methods	3
HCIN-610	Foundations of Human-Computer Interaction	3
HCIN-620	Information and Interaction Design	3
HCIN-630	Usability Testing	3
	Application Domain Courses	6
	Program Electives	6
Second Year		
HCIN-797	MS HCI Directed Final Project	3
	Program Elective	3
Total Semester Credit Hours		**30**

* Directed Final Project Option is for online students.

Application domain courses

e-Learning technologies

COURSE	
HCIN-660	Fundamentals of Instructional Technology
HCIN-661	Interactive Courseware

Geographic information science and technology

COURSE	
IGME-770	Geographic Information Science and Technology
IGME-772	Geographic Visualization

Smart device application design and development

COURSE	
HCIN-720	Prototyping Wearable and Internet of Things Devices
HCIN-722	Human-Computer Interaction with Mobile, Wearable, and Ubiquitous Devices

Web development

COURSE	
ISTE-645	Foundations of Web Technologies I
ISTE-646	Foundations of Web Technologies II

Program electives

COURSE	
HCIN-660	Fundamentals of Instructional Technology
HCIN-661	Interactive Courseware
HCIN-700	Current Topics in HCI
HCIN-720	Prototyping Wearable and Internet of Things Devices
HCIN-722	Human-Computer Interaction with Mobile, Wearable, and Ubiquitous Devices
HCIN-730	User-Centered Design Methods
HCIN-794	MS Human Computer Interaction Capstone Proposal
IGME-770	Geographic Information Science and Technology
IGME-772	Geographic Visualization
ISTE-645	Foundations of Web Technologies I
ISTE-646	Foundations Of Web Technologies II
ISTE-764	Project Management
ISTE-782	Visual Analytics
MEDI-701	Introduction to Health Informatics
PSYC-712	Graduate Cognition
PSYC-715	Graduate Perception

Admission requirements

To be considered for admission to the MS program in human-computer interaction, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.

- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- Have college level credit or practical experience in computing; however, study in other disciplines will be given consideration.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Prerequisites

The program requires strong technical and social science skills. Knowledge of quantitative statistical methodologies is important since students review research studies as well as analyze the results of their own usability evaluations. Students are also expected to have a solid background in computer programming. These competencies may be demonstrated by previous course work, technical certifications, or comparable work experience. Bridge courses are available to fulfill any gaps in an applicant's qualifications. Applicants will be made aware of any areas where additional course work may be necessary.

Information Technology and Analytics, MS

www.rit.edu/study/information-technology-and-analytics-ms

Qi Yu, Professor
585-475-6929, Qi.Yu@rit.edu

Program overview

Technology has woven itself into the fabric of society, binding people and information closer together than ever before. This new digital era brings with it exciting innovations. It also brings a host of new, unexplored problems that can be unlocked through data analytics. RIT's master's of information technology and analytics provides an opportunity for in-depth, career-oriented study that explores how information is understood and leverages the most current data analytics techniques to address industry problems.

The internet has brought a new kind of democracy where all information is created equal. No longer the sole province of experts and the traditional media, it has become grassroots, viral, and global. The sheer volume and lightning speed of information transfer has changed how the world communicates, educates, learns, and ultimately solves problems. As the web and its related technologies evolve, users need help in managing these new tools.

An Information Technology Master's Degree That Combines IT and Analytics

Graduate study in a computing discipline that only focuses on traditional computing approaches is not flexible enough to meet the needs of the real world. New hardware and software tools are continually introduced into the market. IT professionals must have a specific area of expertise, as well as adaptability, to tackle the next new thing. Or, just as often, retrofit available technologies to help users adapt to the latest trends.

RIT's master's of information technology and analytics provides an opportunity for in-depth study that prepares you for today's high-demand computing careers. Companies are drowning in data—structured, semi-structured, and unstructured. Big data is not just high transaction volumes; it is also data in various formats, with high velocity change, and increasing complexity. Information is gleaned from unstructured sources—such as web traffic or social networks—as well as traditional ones; and information delivery must be immediate and on demand.

As the users' advocate, IT professionals also need the critical thinking skills to problem-solve in a wide variety of computing situations, combined with an understanding of the needs of their audience. Just knowing how technology works is no longer enough. Today, computing professionals need to know how to make it all work.

RIT's Master's of Information Technology and Analytics

The master's of information technology and analytics program addresses the web systems and integration technologies, and the information management and database technology pillars, of the IT academic discipline, along with the additional option of discovery informatics.

Domain Electives–Chosen only by those enrolled in the on-campus option, domain electives are available in: analytics, information management and database technology, or web systems and integration technologies. With permission of the graduate program director, students may select the special topics track to fulfill this requirement. See the graduate program director for more information.

Thesis/Capstone Options–For the on-campus option of the program, students may choose a project or a thesis to build upon their domain of study. The project option is 3 credit hours and requires one additional 3

credit domain elective. The thesis option is 6 credit hours and does not require an additional elective. The online option consist of a capstone project.

Experiential Learning

Cooperative Education

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Cooperative education is optional but strongly encouraged for graduate students in the MS in information technology and analytics.

Curriculum

Information Technology and Analytics (thesis and project options), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
DSCI-633	Foundations of Data Science and Analytics	3
ISTE-605	Scholarship In Information Sciences And Technologies	3
ISTE-608	Database Design and Implementation	3
ISTE-610	Non-Relational Data Management	3
ISTE-612	Information Retrieval and Text Mining	3
	Domain Electives	9
Second Year		
Choose one of the following:		6
ISTE-790	Thesis in Information Sciences and Technologies	6
or		
ISTE-791	Project In Information Sciences And Technologies	3
	Domain Elective	3
Total Semester Credit Hours		**30**

Domain electives

COURSE	
Data Analytics	
ISTE-724	Data Warehousing
ISTE-732	IOT Analytics
ISTE-780	Data Driven Knowledge Discovery
ISTE-782	Visual Analytics
Information Management and Database Technology	
ISTE-721	Information Assurance Fundamentals
ISTE-722	Database Connectivity and Access
ISTE-724	Data Warehousing
ISTE-726	Database Management and Access
Other approved electives	
ISTE-730	Foundations of IOT
ISTE-764	Project Management
ISTE-792	Capstone Guidance Colloquium

Admission requirements

To be considered for admission to the MS program in information technology and analytics, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Prerequisites

It is expected that prospective students will have a background in fundamental information technology concepts including object-oriented programming, website development, database theory and practice, and statistics. Students without the necessary background should complete the prerequisites before applying to the program. However, bridge courses are available to satisfy the prerequisites.

Bridge Program

Students whose undergraduate preparation or employment experience does not satisfy the prerequisites can make up these deficiencies by completing prerequisite bridge courses as prescribed by the graduate program director. The bridge courses are not part of the 30 semester credit hours required for the master's degree. Grades for bridge courses are not included in a student's GPA if the courses are taken before matriculation; they are included if completed after matriculation. Since bridge programs can be designed in a variety of ways, the graduate program director will assist students in planning and course selection.

Software Engineering, MS

www.rit.edu/study/software-engineering-ms
J Scott Hawker, Associate Professor
585-475-2705, jshvse@rit.edu

Program overview

As you pursue a software engineering master's degree your educational experience will parallel the realities of the industry as you learn how to define, design, develop, and deliver modern software. Utilize computer science theories to create software that allows computers to meet the demands of an ever-changing, technologically-dependent society. Conduct research in many areas including data science for software engineering, artificial intelligence applications in software engineering, software modeling. Gain hands-on experience through team-based projects that help you master modern software engineering techniques.

RIT is renowned for its cooperative education program, one of the oldest and largest programs in the world. Co-op is full-time, paid work experience in industry. A number of graduates from the software engineering master's degree are employed at companies such as Citrix, SpaceX, Intuit, Amazon, Microsoft, and many others.

RIT's Master's in Software Engineering

Since these systems are rarely the result of a single individual's effort, RIT's master's in software engineering focuses on a team-based approach that recognizes the significant role teams play in the design, development, and implementation of software systems of varying size and complexity. You will be actively engaged in software architecture, software security, and mining of software repositories research. And, you will be involved in the software engineering department's emerging areas of research in data science for software engineering and software engineering for data science. As a result, our software engineering master's degree prepares you to contribute to and lead software development projects from day one.

Software Engineering Courses

RIT's master's in software engineering accepts students from many educational backgrounds, including recent undergraduates and professionals interested in pursuing a software engineering career. An introductory course, Software Construction, helps students get up to speed on programming and basic computing concepts. We also have an introductory core course, Software Engineering Fundamentals. Students with degrees in engineering, science, business, and education have all bee successful graduates of our program. Our students master modern software engineering techniques in a team setting using state-of-the-art tools and platforms.

With careful selection of your electives and the topics chosen for your course projects and capstone project or thesis research, you may focus on core software engineering topics, or you may specialize in the applications of software engineering to numerous fields, including:

- Data Science: Courses are available in areas such as Foundations of Data Science, Software Engineering for Data Science, Applied Data Science, Engineering Cloud Software Systems, etc.
- Full-Stack Web Development: Courses are available in areas such as Software Architecture, Client Design and Development, Server Design and Development, and Secure Web Application Development.
- Technology and Project Management: You may take courses from RIT's MS in business analytics or MS in technology innovation management and entrepreneurship.

In RIT's software engineering department, you will learn and receive personalized attention from faculty who are working in many areas of software engineering and its applications. Outfitted with the latest hardware and software technology, our facilities include studio labs, project labs, team rooms, a collaboration lab, and a real-time and embedded systems lab–all designed to help you collaborate on projects, polish your skills, and collaborate with faculty. The department has partnered with a number of software companies to provide you with access to a wide range of software products for learning and research.

Experiential Learning

Cooperative Education

What's different about RIT's engineering education? It's the opportunity to complete engineering co-ops and internships with top companies in every single industry. You'll earn more than a degree. You'll gain real-world career experience that sets you apart.

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Curriculum

Software Engineering (thesis option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
SWEN-601	Software Construction	3
SWEN-610	Foundations of Software Engineering	3
SWEN-640	Research Methods	3
SWEN-746	Model-Driven Development	3
SWEN-732	Collaborative Software Development	3
	Elective	3
Second Year		
SWEN-755	Software Architecture	3
SWEN-777	Software Quality Assurance	3
SWEN-790	Thesis	6
SWEN-799	Independent Study	3
	Elective	3
Total Semester Credit Hours		**36**

Software engineering (capstone option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
SWEN-601	Software Construction	3
SWEN-610	Foundations of Software Engineering	3
SWEN-640	Research Methods	3
SWEN-746	Model-Driven Development	3
SWEN-732	Collaborative Software Development	3
	Elective	3
Second Year		
SWEN-755	Software Architecture	3
SWEN-777	Software Quality	3
SWEN-780	Capstone Research Project	3
	Electives	6
	SE Elective	3
Total Semester Credit Hours		**36**

Admission requirements

To be considered for admission to the MS program in software engineering, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Professional experience developing software is preferred, but candidates without a background in computing will be considered. Additional bridge course work may be required, and may extend time to graduation.

Bridge Courses

Based on the evaluation of academic and relevant experience, the graduate program director may require some applicants to successfully complete bridge courses to fill in any gaps in their background. Successful completion of bridge courses is necessary for registration in graduate-level courses.

Web Development, Adv. Cert.

www.rit.edu/study/web-development-adv-cert
Qi Yu, Professor
585-475-6929, Qi.Yu@rit.edu

Program overview

As interactive technologies advance, the ways in which we communicate change—and the importance of enhancing the communication experience within electronic environments increases. The advanced certificate in web development provides an opportunity for students to gain firsthand knowledge and expertise in the art and science of interactive multimedia design.

RIT's Graduate Certificate in Web Development

Students explore the theories of interactive computing, fundamentals of interactive design, web and multimedia programming, and the impact of networked technologies in web communications. Projects include the development of websites and interactive multimedia applications. Students have at their disposal a variety of computer, video, and digitizing equipment in our state-of-the-art interactive media laboratories.

What is a Graduate Certificate?

A graduate certificate, also called an advanced certificate, is a selection of up to five graduate level courses in a particular area of study. It can serve as a stand-alone credential that provides expertise in a specific topic that enhances your professional knowledge base, or it can serve as the entry point to a master's degree. Some students complete an advanced certificate and apply those credit hours later toward a master's degree.

Curriculum

Web Development, advanced certificate, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
HCIN-610	Foundations of Human-Computer Interaction	3
ISTE-645	Foundations of Web Technologies I	3
ISTE-646	Foundations of Web Technologies II	3
HCIN-636	Interactive Programming	3
Total Semester Credit Hours		**12**

Admission requirements

To be considered for admission to the advanced certificate in web development, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Prerequisites

Due to continuing advances in the technologies used for interactive multimedia, knowledge of programming is necessary in this field. Students must have object-oriented programming skills equivalent to one year of study. Bridge courses are available to complete any requirements missing from the applicant's credentials.

Study Options

This certificate is intended for part-time study; therefore, RIT cannot issue I-20 paperwork. Courses are only offered on campus.

Faculty

Dean's Office

Matt Huenerfauth, MS, University of Delaware; MSc, University College Dublin (Ireland); Ph.D., University of Pennsylvania—Dean; Professor

Michael A. Yacci, BS, Ithaca College; MS, Rochester Institute of Technology; Ph.D., Syracuse University—Senior Associate Dean for Academic Affairs; Professor

Pengcheng Shi, BS, Shanghai Jiao Tong University (China); MS, M.Phil, Ph.D., Yale University—Doctorate Program Director; Professor; Associate Dean for Research and Scholarship

Computer Science

Zack Butler, BS, Alfred University; Ph.D., Carnegie Mellon University—Interim Department Chair; Professor

Reynold Bailey, BS, Midwestern State University; MS, Ph.D., Washington University—Associate Undergraduate Program Director; Professor

Ivona Bezakova, BS, Comenius University (Slovakia); Ph.D., University of Chicago—Professor

Hans-Peter Bischof, BS, MS, University of Ulm (Germany); Ph.D., University of Osnabrück (Germany)—Graduate Program Director; Professor

TJ. Borrelli, BS, St. John Fisher College; MS, Rochester Institute of Technology—Principal Lecturer

Jeremy Brown, BS, Rochester Institute of Technology; MS, Florida Institute of Technology—Lecturer

Ting Cao, BS, Changsha University of Science and Technology (China); MS, University of Edinburgh (United Kingdom)—Lecturer

Warren Carithers, BS, MS, University of Kansas—Associate Professor

Maria Cepeda, BS, Antonio Machado Education Institute (Spain); MS, Rochester Institute of Technology—Lecturer

Varsha Dani, BS, University of Bombay (India); MS, Ph.D.., University of Chicago—Assistant Professor

Aaron Deever, BS, Pennsylvania State University; Ph.D., Cornell University—Senior Lecturer, Associate Undergraduate Program Director

Matthew Fluet, BS, Harvey Mudd College; Ph.D., Cornell University—Associate Professor

Joe Geigel, BS, Manhattan College; MS, Stevens Institute of Technology; Ph.D., George Washington University—Professor

James Heliotis, BS, Cornell University; Ph.D., University of Rochester—Professor

Edith Hemaspaandra, BS, MS, Ph.D., University of Amsterdam (Netherlands)—Professor

Chris Homan, AB, Cornell University; MS, Ph.D., University of Rochester—Associate Professor

Scott Johnson, BS, MS, Rochester Institute of Technology—Senior Lecturer

Thomas Kinsman, BS, University of Delaware; MS, Carnegie Mellon University; Ph.D., Rochester Institute of Technology—Senior Lecturer

Mohan Kumar, BE, Bangalore University (India); MTech, Ph.D., Indian Institute of Science (India)—Professor

Mineseok Kwon, BS, MS, Seoul National University (South Korea); Ph.D., Purdue University—Associate Chair; Associate Professor

Xumin Liu, BE, Dalian University (China); ME, Jinan University (China); Ph.D., Virginia Polytechnic Institute and State University—Associate Professor

Michael Mior, BS, University of Ontario (Canada); MS, University of Toronto (Canada); Ph.D., University of Waterloo (Canada)—Assistant Professor

Arthur Nunes-Harwitt, BS, Brandeis University; MS, University of Pittsburgh; Ph.D., Rochester Institute of Technology—Senior Lecturer

Jansen Orfan, BS, Monmouth University; MS, University of Rochester—Lecturer

Alex Ororbia, BS, Bucknell University; MS, Ph.D., Pennsylvania State University—Assistant Professor

Monika Polak, BS, MS, Ph.D., Maria Curie-Sktodowska University (Poland)—Lecture

Stanislaw Radziszowski, MS, Ph.D., University of Warsaw (Poland)—Professor

Muhammed Mustapha Rafique, BS, National University of Computer and Emerging Sciences (Pakistan); MS, Ph.D. Virginia Tech University—Assistant Professor

Rajendra K. Raj, BS, Indian Institute of Technology (India); MS, University of Tennessee; MS, Ph.D., University of Washington—Professor

Leonid Reznik, Degree of Electronics, Leningrad Institute of Aeronautical Construction (Russia); MS, St. Petersburg Aircraft Academy (Russia); Ph.D., St. Petersburg Polytechnic Institute (Russia)

Carlos Rivero Osuna, BS, MS, Ph.D., University of Seville (Spain)—Associate Professor

Richard Zanibbi, BA, MS, Ph.D., Queens University (Canada)—Professor

Weijie Zhao, BS, East China Normal University (China); Ph.D., University of California—Assistant Professor

Computing Security

Matthew Wright, BS, Harvey Mudd College; MS, Ph.D., University of Massachusetts at Amherst—Department Chair; Professor

Hrishikesh Acharya, BS, Indian Institute of Technology Kharagpur (India); Ph.D., University of Texas at Austin—Assistant Professor

Ivan De Oliveira Nunes, BE, Federal University of Espirito Santo; MS, Federal University of Minas Gerais; Ph.D., University of California Irvine—Assistant Professor

Yidan Hu, BE, MS, Hangzhou Dianzi University; Ph.D. University of Delaware—Assistant Professor

Daryl Johnson, BS, St. John Fisher College; MS, Rochester Institute of Technology—Associate Professor

Sumita Mishra, BS, Patna University (India); BS, Ph.D., State University of New York at Buffalo—Professor; Graduate Program Director

Rob Olson, BS, MS, State University of New York at Fredonia; MS, Nova Southeastern University—Senior Lecturer

Yin Pan, BS, MS, Shanghai Normal University (China); MS, Ph.D., State University of New York at Binghamton—Professor

Hanif Rahbari, BS, Sharif University of Technology (Iran); MS, Amirkabir University (Iran); Ph.D., University of Arizona—Assistant Professor

William Stackpole, BS, Roberts Wesleyan College; MS, Rochester Institute of Technology—Professor

Jonathan S. Weissman, BS, College of Staten Island; MA, Brooklyn College—Senior Lecturer

Bo Yuan, BS, MS, Shanghai Normal University (China); Ph.D., State University of New York at Binghamton—Professor

School of Information

Stephen J. Zilora, BS, University of Rochester; MS, New Jersey Institute of Technology—Interim School Director; Professor

Catherine I. Beaton, BA, BEd, MITE, Dalhousie University (Canada)—Associate Professor

Daniel S. Bogaard, BFA, Indiana University; MS, Rochester Institute of Technology—Undergraduate Program Director; Associate Professor

Charles B. Border, BA, State University College at Plattsburgh; MBA, Ph.D., State University of New York at Buffalo—Associate Professor

Stephen Cady, BA, Brooks Institute; BA, Antioch University; MFA, University of Illinois—Lecturer

Anne R. Haake, BA, Colgate University; MS, Rochester Institute of Technology; MS, Ph.D., University of South Carolina—Professor

Vicki Hanson, BA, University of Colorado; MA, Ph.D., University of Oregon—Distinguished Professor Emeritus

Bruce H. Hartpence, BS, MS, Ph.D., Rochester Institute of Technology—Professor

Lawrence Hill, BS, MS, Rochester Institute of Technology—Associate Professor

Edward Holden, BA, State University College at Oswego; MBA, Rochester Institute of Technology—Associate Professor

Jai Kang, BS, Seoul National University (South Korea); MA, Kent State University; MS, Georgia Institute of Technology; Ph.D., State University of New York at Buffalo—Associate Professor

Jefrey A. Lasky, BBA, MBA, City College of New York; MS, University of Minnesota—Professor Emeritus

Jim Leone, BS, University of Cincinnati; MA, Ph.D., Johns Hopkins University—Professor Emeritus

Sharon P. Mason, BS, Ithaca College; MS, Rochester Institute of Technology—Professor

Tae (Tom) Oh, BS, Texas Tech University; MS, Ph.D., Southern Methodist University—Professor

Roshan L. Peiris, BS, University of Moratuwa (Sri Lanka); Ph.D., National University of Singapore (Singapore)—Assistant Professor

Sylvia Perez-Hardy, BS, MBA, Cornell University—Associate Professor

Evelyn P. Rozanski, BS, State University College at Brockport; MS, Syracuse University; Ph.D., State University of New York at Buffalo—Professor Emeritus

Nirmala Shenoy, BE, ME, University of Madras (India); Ph.D., University of Bremen (Germany)—Professor

Kristen Shinohara, BS, University of Puget Sound; MS, University of Washington-Tacoma; Ph.D., University of Washington-Seattle—Assistant Professor

Zhiqiang Tao, B.Eng, MS, Tianjin University (China); Ph.D., Northeastern University

Elissa M. Weeden, BS, MS, Ph.D., Rochester Institute of Technology—Associate Professor

Qi Yu, BE, Zhejiang University (China); MS, National University of Singapore (Singapore); Ph.D., Virginia Polytechnic Institute and State University—Professor; Graduate Program Director

Interactive Games and Media

David I. Schwartz, BS, MS, Ph.D., University of Buffalo—Director; Associate Professor

Jessica Bayliss, BS, California State University at Fresno; MS, Ph.D., University of Rochester—Professor

John A. Biles, BA, MS, University of Kansas—Professor Emeritus

Carlos Castellanos, BA, San Francisco State University; MFA, San Jose State University; Ph.D., Simon Fraser University—Assistant Professor

Chris Egert, BS, MS, Rochester Institute of Technology; Ph.D., University at Buffalo—Associate Professor

Owen Gottlieb, AB, MA, MA, Ph.D., New York University—Associate Professor

W. Michelle Harris, BS, Carnegie Mellon University; MPS, New York University—Associate Professor

Jay Alan Jackson, BS, MS, Ph.D., Florida State University—Associate Professor

Elizabeth Lane Lawley, AB, MLS, University of Michigan; Ph.D., University of Alabama—Professor

Sten McKinzie, BS, MS, Rochester Institute of Technology—Lecturer

Elouise Oyzon, BFA, MFA, Rochester Institute of Technology—Associate Professor

Konstantinos Papangelis, BS, University of Huddersfield (United Kingdom); MS, University of Lancaster (United Kingdom); Ph.D., University of Aberdeen (United Kingdom); Fellow of the Royal Society of the Arts—Assistant Professor

Chao Peng, B.Arch, Hebei University of Engineering (China); MFA, University of Alaska Fairbanks; MS, Ph.D., Virginia Polytechnic Institute and State University—Associate Professor

Justus Roberston, BS, MS, Ph.D., North Carolina State University—Assistant Professor

David Simkins, BA, Earlham College; MS, Ph.D., University of Wisconsin-Madison—Associate Professor

Brian Tomaszewski, BA, University of Albany; MA, University at Buffalo; Ph.D., Pennsylvania State University—Professor

Software Engineering

Naveen Sharma, MS, Indian Institutes of Sciences (India); Ph.D., Kent State University—Department Chair; Professor

Travis Desell, BS, MS, Ph.D., Rensselaer Polytechnic Institute—Associate Professor; Data Science Graduate Program Director

J. Scott Hawker, BS, MS, Texas Tech University; Ph.D., Lehigh University—Software Engineering Graduate Program Director; Associate Professor

Ashique KhudaBukhsh, B.S., West Bengal University of Technology (India); M.Sc., The University of British Columbia (Canada); Ph.D., Carnegie Mellon University—Assistant Professor

Daniel Krutz, BS, St. John Fisher College; MS, Rochester Institute of Technology; Ph.D., Nova Southeastern University—Assistant Professor

Andrew Meneely, BA, Calvin College; Ph.D., North Carolina State University—Associate Professor

Mehdi Mirakhorli, BS, Teacher Training University (Iran); MS, National University (Iran); Ph.D., DePaul University—Director of Research, ESL Global Cybersecurity Institute; Assistant Professor

Mohamed Wiem Mkaouer, BS, University of Tunis (Tunisia); MS, University of Geneva (Switzerland); Ph.D., University of Michigan—Assistant Professor

Christian Newman, BS, MS, Ph.D., Kent State University—Assistant Professor

Nidhi Rastogi, BS, University of Delhi; MS, University of Cincinnati; Ph.D., Rensselaer Polytechnic Institute—Assistant Professor

Zhe Yu, BS, MS, Shanghai Jiao Tong University (China); Ph.D., North Carolina State University—Assistant Professor

Xueling Zhang, BS, Chongqing University, China; PhD, University of Texas—Assistant Professor

Computing and Information Sciences

Pengcheng Shi, BS, Shanghai Jiao Tong University (China); MS, M.Phil., Ph.D., Yale University—Doctorate Program Director; Professor; Associate Dean for Research and Scholarship

Yu Kong, BS, Anhui University (China); MS, Ph.D., Beijing Institute of Technology (China)—Assistant Professor

Rui Li, BS, Harbin Institute of Technology (China); MS, Tianjin University of Technology (China); Ph.D., Rochester Institute of Technology—Assistant Professor

Linwei Wang, BS, Zhejiang University (China); M.Phil., Hong Kong University of Science and Technology (Hong Kong); Ph.D., Rochester Institute of Technology—Professor

Kate Gleason College of Engineering

Doreen Edwards, Dean
rit.edu/engineering

Programs of Study

🖱 Online learning option available.

The Kate Gleason College of Engineering offers comprehensive, innovative graduate programs in a broad range of engineering disciplines. Programs include master of science degrees, master of engineering degrees, advanced certificates, and broad-based, cross-disciplinary doctoral programs in engineering and microsystems engineering. In conjunction with the College of Science, the Kate Gleason College offers an interdisciplinary MS degree in materials science and engineering.

The doctorate program in engineering prepares the next generation of engineering leaders to tackle some of the most daunting and complex problems facing our society. This program provides an original approach to engineering doctoral education, resulting in graduates who are prepared equally well for careers in industry as well as academia. The doctorate program in microsystems engineering builds on the fundamentals of traditional engineering and science combined with curriculum and research activities addressing the numerous technical challenges of micro- and nanosystems. This program provides a foundation to explore future technology through research in nano-engineering, design methods, and technologies and their integration into micro- and nanoscaled systems.

The master of science degree programs in the Kate Gleason College include extensive course work and an individual research experience to prepare graduates for employment in industry or graduate study at the doctoral level. The master of engineering degree programs are generally considered to be terminal degrees, focused on preparing graduates for technical and leadership careers in industry. A capstone experience combined with additional course work replaces the traditional thesis requirement.

Please visit the college's website–**www.rit.edu/engineering**–for in depth information on academics, faculty, facilities, research initiatives, advising, and more.

Admission requirements

Each college makes all decisions regarding graduate admission. Please refer to the individual program descriptions for information regarding specific admission criteria. For general graduate admission information, please refer to the Admission section of this bulletin.

Financial aid and scholarships

Please refer to the Financial Aid and Scholarship section of this bulletin for information regarding financial aid, scholarships, grants, loans, and graduate assistantships.

Biomedical and Chemical Engineering, Ph.D.

www.rit.edu/study/biomedical-and-chemical-engineering-phd
Tom Gaborski, Associate Professor
585-475-4117, trgbme@rit.edu

Program overview

The biomedical and chemical engineering Ph.D. program provides you with the knowledge, training, and expertise to tackle important problems in industry, academia, government, and health care.

In the biomedical and chemical engineering Ph.D. program you will complete a number of classes in your first two years of study, including foundational courses with other engineering doctorate students, discipline-specific courses within biomedical and chemical engineering, and elective courses you select with your research advisor. You will complete a research thesis project with your faculty advisor in their lab and may have the opportunity to complete a complementary industrial co-op or internship. You will graduate from the program as a highly skilled researcher who is well positioned to be a leader in the next generation of engineers who will help tackle the challenging and complex problems facing our society.

Plan of Study

The curriculum for the biomedical and chemical engineering Ph.D. program provides the knowledge and skills to develop successful independent researchers.

Core Courses: Core courses, which are usually completed during the first two semesters of the program, serve as foundational preparation for elective courses. They develop your core competency skills for research, introduce the research landscape in biomedical and chemical engineering, and helping prepare you for the qualifying exam.

Discipline Concentration Elective Courses: The discipline concentration elective courses provide rigorous education in a field of research in biomedical and chemical engineering. Students may choose elective courses in consultation with the dissertation and research advisor, and from courses offered by the department of biomedical engineering and the department of chemical engineering.

Focus Area Elective Courses: Focus area elective courses provide the flexibility for you to engage in trans-disciplinary learning. In consultation with your dissertation and research advisor, you will select graduate level elective courses offered by any of the departments in the Kate Gleason College of Engineering. In addition, and subject to the program director's approval, you may choose graduate courses offered by any of the RIT colleges.

Qualifying Exam: You will complete a qualifying exam at the end of your first year of study. The exam evaluates your aptitude, potential, and competency in conducting doctorate-level research. Through written documentation and a presentation of your work, you will critically review a recent peer-reviewed journal article in your field and propose a creative extension of the work.

Dissertation Proposal and Candidacy Exam: You will present and defend a dissertation proposal to your dissertation committee typically during your third year of study. The proposal provides the opportunity for you to elaborate on your research plans and to obtain feedback from your dissertation committee on the direction and approach of your research.

Research Review Meetings: Research review meetings provide comprehensive feedback regarding your dissertation research progress and expected outcomes prior to the defense of your full dissertation.

Dissertation Presentation and Defense: You will prepare an original, technically rigorous, and well-written dissertation that describes your research body of work and novel contributions that have resulted from your doctoral studies in biomedical and chemical engineering. You will present and defend your dissertation and its accompanying research to your dissertation committee.

Research Assistantships

Research assistantships are available to doctoral students. Learn more about the college's research assistantship opportunities and how you can apply.

Experiential Learning

Internships

You may apply for internships in industry or at one of the national laboratories that align with your thesis research. Internships provide an opportunity for hands-on research experience, professional networking, and can serve to advance your thesis work. In addition, you may identify research opportunities at the National Labs Career Fair, an annual event hosted by RIT that brings representatives to campus from the United States' federally-funded research and development labs.

Curriculum

Biomedical and Chemical Engineering, Ph.D. degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
ENGR-701	Inter-disciplinary Research Methods	3
ENGR-702	Translating Discovery into Practice	3
ENGR-795	Doctoral Seminar	2
ENGR-892	Graduate Research	3
	Engineering Foundation 1, 2*	6
	Discipline Concentration 1, 2†	6
Second Year		
ENGR-795	Doctoral Seminar	1
ENGR-892	Graduate Research	6
	Discipline Concentration 3†	3
	Focus Area Elective 1, 2, 3, 4‡	12
Third Year		
ENGR-890	Dissertation and Research	21
Total Semester Credit Hours		**66**

*Engineering Foundation Electives:

BIME-750	Statistical Analysis and Modeling of Biomedical Data
CHME-709	Advanced Engineering Mathematics
EEEE-707	Engineering Analysis
EEEE-709	Advanced Engineering Mathematics
ISEE-760	Design of Experiments
MATH-655	Biostatistics

† Discipline Concentration: Any graduate level course offered by the departments of biomedical or chemical engineering, exclusive of capstones.
‡ Focus Area Elective: Any graduate level course offered by the Kate Gleason College of Engineering, exclusive of capstones.

Admission requirements

To be considered for admission to the Ph.D. program in biomedical and chemical engineering, candidates must fulfill the following requirements:

- Complete a graduate application.
- Hold a bachelor's or master's degree (or equivalent) from an accredited university or college in engineering. Other degrees may also be accepted, but students may be required to take bridge courses. Please contact the program director for more information.
- Submit official transcripts (in English) for all previously completed undergraduate and graduate course work.
- Have a minimum cumulative GPA of 3.0 (or equivalent).
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a Statement of Purpose for Research.
- Submit a current resume or curriculum vitae highlighting educational background and experiences.
- Submit at least two letters of academic and/or professional recommendation. Letters for doctoral candidates must be confidential and must be submitted directly from the referee to RIT.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Students are strongly encouraged to contact individual faculty members to discuss research interests and potential opportunities.

Computer Engineering, MS

www.rit.edu/study/computer-engineering-ms
Andres Kwasinski, Professor
585-475-5139, ak@mail.rit.edu

Program overview

The computer engineering masters focuses on the design and development of computer and computer-integrated systems, with consideration to such engineering factors as function, performance, security, and sustainability. Computer engineers design and build these systems to meet application and system requirements with attention to the hardware-software interaction. The program emphasizes the careful adoption of design methodology and the application of sophisticated engineering tools. The intensive programming and laboratory work requirements ensure significant, high level, specialized knowledge and experience with modern facilities and state-of-the-art design tools.

RIT's Computer Engineering Master's Degree

The MS in computer engineering provides you with a high level of specialized knowledge in computer engineering. You'll strengthen your ability to successfully formulate solutions to current technical problems while gaining significant independent learning experience that can prepare you for further graduate study or for continuing professional development at the leading edge of the field. The program accommodates applicants with undergraduate degrees in computer engineering or related programs such as electrical engineering or computer science. Some additional bridge courses may be required for applicants from undergraduate degrees outside of computer engineering.

The degree consists of a required course, flexible core courses, graduate electives, graduate seminar, and your choice of a thesis research or a graduate project.

Flexible Core: You will choose one course from each of the following core clusters, with your faculty advisor's guidance.

- Computer Architecture and Digital Design
- Computing, Communications and Algorithms

Graduate Electives: With advisor and department approval, you may request to take graduate courses outside of the department. The graduate electives are selected among the available research tracks. You are encouraged to choose most of your graduate electives within a single track, by consulting with your advisor. You must take a minimum of two electives from the department of computer engineering.

Thesis Research: Thesis research is an independent investigation of a research problem that contributes to the state of the art. Students who pursue the thesis option seek to answer a fundamental science/engineering question that contributes new knowledge in the field. You are expected to formulate the problem under a faculty advisor's guidance and conduct extensive quantitative or qualitative analyses with sound methodology. A thesis committee will guide your research activities. Your findings are expected to be repeatable and generalizable, with sufficient quality to make them publishable in technical conferences and/or journals. For detailed information on thesis research timeline and requirements, please refer to Computer Engineering Thesis Research.

Graduate Project: The graduate project is a scholarly undertaking that addresses a current technical problem with tangible outcomes. The project generally addresses an immediate and practical problem, a scholarly undertaking that can have tangible outcomes. Examples of typical projects include implementing, testing, and evaluating a software and/or hardware system or conducting a comprehensive literature review with a comparative study. You are expected to give a presentation or demonstration of the final deliverables of your project. For detailed information on a graduate project timeline and requirements, please refer to Computer Engineering Graduate Project.

Computer Engineering Research Tracks

You are encouraged to choose most of your graduate electives within a single research track, by consulting with your advisor. You may take relevant courses from other academic programs, including electrical engineering, computer science, and software engineering, to support a specific research focus. The following research tracks are available:

- Computer Architecture–Computer architecture area deals with hardware resource management, instruction set architectures and their close connection with the underlying hardware, and the interconnection and communication of those hardware components. Some of the current computer architecture challenges that are being tackled in the computer engineering department include energy efficient architectures, high performance architectures, graphic processing units (GPUs), reconfigurable hardware, chip multiprocessors, and Networks-on-Chips.
- Computer Vision and Machine Intelligence–Visual information is ubiquitous and ever more important for applications such as robotics, health care, human-computer interaction, biometrics, surveillance, games, entertainment, transportation and commerce. Computer vision focuses on extracting information from image and video data for modeling, interpretation, detection, tracking and recognition. Machine Intelligence methods deal with human-machine interaction, artificial intelligence, agent reasoning, and robotics. Algorithm development for these areas spans image processing, pattern recognition and machine learning, and is intimately related to system design and hardware implementations.
- Integrated Circuits and Systems–Modern processors demand high computational density, small form factors, and low energy dissipation with extremely high performance demands. This is enabled by the nanoscale and heterogeneous integration of transistors and other emerging devices at the massive-scale. Such nanocomputers will open unimaginable opportunities as well as challenges to computer engineers. This research focuses designing computers with emerging novel technologies in the presence of severe physical constraints; investigating dynamic reconfigurability to exploit the power of nanoscale electronics for building reliable computing systems; and studying the applicability of emerging technologies to address challenges in computing hardware of the future.
- Networks and Security–The prevalence of interconnected computing, sensing and actuating devices have transformed our way of life. Ubiquitous access to data using/from these devices with reliable performance as well as security assurance presents exciting challenges for engineers and scientists. Resilient to environmental uncertainty, system failures and cyber attacks requires advances in hardware, software and networking techniques. This research track focuses on intelligent wireless and sensor networks, cryptographic engineering, and predictive cyber situation awareness.
- Signal Processing, Control, and Embedded Systems–This research area is concerned with algorithms and devices used at the core of system that interacts with our physical world. As such, this area considers the sensing, analysis and modeling of dynamic systems with the intent of measuring information about a system, communicating this information and processing it to adapt its behavior. Application areas are robust feedback-based control where uncertainty in the dynamics and environment must be considered during the design process and signal processing algorithms and devices for system sensing and adaptation.

Experiential Learning

Cooperative Education

What makes an RIT education exceptional? It's the opportunity to complete relevant, hands-on engineering co-ops and internships with top companies in every single industry. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Cooperative education is optional but strongly encouraged for graduate students in the computer engineering master's program.

Curriculum

Computer Engineering (thesis option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
CMPE-610	Analytical Topics in Computer Engineering	3
CMPE-795	Graduate Seminar	0
Choose one of the following flexible core courses:		3
CMPE-630	Digital Integrated Circuit Design	
CMPE-660	Reconfigurable Computing	
CMPE-755	High Performance Architectures	
Choose one of the following flexible core courses:		3
CMPE-655	Multiple Processor Systems	
CMPE-670	Data and Communication Networks	
CMPE-677	Machine Intelligence	
	Graduate Electives*	9
Second Year		
CMPE-790	Thesis	9
	Graduate Elective	3
Total Semester Credit Hours		**30**

* At least two graduate electives must come from the computer engineering department.

Computer Engineering (project option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
CMPE-610	Analytical Topics in Computer Engineering	3
CMPE-795	Graduate Seminar	0
Choose one of the following flexible core courses:		3
CMPE-630	Digital Integrated Circuit Design	
CMPE-660	Reconfigurable Computing	
CMPE-755	High Performance Architectures	
Choose one of the following flexible core courses:		3
CMPE-655	Multiple Processor Systems	
CMPE-670	Data and Communication Networks	
CMPE-677	Machine Intelligence	
	Graduate Electives*	9
Second Year		
CMPE-792	Graduate Project	3
	Project Focus Electives	6
	Graduate Elective*	3
Total Semester Credit Hours		**30**

* At least two graduate electives must come from the computer engineering department.

Computer Engineering (comprehensive exam option†), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
CMPE-610	Analytical Topics in Computer Engineering	3
CMPE-795	Graduate Seminar	0
	Primary Flexible Core MS	9
	Secondary Flexible Core MS	3
	Graduate Electives*	3
Second Year		
	Graduate Electives*	12
Total Semester Credit Hours		**30**

* At least three graduate electives must come from the computer engineering department.
† Completing this option requires passing a comprehensive examination.
Students identify a primary flexible core cluster and a secondary flexible core clusters. Students take all courses from the primary cluster and select one course from the secondary cluster.

Flexible Core Cluster I

Computer Architecture and Digital Design	
CMPE-630	Digital Integrated Circuit Design
CMPE-660	Reconfigurable Computing
CMPE-755	High Performance Architectures

Flexible Core Cluster II

Computing, Communications, & Algorithms	
CMPE-655	Multiple Processor Systems
CMPE-670	Data and Communication Networks
CMPE-677	Machine Intelligence

Admission requirements

To be considered for admission to the MS program in computer engineering, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college in computer engineering or a related field.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Electrical and Computer Engineering, Ph.D.

www.rit.edu/study/electrical-and-computer-engineering-phd
Andres Kwasinski, Professor
585-475-5139, ak@mail.rit.edu

Program overview

This is an exciting time in electrical and computer engineering. Harnessing electricity not only provides humanity with a transformative form of energy, but it also leads to the development of digital technologies, which have forged our Information Age as a time of revolutionary advances developed at an unprecedented pace.

The 21st century has witnessed such advances as the Smart Grid, ubiquitous fast internet access through wireless networks, artificial intelligence and machine learning technologies that rival humans in performance, the Internet-of-Things, cloud computing, fiber-optic networks capable of transmitting trillions of bits per second, new computing paradigms such as quantum or neuromorphic computing, and many more. None of these advances would have happened without the dedication of researchers in electrical and computer engineering.

Offered jointly by the department of electrical and microelectronic engineering and the department of computer engineering, students in RIT's Ph.D. in electrical and computer engineering learn to become independent researchers by conducting research under the guidance of the world-class researchers that comprise our faculty. This research is often associated with some of the many centers and laboratories across RIT, including the Center for Human-aware AI (CHAI) and the Global Cybersecurity Institute.

The curriculum for the Ph.D. in electrical and computer engineering provides the knowledge and skills to form successful independent researchers by providing disciplinary and interdisciplinary courses, research mentorship, and seminars.

Research Assistantships

Research assistantships are available to doctoral students. Learn more about the college's research assistantship opportunities and how you can apply.

Curriculum

Electrical and Computer Engineering, Ph.D. degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
ECEP-796	Research Methods in Electrical and Computer Engineering	1
ENGR-701	Inter-disciplinary Research Methods	3
ENGR-702	Translating Discovery into Practice	3
ENGR-795	Doctoral Seminar	1
ENGR-892	Graduate Research	3
	Engineering Foundation 1, 2*	6
	Discipline Concentration 1, 2†	6
Second Year		
ENGR-795	Doctoral Seminar	1
ENGR-892	Graduate Research	6
	Discipline Concentration 3†	3
	Focus Area Elective 1, 2, 3, 4‡	12
Third Year		
ENGR-890	Dissertation and Research	21
Total Semester Credit Hours		**66**

*Engineering Foundation Electives:

EEEE-707/ENGR-707	Engineering Analysis
EEEE-709/ENGR-709	Advanced Engineering Mathematics
CMPE-610	Analytical Topics in Computer Engineering

† Discipline Concentration: Any graduate level course offered by the departments of Electrical and Microelectronic Engineering of Computer Engineering, exclusive of capstones.
‡ Focus Area Elective: Any graduate level course offered by the Kate Gleason College of Engineering, exclusive of capstones.

The curriculum for the Ph.D. in electrical and computer engineering provides the knowledge and skills to form successful independent researchers by providing disciplinary and interdisciplinary courses, research mentorship, and seminars. Courses are organized into three categories: core, discipline concentration elective, and focus area elective courses. In addition, the plan of study includes three major research-based milestones: the doctoral qualifying exam, the doctoral candidacy exam, and the doctoral dissertation defense.

Core Courses

Core courses are usually completed during the first two semesters of the program since they serve as foundational preparation for other elective courses. Core courses develop core competency skills for research, introducing the research landscape in electrical and computer engineering, and helping to prepare students for the qualifying exam.

The discipline concentration elective courses provide rigorous education in a student's specific field of research in electrical and computer engineering. Students choose courses in consultation with the dissertation and research advisor. Graduate courses offered by the department of electrical and microelectronic engineering (courses code EEEE-6/7/8xx) or the department of computer engineering (courses code CMPE-6/7/8xx).

Focus area elective courses provide the curriculum flexibility for students to engage in trans-disciplinary learning. In consultation with the dissertation and research advisor, students choose graduate courses offered by any department in the Kate Gleason College of Engineering. In addition, and subject to the approval of the Ph.D. program director, students may choose graduate courses offered by any of RIT's colleges.

Students complete a qualifying exam at the end of their first year of study. The exam evaluates the student's aptitude, potential, and competency in conducting Ph.D.-level research.

Students must present a dissertation proposal to their dissertation committee no sooner than six months after the qualifying exam and at least twelve months prior to the dissertation defense exam. The proposal provides the opportunity for students to elaborate on their research plans and to obtain feedback on the direction and approach to their research from their dissertation committee.

Each doctoral candidate prepares an original, technically rigorous, and well-written dissertation that describes the candidate's research body of work and novel contributions to the discipline of electrical and computer engineering that have resulted from the doctoral studies. In this culminating milestone, each doctoral candidate presents and defends their dissertation and its accompanying research to their dissertation committee.

Discipline Concentration Elective Courses

Core courses are usually completed during the first two semesters of the program since they serve as foundational preparation for other elective courses. Core courses develop core competency skills for research, introducing the research landscape in electrical and computer engineering, and helping to prepare students for the qualifying exam.

The discipline concentration elective courses provide rigorous education in a student's specific field of research in electrical and computer engineering. Students choose courses in consultation with the dissertation and research advisor. Graduate courses offered by the department of electrical and microelectronic engineering (courses code EEEE-6/7/8xx) or the department of computer engineering (courses code CMPE-6/7/8xx).

Focus area elective courses provide the curriculum flexibility for students to engage in trans-disciplinary learning. In consultation with the dissertation and research advisor, students choose graduate courses offered by any department in the Kate Gleason College of Engineering. In addition, and subject to the approval of the Ph.D. program director, students may choose graduate courses offered by any of RIT's colleges.

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Focus Area Elective Courses

Core courses are usually completed during the first two semesters of the program since they serve as foundational preparation for other elective courses. Core courses develop core competency skills for research, introducing the research landscape in electrical and computer engineering, and helping to prepare students for the qualifying exam.

The discipline concentration elective courses provide rigorous education in a student's specific field of research in electrical and computer engineering. Students choose courses in consultation with the dissertation and research advisor. Graduate courses offered by the department of electrical and microelectronic engineering (courses code EEEE-6/7/8xx) or the department of computer engineering (courses code CMPE-6/7/8xx).

Focus area elective courses provide the curriculum flexibility for students to engage in trans-disciplinary learning. In consultation with the dissertation and research advisor, students choose graduate courses offered by any department in the Kate Gleason College of Engineering. In addition, and subject to the approval of the Ph.D. program director, students may choose graduate courses offered by any of RIT's colleges.

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Students must present a dissertation proposal to their dissertation committee no sooner than six months after the qualifying exam and at least twelve months prior to the dissertation defense exam. The proposal provides the opportunity for students to elaborate on their research plans and to obtain feedback on the direction and approach to their research from their dissertation committee.

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Qualifying Exam

Core courses are usually completed during the first two semesters of the program since they serve as foundational preparation for other elective courses. Core courses develop core competency skills for research, introducing the research landscape in electrical and computer engineering, and helping to prepare students for the qualifying exam.

The discipline concentration elective courses provide rigorous education in a student's specific field of research in electrical and computer engineering. Students choose courses in consultation with the dissertation and research advisor. Graduate courses offered by the department of electrical and microelectronic engineering (courses code EEEE-6/7/8xx) or the department of computer engineering (courses code CMPE-6/7/8xx).

Focus area elective courses provide the curriculum flexibility for students to engage in trans-disciplinary learning. In consultation with the dissertation and research advisor, students choose graduate courses offered by any department in the Kate Gleason College of Engineering. In addition, and subject to the approval of the Ph.D. program director, students may choose graduate courses offered by any of RIT's colleges.

Students complete a qualifying exam at the end of their first year of study. The exam evaluates the student's aptitude, potential, and competency in conducting Ph.D.-level research.

Students must present a dissertation proposal to their dissertation committee no sooner than six months after the qualifying exam and at least twelve months prior to the dissertation defense exam. The proposal provides the opportunity for students to elaborate on their research plans and to obtain feedback on the direction and approach to their research from their dissertation committee.

Each doctoral candidate prepares an original, technically rigorous, and well-written dissertation that describes the candidate's research body of work and novel contributions to the discipline of electrical and computer engineering that have resulted from the doctoral studies. In this culminating milestone, each doctoral candidate presents and defends their dissertation and its accompanying research to their dissertation committee.

Dissertation Proposal and Candidacy Exam

Core courses are usually completed during the first two semesters of the program since they serve as foundational preparation for other elective courses. Core courses develop core competency skills for research, introducing the research landscape in electrical and computer engineering, and helping to prepare students for the qualifying exam.

The discipline concentration elective courses provide rigorous education in a student's specific field of research in electrical and computer engineering. Students choose courses in consultation with the dissertation and research advisor. Graduate courses offered by the department of electrical and microelectronic engineering (courses code EEEE-6/7/8xx) or the department of computer engineering (courses code CMPE-6/7/8xx).

Focus area elective courses provide the curriculum flexibility for students to engage in trans-disciplinary learning. In consultation with the dissertation and research advisor, students choose graduate courses offered by any department in the Kate Gleason College of Engineering. In addition, and subject to the approval of the Ph.D. program director, students may choose graduate courses offered by any of RIT's colleges.

Students complete a qualifying exam at the end of their first year of study. The exam evaluates the student's aptitude, potential, and competency in conducting Ph.D.-level research.

Students must present a dissertation proposal to their dissertation committee no sooner than six months after the qualifying exam and at least twelve months prior to the dissertation defense exam. The proposal provides the opportunity for students to elaborate on their research plans and to obtain feedback on the direction and approach to their research from their dissertation committee.

Each doctoral candidate prepares an original, technically rigorous, and well-written dissertation that describes the candidate's research body of work and novel contributions to the discipline of electrical and computer engineering that have resulted from the doctoral studies. In this culminating milestone, each doctoral candidate presents and defends their dissertation and its accompanying research to their dissertation committee.

Dissertation Presentation and Defense

Core courses are usually completed during the first two semesters of the program since they serve as foundational preparation for other elective courses. Core courses develop core competency skills for research, introducing the research landscape in electrical and computer engineering, and helping to prepare students for the qualifying exam.
The discipline concentration elective courses provide rigorous education in a student's specific field of research in electrical and computer engineering. Students choose courses in consultation with the dissertation and research advisor. Graduate courses offered by the department of electrical and microelectronic engineering (courses code EEEE-6/7/8xx) or the department of computer engineering (courses code CMPE-6/7/8xx).
Focus area elective courses provide the curriculum flexibility for students to engage in trans-disciplinary learning. In consultation with the dissertation and research advisor, students choose graduate courses offered by any department in the Kate Gleason College of Engineering. In addition, and subject to the approval of the Ph.D. program director, students may choose graduate courses offered by any of RIT's colleges.
Students complete a qualifying exam at the end of their first year of study. The exam evaluates the student's aptitude, potential, and competency in conducting Ph.D.-level research.
Students must present a dissertation proposal to their dissertation committee no sooner than six months after the qualifying exam and at least twelve months prior to the dissertation defense exam. The proposal provides the opportunity for students to elaborate on their research plans and to obtain feedback on the direction and approach to their research from their dissertation committee.
Each doctoral candidate prepares an original, technically rigorous, and well-written dissertation that describes the candidate's research body of work and novel contributions to the discipline of electrical and computer engineering that have resulted from the doctoral studies. In this culminating milestone, each doctoral candidate presents and defends their dissertation and its accompanying research to their dissertation committee.

Admission requirements

To be considered for admission to the doctorate program in electrical and computer engineering, applicants must complete a graduate application and fulfill the following requirements:

- Complete a graduate application.
- Hold a baccalaureate degree (or equivalent) from an accredited university or college in electrical or computer engineering or in a related field in science, engineering, or computing.
- Submit official transcripts (in English) for all previously completed undergraduate and graduate course work.
- Have a minimum cumulative GPA of 3.0 (or equivalent).
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a Statement of Purpose for Research. The Statement of Purpose for Research is an important document because it is from where we learn the most about you as a prospective researcher. In the statement, we look for your ability to present your thoughts in a clear, concise way,evidence of your maturity and commitment to conduct research (you will be making contributions of worldwide impact in projects at the cutting edge of technology)your understanding of what studying for a Ph.D. means,your awareness of technological advancement in the field of electrical and computer engineering, andyour vision for specific areas where you would like to do research
- Submit a current resume or curriculum vitae highlighting educational background and experiences.
- Submit at least two letters of academic and/or professional recommendation. Letters for doctoral candidates must be confidential and must be submitted directly from the referee to RIT.
- Participate in an on-campus or teleconference interview (when applicable).
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Electrical Engineering, MS

www.rit.edu/study/electrical-engineering-ms
Jayanti Venkataraman, Professor
585-475-2143, jnveee@rit.edu

Program overview

In the electrical engineering master's degree you can customize a specialty of your choosing while working closely with electrical engineering faculty in a contemporary, applied research area. The program gives you the skills to solve industry and business challenges, and deploy high-level solutions to problems affecting the world of engineering technology today.

RIT's Electrical Engineering Master's Degree

In the electrical engineering master's degree, you have the option of completing a thesis or graduate paper. For those who choose the graduate paper, an additional course is required. Students may also choose a course-only option with a comprehensive exam. All students are expected to attend an electrical engineering graduate seminar every semester they are on campus.

Focus Areas: You are required to choose among the following eight focus areas: communications, controls, digital systems, electromagnetics, integrated electronics, MEMs, robotics, or signal and image processing.

Graduate Paper/Thesis: In order to earn the MS in electrical engineering, you must complete a graduate paper or a graduate thesis.

Experiential Learning

Cooperative Education

What makes an RIT education exceptional? It's the opportunity to complete relevant, hands-on engineering co-ops and internships with top companies in every single industry. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Cooperative education is optional but strongly encouraged for graduate students in the electrical engineering master's program.

Curriculum

Electrical Engineering (communications focus area), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
EEEE-602	Random Signals and Noise	3
EEEE-692	Communication Networks	3
EEEE-693	Digital Data Communication	3
EEEE-694	Sensor Array Processing for Wireless Communications	3
EEEE-707	Engineering Analysis	3
EEEE-709	Advanced Engineering Mathematics	3
EEEE-795	Graduate Seminar	0
Second Year		
EEEE-790	Thesis	6
EEEE-797	Wireless Communication	3
	Graduate Elective	3
Total Semester Credit Hours		**30**

Electrical Engineering (controls focus area), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
EEEE-602	Random Signals and Noise	3
EEEE-661	Modern Control Theory	3
EEEE-707	Engineering Analysis	3
EEEE-709	Advanced Engineering Mathematics	3
EEEE-765	Optimal Control	3
EEEE-795	Graduate Seminar	0
	Graduate Elective	3
Second Year		
EEEE-663	Real-Time and Embedded Systems	3
EEEE-683	Mechatronics	3
EEEE-790	Thesis	6
Total Semester Credit Hours		**30**

Electrical Engineering (digital systems focus area), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
EEEE-620	Design of Digital Systems	3
EEEE-621	Design of Computer Systems	3
EEEE-707	Engineering Analysis	3
EEEE-709	Advanced Engineering Mathematics	3
EEEE-720	Advanced Topics in Digital Systems Design	3
EEEE-721	Advanced Topics in Computer Systems Design	3
EEEE-795	Graduate Seminar	0
Second Year		
EEEE-790	Thesis	6
	Graduate Electives	6
Total Semester Credit Hours		**30**

Electrical Engineering (electromagnetics focus area), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
EEEE-602	Random Signals and Noise	3
EEEE-617	Microwave Circuit Design	3
EEEE-629	Antenna Theory	3
EEEE-707	Engineering Analysis	3
EEEE-709	Advanced Engineering Mathematics	3
EEEE-795	Graduate Seminar	0
	Graduate Elective	3
Second Year		
EEEE-710	Advanced Electromagnetic Theory	3
EEEE-718	Design and Characterization of Microwave Systems	3
EEEE-790	Thesis	6
Total Semester Credit Hours		**30**

Electrical Engineering (integrated electronics focus area), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
EEEE-610	Analog Electronics Design	3
EEEE-707	Engineering Analysis	3
EEEE-709	Advanced Engineering Mathematics	3
EEEE-711	Advanced Carrier Injection Devices	3
EEEE-712	Advanced Field Effect Devices	3
EEEE-726	Mixed-Signal IC Design	3
EEEE-795	Graduate Seminar	0
Second Year		
EEEE-790	Thesis	6
	Graduate Elective	6
Total Semester Credit Hours		**30**

Electrical engineering (MEMS focus area), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
EEEE-661	Modern Control Theory	3
EEEE-689	Fundamentals of MEMS	3
EEEE-707	Engineering Analysis	3
EEEE-709	Advanced Engineering Mathematics	3
EEEE-787	MEMS Evaluation	3
EEEE-795	Graduate Seminar	0
Second Year		
EEEE-790	Thesis	6
	Graduate Electives	9
Total Semester Credit Hours		**30**

Electrical Engineering (robotics focus area), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
EEEE-636	Biorobotics/Cybernetics	3
EEEE-647	Artificial Intelligence Explorations	3
EEEE-685	Principle of Robotics	3
EEEE-707	Engineering Analysis	3
EEEE-709	Advanced Engineering Mathematics	3
EEEE-784	Advanced Robotics	3
EEEE-795	Graduate Seminar	0
Second Year		
EEEE-602	Random Signals and Noise	3
EEEE-790	Thesis	6
	Graduate Elective	3
Total Semester Credit Hours		**30**

Electrical Engineering (signal and image processing focus area), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
EEEE-602	Random Signals and Noise	3
EEEE-670	Pattern Recognition	3
EEEE-678	Digital Signal Processing	3
EEEE-694	Sensor Array Processing for Wireless Communications	3
EEEE-707	Engineering Analysis	3
EEEE-709	Advanced Engineering Mathematics	3
EEEE-795	Graduate Seminar	0
Second Year		
EEEE-779	Digital Image Processing	3
EEEE-790	Thesis	6
	Graduate Elective	3
Total Semester Credit Hours		**30**

Admission requirements

To be considered for admission to the MS program in electrical engineering, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college in engineering or a related field.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.

- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- Applicants with a bachelor's degree in fields outside of electrical engineering may be considered for admission, however, bridge courses may be required to ensure the student is adequately prepared for graduate study.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Engineering Management, ME

www.rit.edu/study/engineering-management-me
Katie McConky, Associate Professor
585-475-6062, Katie.McConky@rit.edu

Program overview

Engineers are problem solvers. They actively seek out problems in order to design and develop solutions that lead to innovative products, improvements to people's lives, and solutions that better the world. But engineers don't always speak that same language as business leaders. That's when an engineering management master's degree can make a profound difference.

RIT's Engineering Management Master's Degree

The engineering management master's degree combines technical expertise with managerial skills to focus on the management of engineering and technological business challenges. You will learn the technology involved in engineering projects and the business processes through which technology is applied. The objective is to provide you with a solid foundation in organizational behavior, finance, and accounting, the areas commonly needed by managers who oversee engineers and engineering projects.

A Collaborative Master's of Management for Engineers

The engineering management master's degree is a blend of courses from the department of industrial and systems engineering in RIT's Kate Gleason College of Engineering and Saunders College of Business. This creates a hybrid curriculum combining technological expertise with managerial skills.

Students in the engineering management program often take advantage of cooperative education opportunities. Cooperative education is optional but strongly encouraged for graduate students in the engineering management master's program. Co-op is hands-on, paid career experience where you can can experience in industry before you graduate. Students' co-op experiences enrich classroom discussions, and set our students apart in the job market.

Experiential Learning

Cooperative Education

What makes an RIT education exceptional? It's the opportunity to complete relevant, hands-on engineering co-ops and internships with top companies in every single industry. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Cooperative education is optional but strongly encouraged for graduate students in the engineering management master's program.

Curriculum

Engineering Management, ME degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
ACCT-794	Cost Management in Technical Organizations	3
ISEE-750	Systems and Project Management	3
ISEE-760	Design of Experiments	3
ISEE-771	Engineering of Systems I	3
	Engineering Management Elective	3
	Technical Engineering Elective	3
Second Year		
ISEE-792	Engineering Capstone	3
	Engineering Management Elective	3
	Technical Engineering Elective	3
	ISEE Elective	3
Total Semester Credit Hours		**30**

Admission requirements

To be considered for admission to the ME program in engineering management, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college in engineering, mathematics, or science, from an accredited institution,
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Industrial and Systems Engineering, MS

www.rit.edu/study/industrial-and-systems-engineering-ms
Katie McConky, Associate Professor
585-475-6062, Katie.McConky@rit.edu

Program overview

Industrial engineering is a multi-disciplinary engineering field at the intersection of mathematics, computer science, and business. The program teaches you how to design the systems behind products and services that affect our everyday lives.

The industrial engineering master's offers you hands-on experiences designing, improving, and controlling complex systems to make them more profitable, practical, controllable, and flexible. As a result, you will become a problem-solver through a flexible program that leverages skills in advanced manufacturing processes, operations research, data analytics, human computer interaction and augmented reality, product development, ergonomics and human factors, health care, logistics and supply chain management, and sustainable design and development.

You also will have the opportunity to explore different domain areas while working closely with faculty doing research on contemporary problems. We encourage all of our students to participate in cooperative education, which enables you to apply your skills in the real world before you graduate, and helps to enhance your classroom learning once you return from co-op.

What is an Industrial Engineer?

An industrial engineer uses their knowledge of manufacturing and production systems, work efficiencies, energy, and natural resources and materials to develop, improve, and optimize integrated systems to become more efficient and sustainable. An industrial engineer improves how an organization integrates work processes, manufactures products, or provides services while also taking into account ergonomic analysis, logistics and supply chain management, and sustainable design and development with an overall systems approach.

RIT's Master's in Industrial Engineering

Our industrial engineering master's degree allows you to customize your course work while working closely with industrial and systems engineering faculty in a contemporary, applied research area. Faculty members are currently conducting applied project and research work in the areas of contemporary and advanced manufacturing processes/systems, ergonomic/biomedical analysis, human computer interaction and augmented reality, logistics and supply chain management, health systems, energy systems, sustainable design and development, systems engineering/product development, and systems simulation.

Experiential Learning

Cooperative Education

What makes an RIT education exceptional? It's the opportunity to complete relevant, hands-on engineering co-ops and internships with top companies in every single industry. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Cooperative education is optional but strongly encouraged for graduate students in the industrial engineering master's program.

Curriculum

Industrial and Systems Engineering, MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
ISEE-601	Systems Modeling and Optimization	3
ISEE-760	Design of Experiments	3
ISEE-771	Engineering of Systems I	3
ISEE-795	Graduate Seminar*	0
	Electives	9
Second Year		
	Electives	6
Choose one of the following:		6
ISEE-788	Project with Paper, plus one Engineering Elective	
ISEE-790	Thesis	
ISEE-792	Engineering Capstone, plus one Engineering Elective	
Total Semester Credit Hours		**30**

* Graduate Seminar (ISEE-795) must be completed twice in the first year of study.

Admission requirements

To be considered for admission to the MS program in industrial and systems engineering, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college in engineering, mathematics, or science.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Lean Six Sigma, Adv. Cert.

www.rit.edu/study/lean-six-sigma-adv-cert
Rebecca Ziebarth,
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Program overview

Lean Six Sigma is a methodology for increasing organizational productivity and efficiency through a structured problem solving process called DMAIC (define, measure, analyze, improve, and control). The focus is on improving organizational systems and work processes.

Lean Six Sigma Certification

The advanced certificate in Lean Six Sigma is for engineers, process-improvement facilitators, and other practitioners looking to increase their effectiveness or enhance their qualifications to broaden their careers. Lean Six Sigma has many benefits for organizations, among them:

- Reduction of new product development time
- Reduction of product delivery time
- Reduction of waste and costs
- Reduction of work-in-process inventory
- Reduction of product variability
- Increased profits
- Increased customer satisfaction, retention and loyalty

The focus of the courses in this certificate is on quality control situations in engineering and on driving process improvements in a broad range of business environments and industries to achieve the benefits outlined above.

Lean Six Sigma Training

Industry certifications such as Lean Six Sigma green belt and black belt are not the focus of this certificate program, however, students interested in obtaining these credentials are well prepared to do so after the deep topical coverage offered in this advanced certificate program. RIT's Center for Quality and Applied Statistics offers three levels of certification for Lean Six Sigma practitioners: Yellow Belt, Green Belt, and Black Belt. Learn more about RIT's offerings in Lean Six Sigma, including training schedules, examples of projects, and more.

What is a Graduate Certificate?

A graduate certificate, also called an advanced certificate, is a selection of up to five graduate level courses in a particular area of study. It can serve as a stand-alone credential that provides expertise in a specific topic that enhances your professional knowledge base, or it can serve as the entry point to a master's degree. Some students complete an advanced certificate and apply those credit hours later toward a master's degree.

Curriculum

Lean Six Sigma, advanced certificate, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
ISEE-682	Lean Six Sigma Fundamentals	3
Choose one of the following:		3
ISEE-660	Applied Statistical Quality Control	
STAT-621	Statistical Quality Control	
Choose one of the following:		3
ISEE-760	Design of Experiments	
STAT-670	Design of Experiments	
Elective		**3**
Total Semester Credit Hours		**12**

Electives

COURSE	
BANA-680	Data Management for Business Analytics
PROF-710	Project Management
PROF-711	Advanced Project Management
PROF-712	International Project Management
PROF-714	Agile Project Management
DECS-743	Operations and Supply Chain Management
DECS-744	Project Management
DECS-745	Quality Control and Improvement
INTB-710	Global Business Analytics
ISEE-626	Contemporary Production Systems
ISEE-703	Supply Chain Management
ISEE-704	Logistics Management
ISEE-720	Production Control
ISEE-723	Global Facilities Planning
ISEE-728	Production Systems Management
ISEE-745	Manufacturing Systems
ISEE-750	Systems and Project Management
ISEE-751	Decision and Risk Benefit Analysis
ISEE-771	Engineering of Systems I
ISEE-786	Lifecycle Assessment
MGIS-650	Introduction to Data Analytics and Business Intelligence
SERQ-723	Service Analytics
STAT-611	Statistical Software - R
STAT-641	Applied Linear Models - Regression
STAT-642	Applied Linear Models - ANOVA
STAT-745	Predictive Analytics
STAT-747	Principles of Statistical Data Mining

Admission requirements

To be considered for admission to the advanced certificate in Lean Six Sigma, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- One letter of recommendation is required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- Have college level credit or practical experience in statistics (at least one course in probability and statistics).
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Students currently enrolled in master's degree programs at RIT may add the advanced certificate in Lean Six Sigma as part of their current program of study in consultation with their academic advisor. Students must have a satisfactory background in statistics (at least one course in probability and statistics) to be eligible. Students should complete the Adding a Certificate or Advanced Certificate form to add the lean six sigma advanced certificate program to their master's degree program. The form should be submitted to cqas@rit.edu.

Prerequisites

Students should have a basic familiarity with MINITAB statistical software. This may be obtained by self-study or through a short course.

Manufacturing Leadership, MS

www.rit.edu/study/manufacturing-leadership-ms
Mark Smith,
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Program overview

The master of science in manufacturing leadership is for experienced engineers and other professionals who aspire to high-level positions in operations, supply chain management, and process improvement. The program integrates business and engineering management courses, delivering them online or on-campus where students continue to work while taking classes.

Manufacturing leadership is a focused program developed jointly by the Kate Gleason College of Engineering and Saunders College of Business. Particular emphasis is placed on supply chain management, global manufacturing and operations, lean systems thinking, leadership, and decision making. A capstone project, oriented to the solution of an operations or service management problem or process improvement initiative, enables students to apply new skills and capabilities to the solution of a pressing real-world problem, with significant financial benefit to sponsors. The program can also be taken on a full-time basis, with several courses available on campus. Students may start any term (fall, spring, summer) and complete courses at their own pace.

Sponsorship

Most students are sponsored by an employer, who is committed to improving leadership capabilities in operational excellence. Sponsorship includes financial support and a commitment to work with the student to provide clear expectations and a well-articulated career development plan that builds upon the program. Candidates are welcome to sponsor themselves. Students should contact Financial Aid and Scholarship for more information.

Related Programs

Visit the Engineering Leadership department for information on related offerings, including the master of science in product development, graduate certificate programs, and non-credit workshops and training programs.

Programs are available online, on-campus, or onsite at your location. Contact us for information about partnerships and customized programs for your organization.

Curriculum

Educational Objective

To prepare graduates to lead teams and organizations within a manufacturing or service enterprise for successful competition in a complex global economy, through the integration of business and technical skills.

Key Capabilities of Graduates

- Ability to make sound business decisions in a complex global economy: business planning with full understanding of outsourcing and offshoring; financial management and total/life-cycle cost; agile decision-making.
- Ability to manage the global supply chain: supply chain strategy development and execution; logistics management (quality and delivery assurance); systems needs for supply chain management; and supply chain optimization.
- Ability to manage global, multi-site production and operations: managing distributed teams; process technology transfer to domestic and international locations; service operations; enterprise and manufacturing strategies; lean operations; location strategy and facility design; state-of-the-art tools; regulatory issues and established norms.
- Comprehensive understanding of quality and continuous improvement principles, with application to the manufacturing and operations management.
- Strong leadership and management skills applied to global high technology manufacturing: systems thinking, planning, and management; applications ("hands-on") orientation; project management expertise (planning, relationship management, control, risk management and decision-making); creative leadership to drive innovative solutions; enhanced ability to recognize barriers to success early, when corrective actions are least costly.

Manufacturing Leadership, MS degree

COURSE		SEMESTER CREDIT HOURS
ISEE-682	Lean Six Sigma Fundamentals	3
ISEE-703	Supply Chain Management	3
ISEE-723	Global Facilities Planning	3
ISEE-745	Manufacturing Systems	3
ISEE-771	Engineering of Systems I	3
MGMT-740	Leading Teams in Organizations	3
Choose one of the following:		3
PROF-710	Project Management	
PROF-714	Agile Project Management	
ISEE-750	Systems and Project Management	
Choose one of the following:		3
ACCT-603	Accounting for Decision Makers	
ACCT-794	Cost Management in Technical Organizations	
Choose one of the following:		3
ISEE-792	Engineering Capstone	
ISEE-793	Manufacturing Leadership Capstone	
	Engineering Elective or other non-Business Elective	3
Total Semester Credit Hours		**30**

Elective courses

An elective course offers students the opportunity to better meet personal and organizational needs. Students may select from a long list of courses. Recommended electives include such offerings as Decision and Risk Benefit Analysis, Advanced or International Project Management, Breakthrough Thinking and Creativity, Customer Centricity, and others.

Capstone project

Students complete a project during the final academic year of the program, based on a real problem often identified in the companies where they work. The corporate-oriented capstone project is directed at the solution of a manufacturing or services management problem or process improvement initiative. It enables students to broaden the educational experience and demonstrate the knowledge and skills essential to business leadership. The project provides immediate benefits to sponsoring organizations and is an excellent opportunity for students to gain visibility and recognition. Projects often result in substantial cost savings or improved efficiencies. View our list of capstone projects for examples of projects past students have completed as part of the program.

Admission requirements

To be considered for admission to the MS program in manufacturing leadership, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- One letter of recommendation is required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- Have at least two years of experience in a manufacturing-related organization or business environment.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Applications are accepted on a rolling basis and students may begin the program in any semester.

Prerequisite Knowledge

Admitted students must possess knowledge and skills at the introductory course level in probability and statistics, engineering economy, or basic accounting. Areas that need strengthening may be addressed by guided reading, independent study, or formal course work.

Format

Students may start the program during any semester and complete the course work at their own pace. Classes are available online but several courses may be taken on campus for local or full-time students. Students may take up to three courses on a nonmatriculated basis. Credits earned while enrolled as a nonmatriculated student may be applied to the degree program following formal admission.

Tuition

The program's tuition is calculated using the part-time graduate tuition rate (12 credits or less). For information on tuition, scholarships, and financial aid, please visit Financial Aid and Scholarships. Discounts are available for groups.

Materials Science and Engineering, MS

www.rit.edu/study/materials-science-and-engineering-ms
Scott Williams, Professor
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Program overview

In the materials science master's degree you'll receive a serious interdisciplinary learning experience in materials studies, crossing over the traditional boundaries of such classical disciplines like chemistry, physics, and engineering.

The objectives of the materials science degree are threefold:

- With the advent of new classes of materials and instruments, the traditional practice of empiricism in the search for and selection of materials is rapidly becoming obsolete. Therefore, the program offers a serious interdisciplinary learning experience in materials studies, crossing over the traditional boundaries of such classical disciplines like chemistry, physics, and electrical, mechanical, and microelectronic engineering.
- The program provides extensive experimental courses in diverse areas of materials-related studies.
- The program explores avenues for introducing greater harmony between industrial expansion and academic training.

RIT's Materials Science Master's

Our materials science master's degree spans across three colleges: Science, Engineering and Sustainability. This gives you broad access that is not found in other programs that might be in a single college. In addition, the applied nature of the research and our co-op connections are unrivaled.

- Take part in extensive experimental courses in diverse areas of materials-related studies.
- Explore avenues for introducing greater harmony between industrial expansion and academic training.
- Gain the independent thinking and project management skills to grow professionally and prepare yourself for a wide range of careers.

Materials Science and Engineering Master's Courses

The materials science degree includes three required core courses, graduate electives, and either a thesis or project.

Courses: The core courses are specially designed to establish a common base of materials-oriented knowledge for students with baccalaureate degrees in chemistry, chemical engineering, electrical engineering, mechanical engineering, physics, and related disciplines.

There also is an emphasis on experimental techniques, with one required experimental course as part of the curriculum. This aspect of the masters in materials science will enhance your confidence when dealing with materials-related problems.

Electives: Elective courses may be selected from advanced courses offered by the School of Chemistry and Materials Science or, upon approval, from courses offered by other RIT graduate programs. Elective courses are scheduled on a periodic basis. Transfer credit may be awarded based on academic background beyond the bachelor's degree or by examination, based on experience.

Thesis/Project: Choose to complete a thesis or a project as the conclusion to your program. If you pursue the thesis option, you will take four graduate electives, complete nine credit hours of research, and produce a

thesis paper. Alternatively, the project option includes six graduate electives and a 3 credit hour project.

Part-Time Study: The materials science degree offers courses in the late afternoon and evenings to encourage practicing scientists and engineers to pursue the program without interrupting their employment. (This may not apply to courses offered off campus at selected industrial sites.) Students employed full time are normally limited to a maximum of two courses, or 6 credit hours, each semester. If you wish to register for more than 6 credit hours, then you must obtain the permission of your advisor.

Experiential Learning

Cooperative Education

What makes an RIT science and math education exceptional? It's the ability to complete science and math co-ops and gain real-world experience that sets you apart. Co-ops in the College of Science include cooperative education and internship experiences in industry and health care settings, as well as research in an academic, industry, or national lab. These are not only possible at RIT, but are passionately encouraged.

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

National Labs Career Fair

Hosted by RIT's Office of Career Services and Cooperative Education, the National Labs Career Fair is an annual event that brings representatives to campus from the United States' federally funded research and development labs. These national labs focus on scientific discovery, clean energy development, national security, technology advancements, and more. Students are invited to attend the career fair to network with lab professionals, learn about opportunities, and interview for co-ops, internships, research positions, and full-time employment.

Curriculum

Materials Science and Engineering (thesis option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
MTSE-601	Materials Science	3
MTSE-704	Theoretical Methods in Materials Science and Engineering	3
MTSE-705	Experimental Techniques	3
MTSE-790	Research & Thesis	6
	Graduate Electives	12
Second Year		
MTSE-790	Research & Thesis	3
Total Semester Credit Hours		**30**

Materials Science and Engineering (project option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
MTSE-601	Materials Science	3
MTSE-704	Theoretical Methods in Materials Science and Engineering	3
MTSE-705	Experimental Techniques	3
MTSE-777	Graduate Project	3
	Graduate Electives	15
Second Year		
	Graduate Elective	3
Total Semester Credit Hours		**30**

Electives

COURSE	
MTSE-602	Polymer Science
MTSE-617	Material Degradation
MTSE-632	Solid State Science
MTSE-704	Theoretical Methods in Materials Science and Engineering
MTSE-780	Theory of Microsensors and Actuators
MTSE-799	Independent Study

* Additional approved electives comprise graduate courses offered by programs in the College of Science, Kate Gleason College of Engineering, College of Engineering Technology, Golisano Institute for Sustainability, School of Individualized Studies, and the Saunders College of Business. Prerequisites for all approved electives include Graduate Standing and may require permission of instructor.

Admission requirements

To be considered for admission to the MS program in materials science and engineering, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college in chemistry, physics, chemical engineering, electrical engineering, mechanical engineering, or a related field.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Candidates not meeting the general requirements may petition for admission to the program. In such cases, it may be suggested that the necessary background courses be taken at the undergraduate level. However, undergraduate credits that make up deficiencies may not be counted toward the master's degree.

Any student who wishes to study at the graduate level must first be admitted to the program. However, an applicant may be permitted to take graduate courses as a nonmatriculated student if they meet the general requirements mentioned above.

Mechanical and Industrial Engineering, Ph.D.

www.rit.edu/study/mechanical-and-industrial-engineering-phd

Katie McConky, Associate Professor
585-475-6062, Katie.McConky@rit.edu

Program overview

The mechanical and industrial engineering doctorate program produces graduates with a depth of knowledge in mechanical or industrial engineering while allowing students to engage in cutting-edge, cross-disciplinary research. The flexible curriculum encourages students to gain domain-specific knowledge from courses offered throughout the college's portfolio of engineering programs. The curriculum, coupled with the depth of knowledge in mechanical or industrial engineering disciplines, creates graduates who are ready to tackle the world's most pressing societal and industrial challenges. The program develops world-class researchers who can capitalize on the most promising discoveries and innovations to develop interdisciplinary solutions for real-world challenges.

The mechanical and industrial Ph.D. requires students to address fundamental technical problems of national and global importance for the 21st century. The program finds its roots in tackling global problems in energy, transportation, health care, communications, and manufacturing. The mechanical and industrial engineering departments offer a broad range of technological research strengths including additive and advanced manufacturing, nanotechnology, robotics and mechatronics, heat transfer and thermo-fluids, simulation, modeling and optimization, ergonomics, biomimetic systems, wearable sensors, health care data analytics, prognostics and fault detection, and energy systems. Students collaborate with faculty advisors to build on these technological strengths to solve problems of global significance in order to prepare them, and for careers in both industry and academia.

Curriculum

Mechanical and Industrial Engineering, Ph.D. degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
ENGR-701	Inter-disciplinary Research Methods	3
ENGR-702	Translating Discovery into Practice	3
ENGR-795	Doctoral Seminar	2
ENGR-892	Graduate Research	3
	Engineering Foundation 1, 2*	6
	Discipline Concentration 1, 2†	6
Second Year		
ENGR-795	Doctoral Seminar	1
ENGR-892	Graduate Research	6
	Discipline Concentration 3†	3
	Focus Area Elective 1, 2, 3, 4‡	12
Third Year		
ENGR-890	Dissertation and Research	21
Total Semester Credit Hours		**66**

† Discipline Concentration: Any graduate level course offered by the departments of mechanical or industrial and systems engineering, exclusive of capstones.
‡ Focus Area Elective: Any graduate level course offered by the Kate Gleason College of Engineering, exclusive of capstones.

Electives

Engineering Foundation Electives

COURSE	
MECE-707/ENGR-707	Engineering Analysis
MECE-709/ENGR-709	Advanced Engineering Mathematics
ISEE-601	Systems Modeling and Optimization
ISEE-760	Design of Experiments
ISEE-771	Engineering of Systems I

Admission requirements

To be considered for admission to the doctorate program in mechanical and industrial engineering, candidates must complete a graduate application and fulfill the following requirements:

- Complete a graduate application.
- Hold a baccalaureate degree (or equivalent) from an accredited university or college in the physical sciences or engineering.
- Submit official transcripts (in English) from all previously completed undergraduate and graduate course work.
- Have a minimum cumulative GPA of 3.0 (or equivalent).
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a current resume or curriculum vitae.
- Submit a personal statement of educational objectives which specifically addresses research interests.
- Submit two letters of academic and/or professional recommendation.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Mechanical Engineering, ME

www.rit.edu/study/mechanical-engineering-me
Sarilyn Ivancic, Senior Lecturer
585-475-6003, srieme@rit.edu

Program overview

The mechanical engineering masters prepares graduates to support the design of engineered systems through the application of the fundamental knowledge, skills, and tools of mechanical engineering. Students will work independently as well as collaboratively with leaders in industry, while demonstrating the professional and ethical responsibilities of the engineering profession. Ultimately, graduates will enhance their skills through formal education and training, independent inquiry, and professional development.

RIT's ME in Mechanical Engineering

The ME in mechanical engineering is intended to be a terminal degree program designed for those who do not expect to pursue a doctoral degree, but who wish to become a leader within the mechanical engineering field. This program is particularly well-suited for students who wish to study part time, for those interested in updating their technical skills, or for those who are not focused on a research-oriented master of science degree, which requires a thesis. A conventional thesis is not required for the program. In its place, students complete a capstone experience, which may be a design project leadership course or a well-organized and carefully chosen industrial internship. A research methods course may also fulfill the capstone experience; however, this option is primarily intended for students who are considering transitioning to the MS program in mechanical engineering. Courses taken within the ME program are transferable to the mechanical engineering MS program.

Mechanical Engineering Courses

The ME in mechanical engineering prepares graduates to:

- practice mechanical engineering in support of the design of engineered systems through the application of the fundamental knowledge, skills, and tools of mechanical engineering.
- enhance their skills through formal education and training, independent inquiry, and professional development.
- work independently as well as collaboratively with others, while demonstrating the professional and ethical responsibilities of the engineering profession.

In addition to required courses, students choose focus area courses and electives that customize the degree around their professional goals and interests. Focus areas include automotive systems, business, controls, manufacturing, mechanics-design/materials, product development, sustainability, thermo/fluids engineering, and vibrations engineering.

All full-time students attend a weekly graduate seminar each semester they are on campus. Up to three courses may be taken outside the mechanical engineering department. Students may complete the program's requirements within one calendar year with summer study. Students may also augment their education through cooperative education employment opportunities. Although co-op is not a requirement of the program, it provides students an opportunity to gain valuable employment experience within the field.

Experiential Learning

Cooperative Education

What makes an RIT education exceptional? It's the opportunity to complete relevant, hands-on engineering co-ops and internships with top companies in every single industry. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Cooperative education is optional but strongly encouraged for graduate students in the ME in mechanical engineering.

Curriculum

Mechanical Engineering, ME degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
MECE-707	Engineering Analysis	3
MECE-709	Advanced Engineering Mathematics	3
MECE-795	Graduate Seminar	0
	Graduate Focus Courses I, II	6
	Graduate Electives I, II	6
Second Year		
Choose one of the following:		3
MECE-730	Design Project Leadership*	
MECE-777	Graduate Internship†	
MECE-792	Project with Paper‡	
MECE-795	Graduate Seminar	0
	Graduate Focus Course III	3
	Graduate Electives III, IV	6
Total Semester Credit Hours		**30**

Graduate Seminar (MECE-795) is a 0 credit course required for all full-time and full-time equivalent students to take twice.
* Design Project Leadership (MECE-730) is reserved only for students enrolled in the accelerated MECE-BS/ME program.
† Graduate Internship (MECE-777) is an option for all MECE-ME students and students enrolled in the accelerated MECE-BS/ME program.
‡ Project with Paper (MECE-792) is an option for all MECE-ME students and students enrolled in the MECE-BS/ME program.

Focus areas

COURSE		SEMESTER CREDIT HOURS
Automotive systems		
		Choose three of the following:
ISEE-740	Design for Manufacture and Assembly	3
MECE-623	Powertrain Systems and Design	3
MECE-624	Vehicle Dynamics	3
MECE-643	Classical Controls	3
MECE-650	Sustainable Energy Use in Transportation	3
MECE-658	Introduction to Engineering Vibrations	3
MECE-670	Manufacturing Processes and Engineering	3
MECE-689	Grad. Lower Level Special Topic #4: Computational Gear Design	3
MECE-739	Alternative Fuels and Energy Efficiency	3
MECE-752	Tribology Fundamentals	3
MECE-756	Boiling and Condensation	3
Business		
ACCT-603	Accounting for Decision Makers	3
MGMT-740	Leading Teams in Organizations	3
Choose one of the following:		
ACCT-706	Cost Management	3
HRDE-742	Leading Change	3
INTB-730	Cross-Cultural Management	3
MGMT-735	Management of Innovation	3
Controls		
MECE-643	Classical Controls	3
		Choose two of the following:
EEEE-661	Modern Control Theory	3
EEEE-733	Robust Control	3
EEEE-765	Optimal Control	3
MECE-606	Systems Modeling	3
MECE-743	Digital Controls	3
MECE-744	Nonlinear Controls	3
Manufacturing		
		Choose three of the following:
ISEE-626	Contemporary Production Systems	3
ISEE-682	Lean Six Sigma Fundamentals	3
ISEE-720	Production Control	3
ISEE-740	Design for Manufacture and Assembly	3
ISEE-741	3D Printing	3
ISEE-745	Manufacturing Systems	3
MECE-643	Classical Controls	3
MECE-670	Manufacturing Processes and Engineering	3
MECE-689	Grad. Lower Level Special Topic #4: Computational Gear Design	3
Mechanics-Design/Materials		
		Choose three of the following:
MECE-605	Finite Elements	3
MECE-620	Introduction to Optimal Design	3
MECE-623	Powertrain Systems and Design	3
MECE-644	Introduction to Composite Materials	3
MECE-657	Applied Biomaterials	3
MECE-670	Manufacturing Processes and Engineering	3
MECE-689	Grad. Lower Level Special Topic #4: Computational Gear Design	3
MECE-751	Convective Phenomena	
MECE-752	Tribology Fundamentals	3
MECE-785	Mechanics of Solids	3
Product development		
		Choose three of the following:
PROF-710	Project Management*	3
DECS-744	Project Management*	3
ISEE-750	Systems and Project Management*	3
ISEE-741	3D Printing	3
ISEE-751	Decision and Risk Benefit Analysis	3
ISEE-771	Engineering of Systems I	3
ISEE-772	Engineering of Systems II	3
Sustainability		
		Choose three of the following:
ISEE-785	Fundamentals of Sustainable Engineering	3
ISEE-786	Lifecycle Assessment	3
ISEE-787	Design for the Environment	3
MECE-629	Renewable Energy Systems	3
MECE-650	Sustainable Energy Use in Transportation	3
MECE-739	Alternative Fuels and Energy Efficiency	3
Thermo/Fluids Engineering		
		Choose three of the following:
MCSE-610	Applied Biofluid Mechanics and Microcirculation	3
MECE-725	Fundamentals of Computational Fluid Dynamics	3
MECE-731	Computational Fluid Dynamics	3
MECE-738	Ideal Flows	3
MECE-751	Convective Phenomena	3
MECE-755	Microfluidics	3
MECE-756	Boiling and Condensation	3
Vibrations Engineering		
MECE-658	Introduction to Engineering Vibrations	3
MECE-758	Intermediate Engineering Vibrations	3
		Choose one of the following:
EEEE-602	Random Signals and Noise	3
EEEE-678	Digital Signal Processing	3
MECE-606	System Modeling	3

* Only one of these classes may be used toward the focus area.

Students with a specific career interest may develop an individually customized focus area based on mutual agreement between the student and the department.

Admission requirements

To be considered for admission to the ME program in mechanical engineering, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college in mechanical engineering, physics, or a related field.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Kate Gleason College of Engineering

Mechanical Engineering, MS

www.rit.edu/study/mechanical-engineering-ms
Sarilyn Ivancic, Senior Lecturer
585-475-6003, srieme@rit.edu

Program overview

The mechanical engineering masters produces graduates who are leaders in their respective fields who are ready to tackle high-level problems as practicing professionals. Designed for students who desire advanced training in specific areas of mechanical engineering, the master of science acts as a prelude to a career in either research or industry. Students can choose to focus on a variety of disciplines including dynamics, robotics, nanotechnology, biomechanics, energy systems, or more.

RIT's Mechanical Engineering Master's Degree

The mechanical engineering MS prepare students to:

- practice mechanical engineering in support of the design of engineered systems through the application of the fundamental knowledge, skills, and tools of mechanical engineering.
- enhance their skills through formal education and training, independent inquiry, and professional development.
- work independently as well as collaboratively with others, while demonstrating the professional and ethical responsibilities of the engineering profession.
- successfully pursue graduate degrees at the doctoral levels, should they choose.

Mechancial Engineering Courses

The program includes core courses, focus area courses, elective courses, and a thesis. All full-time and full-time equivalent students are required to attend the weekly graduate seminar each semester they are on campus.

Focus Area Courses: Students develop a focus area of study in mechanical engineering related to their technical and professional development interests and goals. Examples of focus areas include automotive systems, business, controls, manufacturing, mechanics-design/materials, product development, sustainability, thermo/fluids engineering, and vibrations engineering.

Independent Study: Students may earn a limited number of credit hours through independent study with guidance from a member of the graduate faculty. Areas for independent study include selected topics in applied mathematics, analytical mechanics, nonlinear mechanics, fracture mechanics, heat transfer, fluid mechanics, thermodynamics, control systems, optimal control, thermal stresses, composite materials, and biomechanics.

Thesis: Prior to completing course work in the mechanical engineering MS degree, students prepare and present a formal thesis proposal to their faculty advisor. An acceptable proposal (which includes a statement of work, extensive literature search, and proposed timeline), signed by the student and approved by their faculty advisor and department head, is required prior to registering for thesis credits. Students form a graduate thesis committee in coordination with their advisor and present their proposal to their committee for review and approval during the first semester in which they have registered for thesis credit. Students are required to deliver a successful written and oral presentation of their thesis.

Experiential Learning

Cooperative Education

What makes an RIT education exceptional? It's the opportunity to complete relevant, hands-on engineering co-ops and internships with top companies in every single industry. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Cooperative education is optional but strongly encouraged for graduate students in the mechanical engineering master's program.

Curriculum

Mechanical Engineering, MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
MECE-707	Engineering Analysis	3
MECE-709	Advanced Engineering Mathematics	3
MECE-795	Graduate Seminar (fall, spring)*	0
	Graduate Focus Courses I, II	6
	Graduate Electives I, II	6
Second Year		
MECE-790	Thesis	6
	Graduate Focus Course III	3
	Graduate Elective III	3
Total Semester Credit Hours		**30**

* Two semesters of Graduate Seminar (MECE-795) are required for all full-time and full-time equivalent students.

Focus areas

COURSE		SEMESTER CREDIT HOURS
Automotive systems		
		Choose three of the following:
ISEE-740	Design for Manufacture and Assembly	3
MECE-623	Powertrain Systems and Design	3
MECE-624	Vehicle Dynamics	3
MECE-643	Classical Controls	3
MECE-650	Sustainable Energy Use in Transportation	3
MECE-658	Introduction to Engineering Vibrations	3
MECE-670	Manufacturing Processes and Engineering	3
MECE-689	Grad. Lower Level Special Topic #4: Computational Gear Design	3
MECE-739	Alternative Fuels and Energy Efficiency	3
MECE-752	Tribology Fundamentals	3
MECE-756	Boiling and Condensation	3
Business		
ACCT-603	Accounting for Decision Makers	3
MGMT-740	Leading Teams in Organizations	3
Choose one of the following:		
ACCT-706	Cost Management	3
HRDE-742	Leading Change	3
INTB-730	Cross-Cultural Management	3
MGMT-735	Management of Innovation	3
Controls		
MECE-643	Classical Controls	3
		Choose two of the following:
EEEE-661	Modern Control Theory	3
EEEE-733	Robust Control	3
EEEE-765	Optimal Control	3
MECE-606	Systems Modeling	3
MECE-743	Digital Controls	3
MECE-744	Nonlinear Controls	3
Manufacturing		
		Choose three of the following
ISEE-626	Contemporary Production Systems	3
ISEE-682	Lean Six Sigma Fundamentals	3
ISEE-720	Production Control	3
ISEE-740	Design for Manufacture and Assembly	3
ISEE-741	3D Printing	3
ISEE-745	Manufacturing Systems	3
MECE-643	Classical Controls	3
MECE-670	Manufacturing Processes and Engineering	3
MECE-689	Grad. Lower Level Special Topic #4: Computational Gear Design	3
Mechanics-Design/Materials		
		Choose three of the following:
MECE-605	Finite Elements	3
MECE-620	Introduction to Optimal Design	3
MECE-623	Powertrain Systems and Design	3
MECE-644	Introduction to Composite Materials	3
MECE-657	Applied Biomaterials	3
MECE-670	Manufacturing Processes and Engineering	3
MECE-689	Grad. Lower Level Special Topic #4: Computational Gear Design	3
MECE-751	Convective Phenomena	
MECE-752	Tribology Fundamentals	3
MECE-785	Mechanics of Solids	3
Product development		
		Choose three of the following:
PROF-710	Project Management*	3
DECS-744	Project Management*	3
ISEE-750	Systems and Project Management*	
ISEE-741	3D Printing	3
ISEE-751	Decision and Risk Benefit Analysis	3
ISEE-771	Engineering of Systems I	3
ISEE-772	Engineering of Systems II	3
Sustainability		
		Choose three of the following:
ISEE-785	Fundamentals of Sustainable Engineering	3
ISEE-786	Lifecycle Assessment	3
ISEE-787	Design for the Environment	3
MECE-629	Renewable Energy Systems	3
MECE-650	Sustainable Energy Use in Transportation	3
MECE-739	Alternative Fuels and Energy Efficiency	3
Thermo/Fluids Engineering		
		Choose three of the following:
MCSE-610	Applied Biofluid Mechanics and Microcirculation	3
MECE-725	Fundamentals of Computational Fluid Dynamics	3
MECE-731	Computational Fluid Dynamics	3
MECE-738	Ideal Flows	3
MECE-751	Convective Phenomena	3
MECE-755	Microfluidics	3
MECE-756	Boiling and Condensation	3
Vibrations Engineering		
MECE-658	Introduction to Engineering Vibrations	3
MECE-758	Intermediate Engineering Vibrations	3
		Choose one of the following:
EEEE-602	Random Signals and Noise	3
EEEE-678	Digital Signal Processing	3
MECE-606	System Modeling	3

* Only one of these classes may be used toward the focus area.

Students with a specific career interest may develop an individually customized focus area based on mutual agreement between the student and the department.

Admission requirements

To be considered for admission to the MS program in mechanical engineering, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college in mechanical engineering, physics, or a related field.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Transfer Credit

A limited number of credit hours may be transferred from graduate courses taken outside the university, provided such courses complement a student's proposed graduate program in the mechanical engineering department. An adviser will review course work for possible transfer credit. Upon matriculation into the MS program, the student should formulate a plan of study in consultation with an advisor.

Microelectronic Engineering, MS

www.rit.edu/study/microelectronic-engineering-ms
Karl Hirschman, Professor
585-475-5130, kdhemc@rit.edu

Program overview

Integrated microelectronic or nanoelectronic circuits and sensors drive our global economy, increase our productivity, and help improve our quality of life. Semiconductor and photonic devices impact virtually every aspect of human life, from communication, entertainment, and transportation to health, solid state lighting, and solar cells. RIT's microelectronic engineering program is considered a world leader in the education of semiconductor process engineers.

The program is offered both on campus and online.

RIT: A World Leader in the Education of Semiconductor Process Engineers

Microelectronic engineering focuses on the study, design, and fabrication of very small electronic devices and components (micrometer scale or below). These are semiconductor and photonic devices that impact virtually every aspect of human life, from communication, entertainment, and transportation, to health, solid-state lighting, and solar cells. There is an ever-increasing need for talented engineers that not only understand the design of these devices but can direct and optimize their fabrication. Integrated nanoelectronic and microelectronic circuits and sensors drive our global economy, increase our productivity, and help improve our quality of life.

RIT's microelectronic students are powering the future. The university's connection to the semiconductor industry was established 40 years ago when it launched the first microelectronic engineering degree program in the country. Since then, RIT has graduated more than 1,500 engineers trained to make semiconductor devices.

RIT's Microelectronic Engineering Degree

The microelectronic engineering master's provides a unique combination of physics, chemistry, and engineering in a state-of-the-art facility to prepare you for the real world. With internationally renowned professors with years of experience, courses are grounded in reality, with practical skill and advanced theory combined to produce comprehensive learning. In the our microelectronic engineering master's, you'll:

- Understand the fundamental scientific principles governing solid-state devices and their incorporation into modern integrated circuits.
- Understand the relevance of a process or device, either proposed or existing, to current manufacturing practices.
- Develop in-depth knowledge in existing or emerging areas of the field of microelectronics such as device engineering, circuit design, lithography, materials and processes, yield, and manufacturing.
- Apply microelectronic processing techniques to the creation/investigation of new process/device structures.
- Communicate technical material effectively through oral presentations, written reports, and publications.

The microelectronic engineering master's degree provides an opportunity for you to perform graduate-level research as you prepare for entry into either the semiconductor industry or a doctoral program. The on campus program consists of core courses, graduate electives, graduate seminar, and a research project or thesis. Students in the online version of the program complete all of the same requirements, with the exception of the graduate seminar. The degree requires strong preparation in the area of microelectronics and requires a research project or a thesis, which is undertaken once you have completed approximately 20 semester credit hours of study. Planning for both, however, should begin as early as possible. Generally, full-time students should complete their degree requirements, including thesis defense, within two years (four academic semesters and one summer term)

Experiential Learning

Cooperative Education

What makes an RIT education exceptional? It's the opportunity to complete relevant, hands-on engineering co-ops and internships with top companies in every single industry. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Cooperative education is optional but strongly encouraged for graduate students in the MS in microelectronic engineering.

Curriculum

Microelectronic Engineering, MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
MCEE-601	Microelectronic Fabrication	3
MCEE-602	Semiconductor Process Integration	3
MCEE-603	Thin Films	3
MCEE-605	Lithography Materials and Processes	3
MCEE-732	Microelectronics Manufacturing	3
MCEE-795	Graduate Seminar	0
	Graduate Elective	3
Second Year		
MCEE-704	Physical Modeling of Semiconductor Devices	3
	Graduate Elective	3
Choose one of the following:		6
MCEE-792	Graduate Research Project, plus a Graduate elective	
MCEE-790	MS Thesis	
Total Semester Credit Hours		**30**

* Students who are enrolled in the program and take courses on campus must complete MCEE-795 in the first year. Students who are enrolled in the program online do not take MCEE-795. Instead, they complete MCEE-792 in the second year.

Admission requirements

To be considered for admission to the MS program in microelectronic engineering, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college in engineering or a related field.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- Applicants applying with a bachelor's degree in fields outside of electrical and microelectronic engineering may be considered for admission; however, bridge courses may be required to ensure the student is adequately prepared for graduate study.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Assistantships and Fellowships

A limited number of assistantships and fellowships may be available for full-time students. Appointment as a teaching assistant carries a 12-hour-per-week commitment to a teaching function and permits a student to take graduate work at the rate of 9 credits per semester. Appointment as a research assistant also permits taking up to 9 credits per semester while the remaining time is devoted to the research effort, which often serves as a thesis subject. Students in the MS program are eligible for research fellowships. Appointments provide full or partial tuition and stipend. Applicants for financial aid should contact to the program director for details.

Microsystems Engineering, Ph.D.

www.rit.edu/study/microsystems-engineering-phd
Stefan Preble, Professor
585-475-2625, sfpeen@rit.edu

Program overview

The multidisciplinary doctorate degree in microsystems engineering builds on the fundamentals of traditional engineering and science combined with curriculum and research activities addressing the numerous technical challenges of micro- and nano-systems. These include the manipulation of electrical, photonic, optical, mechanical, chemical, and biological functionality to process, sense, and interface with the world at a nanometer scale. This nanotechnology Ph.D. program provides a foundation to explore future technology through research in nano-engineering, design methods, and technologies and their integration into micro- and nano-scaled systems.

The microsystems engineering doctorate includes the following areas of exploration:

- Next-generation nanoelectronics include: development of new techniques, processes, and architectures for nanoelectronic and nano-optoelectronic devicesexploration into new materials research including thin-film electronics, III-V materials, 2D materials, carbon nanotubes, and spintronicsScaled micro- and nano-electronics for integration into biomedical systems
- Photonics and Optoelectronics Research including: Photonic Integrated Circuits for computing, communications, and sensing.Light emitters (Lasers, LEDs/micro-LEDs)Research in biosensing, imaging and detectionQuantum optics and photonics
- Photovoltaic research in compound semiconductors (III-V), and organic solar cells
- Neuromorphic devices and circuits for machine learning, and the use of artificial intelligence to design nanomaterials and microsystems
- Nanomaterials research including nanoparticles, nanowires, nanotubes, quantum dots, self-assembly materials, and their applications in electronics, optics, and materials science
- MEMS(micro-electro-mechanical systems), MEOMS (micro-electro-optical-mechanical systems), and NEMS (nano-electro-mechanical systems) device, processing, and materials research for smart sensors, actuators, biochips, and micro-implantable appliances
- Microfluidics research on the behavior, control, and manipulation of fluids at the micro-scale

Mission

The program fulfills a critical need for an expanded knowledge base and expertise in the innovation, design, fabrication, and application of micro- and nano-scale materials, processes, devices, components, and systems. RIT is an internationally recognized leader in education and research in the fields of microsystems and nanoscale engineering.

The curriculum is structured to provide a sound background and a thorough foundation in engineering and science through world-class education in the innovative application of educational technologies and research experiences.

Plan of Study

A combination of graduate course work and research is required for completion of the program. The course work requires a combination of foundation courses, major and minor technical area courses, and electives. The student must pass the qualifying exam, the candidacy exam, and the dissertation defense exam to complete the degree requirements.

Phase 1–Qualifying: The first phase prepares students with the foundation in science and engineering required for the program as well as to

determine the student's ability to do independent research. This includes the foundation and specialization courses taken during the first year together with the successful completion of the qualifying exam. The qualifying exam tests the student's ability to think and learn independently, to critically evaluate current research work in microsystems engineering, and to use good judgment and creativity to determine appropriate directions for future research work.

Phase 2–Candidacy: The second phase continues students' course work and preliminary dissertation research. Much of this course work supports the dissertation research to be conducted in the third phase. This phase is completed when the student has finished most of the formal course work as prescribed in the program of study, has prepared the dissertation proposal, and has passed the candidacy examination.

Phase 3–Defense: The third phase includes the completion of the experimental and/or theoretical work needed to complete the student's dissertation along with the required publication of results. The research review milestone is held as a meeting during this phase, as is the defense of the dissertation, which consists of a public oral presentation and examination.

The course work requirements are divided into four parts to ensure that students complete a well-rounded program of study with the necessary concentration in their specialized field.

Foundation courses
Four foundation courses and the Microsystems Ph.D. Seminar (MCSE-795) are mandatory for all students. Foundation courses consist of Microelectronic Fabrication (MCEE-601), Introduction to Nanotechnology and Microsystems (MCSE-702), Material Science for Microsystems Engineering (MCSE-703), and Theoretical Methods in Materials Science and Engineering (MTSE-704).

Major technical interest area
Students complete a sequence of three courses in the major technical research area and a sequence of two courses in a support area.

Minor technical interest areas
Students complete a two-course sequence in a minor technical area which should be outside of the student's undergraduate degree major.

Elective courses
Students complete at least two elective courses, in addition to the foundation and technical interest courses.

General course requirements
The total number of credit hours required for the degree depends upon the highest degree level completed by the student before entering the program. Students entering without prior graduate work must complete a minimum of 39 credit hours of course work as outlined above. A minimum of 18 research credits and a total of 66 total credits are required. Credits beyond the minimum of 39 course and 18 research requirements can be taken from either category to reach the 66 credit total.

Students entering the program with a master's degree may be permitted up to 24 course credit hours toward those required for the degree, based on the approval of the program director.

All students are required to maintain a cumulative grade-point average of 3.0 (on a 4.0 scale) to remain in good standing in the program.

Preparing a program of study
Students should prepare a program of study after passing the qualifying exam and no later than the spring semester of the second year. The program of study should be reviewed periodically by the student and the advisor, and modifications should be made as necessary. Leading up to or upon completion of the candidacy exam, the student's advisor and the advisory committee may add additional course work requirements to ensure the student is sufficiently prepared to carry out and complete their dissertation research.

Qualifying examination
Every student must take the qualifying examination, which tests the student's ability to think and learn independently, to critically evaluate current research work in the field of microsystems engineering, and to use good judgment and creativity to determine appropriate directions for future research work. The exam must be completed successfully before a student can submit a thesis proposal and attempt the candidacy examination.

Research proposal
A research topic is chosen by the student and their research advisor becomes the basis for the dissertation. The research proposal sets forth both the exact nature of the matter to be investigated and a detailed account of the methods to be employed. In addition, the proposal usually contains material supporting the importance of the topic selected and the appropriateness of the research methods to be employed.

Advising
Doctoral students' work is overseen by an advisor, the advisory committee, and the program's director.

Candidacy examination
The candidacy examination is an oral examination based on the dissertation research proposal and allows the advising committee to judge the student's ability to execute a research task and to communicate the results. The exam also serves to evaluate the proposed topic to ensure that if completed as posed it constitutes an original contribution to knowledge.

Research review milestone
The research review milestone is administered by the student's advisor and the advisory committee between the time the student passes the candidacy exam and registers for the dissertation defense. This normally occurs approximately six months prior to the Dissertation Defense.

Dissertation defense and examination
The culmination of a student's work toward the doctorate degree is the publication of their research. In addition to developing experimental and technical skills during the creation of research, a student needs to acquire the necessary literary skills to communicate results to others. The preparation of the proposal and the dissertation manuscripts will demonstrate these skills. It is also expected that these skills are developed through the publication of technical papers and communications. The dissertation defense and examination is scheduled after all course requirements for the degree have been successfully completed.

Additional details regarding program requirements can be found in the Microsystems Engineering Ph.D. Graduate Student Manual.

Student Resources
The microsystems engineering Ph.D. offers a variety of resources for our students that range from academic support to handbooks and more. View our student resources for more information.

Curriculum

Microsystems Engineering, Ph.D. degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
MCEE-601	Microelectronic Fabrication	3
MCSE-702	Introduction to Nanotechnology and Microsystems	3
MCSE-703	Material Science for Microsystems Engineering	3
MCSE-795	Microsystems Ph.D. Seminar	2
MTSE-704	Theoretical Methods in Materials Science and Engineering	3
	Major Technical Area Electives	6
Second Year		
MCSE-795	Microsystems Ph.D. Seminar	2
MCSE-890	MCSE-Dissertation	2
	Major Technical Area Electives	6
	Minor Technical Area Electives	6
Third Year		
MCSE-795	Microsystems Ph.D. Seminar	2
MCSE-890	MCSE-Dissertation	9
	Technical Elective	3
Fourth Year		
MCSE-890	MCSE-Dissertation	16
Total Semester Credit Hours		**66**

Admission requirements

To be considered for admission to the doctorate program in microsystems engineering, candidates must complete a graduate application and fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college in the physical sciences or engineering.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Product Development, MS

www.rit.edu/study/product-development-ms
Mark Smith,
585-475-7102, Mark.Smith@rit.edu

Program overview

The master of science in product development is a leadership program for experienced engineers and technical specialists who aspire to high-level positions associated with product innovation. The program integrates business and engineering management courses, delivering them online or on-campus where students continue to work while taking classes.

New products and services are the lifeblood of today's high technology firms, and companies need more technically grounded leaders to drive the engine for business growth. The product development master's degree integrates business and engineering courses consistent with cross-functional, end-to-end product development and the systems perspective critical to conceive, create, launch, and support today's complex product portfolios. Participants acquire the foundation skills and strategic perspective necessary to become future leaders and senior managers responsible for driving business growth through new products and services. In short, the product development program prepares today's technical experts for successful careers as project leaders and technically grounded senior managers of their enterprises.

To stay on the cutting edge, the program was designed by academic and industry leaders to integrate formal education with state-of-the-art research and best practices from industry. It includes a year-long capstone project that generates significant return-on-investment to sponsoring organizations. Electives and the capstone project provide flexibility to tailor the program's content to specific learning objectives of students and sponsoring organizations. The program is offered fully online or as a blend of online and on-campus courses. Students may start any term (fall, spring, summer) and complete courses at their own pace.

Sponsorship
Most students are sponsored by an employer who is committed to improving leadership capabilities in product development. Sponsorship includes financial support and a commitment to work with the student to provide clear expectations and a well-articulated career development plan that builds upon the program. Candidates are welcome to sponsor themselves. Students should contact Financial Aid and Scholarship for more information

Curriculum

Educational objective
To develop a leadership perspective and knowledge base of the total life cycle product development system, integrating management and (systems) engineering elements. To establish the foundation for the systems approach needed to conceive, create, launch, and support products and platforms. The program considers new product development in a larger framework: how a company's business strategy, vision, and core capabilities coupled with the voice of the customer combine to determine product strategy and create best-in-class product portfolios.

Key capabilities of graduates
- Leadership expertise of the product development process and of high-performing product development teams and organizations.
- Improved leadership through structured systems thinking, design, and management.
- A strategic, enterprise-wide and global perspective.

- An innovative mindset receptive to changing markets, new technologies, and new opportunities.
- Decision making in uncertain and fast-paced environments.
- A market-oriented product development focus – i.e. the ability to transform customer problems, needs, and market opportunities into successful product portfolios.
- Economic analysis and the application of sound business principles to effective management in the product development domain.
- Project management: business and technical planning, relationship management and outsourcing, program control, structured decision making and risk management.
- Enhanced ability to recognize barriers to success early, when corrective actions are less costly.
- In-depth understanding and application of state-of-the-art tools for design, analysis, and management in the product development domain.

Embedded engineering competencies

The product development leader must apply engineering competencies to the development of strategic product architectures that relate to the business value chain of the corporation, to the integration of enabling technologies, and to the creation of realizable design concepts. These capabilities are supported by the abilities to:

- Assess the merits and risks associated with emerging technologies.
- Create products with acceptable product liability, life cycle cost, and environmental impact.
- Create products consistent with manufacturing and supply chain capabilities.
- Coordinate the product architecture with organizational structure.
- Select which competencies are core to the business and which can be outsourced.
- Create and implement an organization's decision processes.
- Identify and implement enabling technologies and tools.

The 30 semester-credit program consists of 9 business and engineering courses, including one elective, plus a capstone project (3 credits).

Product Development, MS degree

COURSE		SEMESTER CREDIT HOURS
First Year		
DECS-743	Operations and Supply Chain Management	3
ISEE-751	Decision and Risk Benefit Analysis	3
ISEE-771	Engineering of Systems I	3
ISEE-772	Engineering of Systems II	3
ISEE-781	Excellence in New Product Development	3
Choose one of the following:		3
PROF-710	Project Management	
PROF-714	Agile Project Management	
ISEE-750	Systems and Project Management	
Second Year		
MKTG-761	Marketing Concepts and Commercialization	3
Choose one of the following:		3
ACCT-603	Accounting for Decision Makers	
ACCT-794	Cost Management in Technical Organizations	
Choose one of the following:		3
ISEE-798	Product Development Capstone	
ISEE-792	Engineering Capstone	
	Engineering or Business Elective	3
Total Semester Credit Hours		**30**

Elective courses

An elective course offers students the opportunity to better meet personal and organizational needs. Students may select from a long list of courses. Recommended electives include such offerings as Managing Research and Innovation, Lean Six Sigma Fundamentals, Advanced or International Project Management, Breakthrough Thinking and Creativity, Customer Centricity, and others.

Capstone project

Students complete a project during the final academic year of the program, based on a real problem often identified in the companies where they work. The corporate-oriented capstone project encompasses the broad integrative aspects of new product development – it synthesizes, increases, and demonstrates the student's understanding of previous program material and underscores the behaviors essential to product development leadership. The capstone project generates immediate benefits to sponsoring organizations. View our list of capstone projects for examples of projects past students have completed as part of the program.

Related programs

Visit the Engineering Leadership department for information on related offerings, including the master of science in manufacturing leadership, graduate certificate programs, and non-credit workshops and training programs.

Programs are available online, on-campus, or onsite at your location. Contact us for information about partnerships and customized programs for your organization.

Admission requirements

To be considered for admission to the MS program in product development, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college in engineering (or a related scientific or technical field),
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- One letter of recommendation is required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- Have at least two years of experience in product development or a related business environment.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Exceptions may be considered on a case-by-case basis. No graduate entrance exam is required, although candidates are welcome to support their application with results from the Graduate Management Admission Test (GMAT) or the Graduate Record Exam (GRE).

Applications are accepted on a rolling basis and students may begin the program in any semester.

Format

Students may start the program during any semester and complete the course work at their own pace. Classes are available online but several courses may be taken on campus for local or full-time students. Students may take up to three courses on a nonmatriculated basis. Credits earned while enrolled as a nonmatriculated student may be applied to the degree program following formal admission.

Tuition

The program's tuition is calculated using the part-time graduate tuition rate (12 credits or less). For information on tuition, scholarships, and financial aid, please visit Financial Aid and Scholarships. Discounts are available for groups.

Sustainable Engineering, MS

www.rit.edu/study/sustainable-engineering-ms
Brian Thorn, Professor
585-475-6166, bkteie@rit.edu

Program overview

Sustainable engineering refers to the integration of social, environmental, and economic considerations into the design of products, processes, and energy systems. Additionally, sustainable engineering encourages the consideration of the complete product and process lifecycle during the design effort. The intent is to minimize environmental impacts across the entire lifecycle of a product or process while simultaneously maximizing the benefits to social and economic stakeholders. This degree builds on RIT's work in sustainability research and education, and offers students the flexibility to develop tracks in areas such as renewable energy systems, systems modeling and analysis, product design, and engineering policy and management.

What is Sustainable Engineering?

Sustainable engineering is the process of deliberately designing systems, manufacturing operations, or products that use energy and natural resources sustainably. Or, in other words, using energy and resources in responsible ways that do not compromise our natural environment, negatively impact our natural resources, or create harm that impacts future generations.

Our sustainable engineering degree is designed to:

- Heighten your awareness of issues in areas of sustainability (e.g., global warming, ozone layer depletion, deforestation, pollution, ethical issues, fair trade, gender equity, etc.).
- Establish a clear understanding of the role and impact of various aspects of engineering (design, technology, etc.) and engineering decisions on environmental, societal, and economic problems. Particular emphasis is placed on the potential trade-offs between environmental, social, and economic objectives.
- Strong ability to apply engineering and decision-making tools and methodologies to sustainability-related problems.
- Demonstrate a capacity to distinguish professional and ethical responsibilities associated with the practice of engineering.

RIT's Sustainable Engineering Degree

The MS in sustainable engineering builds on RIT's work in sustainability research and education and offers you the flexibility to develop tracks in areas such as renewable energy systems, systems modeling and analysis, product design, and engineering policy and management. Course work is offered on campus and available on a full- or part-time basis. Technical in nature, the program equips engineers with the tools they need to meet the challenges associated with delivering goods, energy, and services through sustainable means. In addition to basic course work in engineering and classes in public policy and environmental management, students are required to complete a final project related to sustainable design challenges impacting society. Many of these projects support the sustainability-themed research being conducted by RIT faculty in research domains such as energy management, life-cycle engineering, packaging design, and sustainable process implementation.

Students must successfully complete four required core courses, two graduate engineering electives in an area of interest (such as energy, modeling, manufacturing and materials, transportation and logistics, or product design and development), one social context elective, one envi-

ronmental technology elective, two semesters of graduate seminar, and a final project. The program is designed to be completed in two years.

Cooperative Education

What makes an RIT education exceptional? It's the opportunity to complete relevant, hands-on engineering co-ops and internships with top companies in every single industry. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires. Cooperative education is optional but strongly encouraged for graduate students in the sustainable engineering master's program.

Curriculum

Sustainable Engineering, MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
ISEE-771	Engineering of Systems I	3
ISEE-785	Fundamentals of Sustainable Engineering	3
ISEE-786	Lifecycle Assessment	3
ISEE-795	Graduate Seminar*	0
MECE-629	Renewable Energy Systems	3
	Engineering Electives	6
Second Year		
	Technology Elective	3
	Social Context Elective	3
Choose one of the following:		6
ISEE-788	Project with Paper, plus one Engineering Elective	
ISEE-790	Thesis	
ISEE-792	Engineering Capstone, plus one Engineering Elective	
Total Semester Credit Hours		**30**

* Graduate Seminar (ISEE-795) must be completed twice in the first year of study.

Admission requirements

To be considered for admission to the MS program in sustainable engineering, candidates must fulfill the following requirements:

- Complete a graduate application.
- Hold a baccalaureate degree (or equivalent) from an accredited university or college in engineering, mathematics, or science.
- Submit official transcripts (in English) of all previously completed undergraduate and graduate course work.
- Have a minimum cumulative GPA of 3.0 (or equivalent).
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a statement of purpose.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit three letters of recommendation from academic or professional sources.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Vibrations, Adv. Cert.

www.rit.edu/study/vibrations-adv-cert
Michael Schrlau, Associate Professor
585-475-2139, mgseme@rit.edu

Program overview

Engineers with skills in vibration engineering contribute to creating manufacturing production systems, aerospace systems, automotive engineering, medical product development, consumer product development, and a host of industrial equipment and process systems in which vibration must be minimized or controlled.

The Impact of Machine Vibrations

Vibrations generated by machines and equipment can be disruptive and disturbing. Engineers often seek to reduce vibration so they can increase the durability and reliability of a machine, machinery system, or product; eliminate stress on a structure; and/or reduce damage, abnormal stoppage, or catastrophic failure. Targeted vibration prevention is the goal of a vibrations engineer.

Vibration Courses

The advanced certificate in vibrations takes you beyond the preparation in vibration engineering that you would typically complete during your undergraduate program of study. In this collection of graduate level courses, you will learn to use sophisticated software tools, analytical techniques and experimental methods to design, develop, and implement solutions for problems of vibration control and minimization in engineering systems. You will also be exposed to modern technologies used in industry to ensure that you are prepared for today's highly specialized job market. The curriculum answers a need for graduate-level instruction for practicing engineers in a field of importance for the 21st century.

What is a Graduate Certificate?

A graduate certificate, also called an advanced certificate, is a selection of up to five graduate level courses in a particular area of study. It can serve as a stand-alone credential that provides expertise in a specific topic that enhances your professional knowledge base, or it can serve as the entry point to a master's degree. Some students complete an advanced certificate and apply those credit hours later toward a master's degree.

Curriculum

Vibrations, advanced certificate, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
MECE-658	Introduction to Engineering Vibrations	3
MECE-707	Engineering Analysis	3
MECE-709	Advanced Engineering Mathematics	3
MECE-758	Intermediate Engineering Vibrations	3
Choose one of the following:		3
EEEE-602	Random Signals and Noise	
EEEE-678	Digital Signal Processing	
MECE-606	Systems Modeling	
Total Semester Credit Hours		**15**

Admission requirements

For information regarding the admission requirements for the advanced certificate in vibrations, contact the department head or the Office of Graduate Enrollment.

Faculty

Dean's Office

Doreen Edwards, BS, South Dakota School of Mines and Technology; Ph.D., Northwestern University—Dean; Professor

Edward Hensel, BS, Clarkson University; Ph.D., New Mexico State University—Associate Dean of Graduate Studies

Matthew M. Marshall, BS, Rochester Institute of Technology; MS, Ph.D., University of Michigan —Associate Dean, Undergraduate Studies

Biomedical Engineering

Steven Day, BS, Ph.D., University of Virginia—Department Head; Professor, Bioengineering, Implantable Devices, Fluids in Biosystems

Vinay Abhyankar, BS, Binghamton University; MS, Ph.D., University of Wisconsin-Madison—Assistant Professor, Microfluidics, Tissue Engineering, Lab-On-Chip Platforms

Iris Asllani, B.Sc., Nuclear Physics, University of Tirana (Albania); M.Sc., Ph.D., Bioengineering, University of Washington, Seattle—Associate Research Professor, Neuroimaging, Functional MRI, NMR Physics

Jennifer Bailey, BS, Ph.D., Purdue University—Principal Lecturer

Edward E. Brown, Jr., BS, University of Pennsylvania; MS, Ph.D., Vanderbilt University—Associate Professor, Rehabilitation, Robotics, Control Systems, Biomechatronics, Engineering Education

Thomas Gaborski, BS, Cornell University; MS, Ph.D., University of Rochester—Professor, Ph.D. Program Director, Nanomaterials, Bioseparations, Cellular Mechanics

Blanca Lapizco-Encinas, BS, Instituto Tecnologico de Sonora (Mexico); MS, Instituto Tecnologico de Celaya (Mexico); Ph.D., University of Cincinnati—Professor, Microfluidics, Microscale Electrokinetics and Bioseparations

Cristian Linte, BS, University of Windsor (Canada); MS, Ph.D., University of Western Ontario (Canada)—Associate Professor, Biomedical Image Analysis, Image Computing, Modeling and Visualization

Zhi (Jenny) Zheng, BS, Xidian University (China); MS, Ph.D., Vanderbilt University—Assistant Professor, Intelligent Interactive Systems, Human-Machine Interaction, Human-Centered Computing, Computer Vision, Machine Learning, Pattern Recognition and Data Mining

Michael Richards, BS, University of Rochester; Ph.D., Boston University—Assistant Professor, Image Processing, Mechanical Properties and Interactions of Biological Tissues

Iris V. Rivero, BS, MS, Ph.D., Pennsylvania State University—Kate Gleason Professor, Additive Manufacturing, Biomanufacturing, Hybrid Manufacturing, Friction Stir Welding

Karin Wuertz, BS, MS, University of Regensburg (Germany); MBA, University of Cumbria (United Kingdom); Ph.D., University of Ulm (Germany)—Kate Gleason Professor, Regenerative Medicine and Tissue Engineering, Inflammation, Mechanobiology

Chemical Engineering

Steven J. Weinstein, BS, University of Rochester; MS, Ph.D., University of Pennsylvania—Department Head; Professor, Interfacial Transport Processes, Hydrodynamic Wave Phenomena, Applied Mathematics

Jairo A. Diaz, BSE, National University of Columbia; (Columbia); Ph.D., Purdue University—Assistant Professor, Macromolecular and Interfacial Phenomena; Optical, Acoustic and Magnetic Control of Matter

Matt Ganter, BS, St. John Fisher College; MS, Ph.D., Rochester Institute of Technology—Assistant Research Professor

Nicole Hill, BS, Ph.D., Rochester Institute of Technology—Visiting Lecturer

Karuna Koppula, B. Tech, Andhra University (India); MS, University of New Hampshire; Ph.D., Michigan State University—Principal Lecturer

Brian J. Landi, BS, MS, Ph.D., Rochester Institute of Technology—Professor, Carbon Nanotubes, Batteries, Wires

Poornima Padmanabhan, B.Tech, Indian Institute of Technology (India); Ph.D., Cornell University—Assistant Professor, Molecular Simulation, Data-Driven Materials Design, Hierarchical Assemblies, Thermodynamics and Mechanics

Alexander D. Roth, BS, ME, Cornell University; MS, The Ohio State University; Ph.D., Cleveland State University—Lecturer

Patricia Taboada-Serrano, BS, Mayor de San Andres University (Bolivia); MS, Simon Bolivar University (Bolivia); Ph.D., Georgia Institute of Technology—Associate Professor, Electrochemical Energy Generation and Storage, Gas-Hydrates, Molecular Modeling, Monte Carlo Methods

Xiangcheng Sun, BE, Harbin Institute of Technology; MS, University of Chinese Academy of Sciences; Ph.D., University of Connecticut—Assistant Professor

Obioma Uche, BS, University of California, Berkeley; MS, Ph.D., Princeton University—Assistant Professor, Molecular Simulation, Statistical Thermodynamics and Mechanics

Computer Engineering

Amlan Ganguly, B. Tech, Indian Institute of Technology (India); MS, Ph.D., Washington State University—Department Head; Professor, Multi/Many-core Processors, Network-on-Chip, Interconnection Networks, Data Centers, Edge Computer, and 5G Communications

Andres Kwasinski, M.Sc., Ph.D., University of Maryland at College Park—Professor, Wireless Networks, Digital Signal Processing, Machine Learning for Communications and Networking, and Smart Infrastructures

Dongfang Liu, Ph.D., Purdue University—Assistant Professor, Artificial Intelligence, Machine Learning, Deep Learning, Computer Vision, Human-Computer Interaction, and Medical Imaging

Sonia Lopez Alarcon, BS, Ph.D., Complutense University of Madrid (Spain)—Associate Professor, Heterogeneous Computing, High Performance Computing and Architecture

Alexander C. Loui, B.Sc., M.Sc., PhD, University of Toronto (Canada)—Professor of Practice, Computer Vision, Machine Learning, Image/Video Processing and Analysis

Marcin Lukowiak, BS, MS, Ph.D., Poznan University (Poland)—Professor, Reconfigurable Computing, Cryptographic Engineering

Roy W. Melton, BEE, MS, PhD, Georgia Institute of Technology—Principal Lecturer, Computer Architecture, Embedded, Mobile and Cloud Computing

Cory Merkel, BS, MS, Ph.D., Rochester Institute of Technology—Assistant Professor, Artificial Intelligence, Memristive Devices, Neural Networks

Raymond Ptucha, BS, State University of New York at Buffalo; MS, Ph.D., Rochester Institute of Technology—Associate Professor, Machine Learning, Computer Vision, Robotics

Andreas Savakis, BS, MS, Old Dominion University; Ph.D., North Carolina State University—Professor, Digital Image Processing, Computer Vision

Muhammed E. Shaaban, BS, MS, University of Petroleum and Minerals (Saudi Arabia); Ph.D., University of Southern California—Associate Professor, Computer

Architecture, High Performance Computing

Shanchieh J. Yang, BS, National Chiao-Tung University (Taiwan); MS, Ph.D., University of Texas at Austin—Professor, Cyber Security, Machine Learning, Data Analytics, Simulation, Threat Modeling

Electrical and Microelectronic Engineering

Ferat E. Sahin, BS, Istanbul Technical University (Turkey); MS, Ph.D., Virginia Polytechnic Institute and State University—Department Head; Professor, Artificial Intelligence, Control Systems Robotics, Human Robot Collaboration

Mustafa A. G. Abushagur, BS, Tripoli University (Libya); MS, Ph.D., California Institute of Technology—Professor, Micro-optical Systems, Micro- and Nano-photonic Devices

David Borkholder, BS, Rochester Institute of Technology; MS, Ph.D., Stanford University—Bausch and Lomb Professor, Biosensors (Electromagnetic and Chemical), Biomedical Instrumentation, MEMS Fabrication, Drug Delivery, Systems Engineering

Sohail A. Dianat, BS, Aria-Mehr University of Technology (Iran); MS, Ph.D., George Washington University—Professor, Control Systems, Communications, Signal/Image Processing

Lynn F. Fuller, BS, MS, Rochester Institute of Technology; Ph.D., State University of New York at Buffalo—Professor Emeritus, IC Design, Semiconductor Manufacturing, MEMS and Microsystems

Jamison Heard, BS, University of Evansville; MS, Ph.D., Vanderbilt University—Assistant Professor, Robotics, Human-Machine Systems, and Human-Robot Interaction

Karl D. Hirschman, BS, MS, Rochester Institute of Technology; Ph.D., University of Rochester—Associate Department Head, Microelectronic Engineering Programs; Director, Semiconductor and Microsystems Fabrication Laboratory; Professor, Semiconductor Process Integration, Photonic Devices

Jason Hoople, BS, MS, Rochester Institute of Technology; Ph.D., Cornell University—Lecturer, Analog Circuits and Systems, Integrated Piezoelecric Transducers, Integrated CMOS Technology

Christopher R. Hoople, BS, Union College; Ph.D., Cornell University—Senior Lecturer, Power Electronics, Device Physics

Mark Indovina, BS, MS, Rochester Institute of Technology—Director of Outreach and Facilities; Senior Lecturer, Integrated Circuits Design and Digital Signal Processing

Michael A. Jackson, BS, MS, Ph.D., State University of New York at Buffalo—Associate Professor, Solid State Devices, IC Metrology, Electronic Materials and Processing, Photovoltaics

Santosh Kurinec, BS, MS, Ph.D., University of Delhi (India)—Professor, Electronic Materials and Devices, IC Processing, Quantum and Nanoscale Devices, Non Volatile Memory, Photovoltaics

Sergey Lyshevski, MS, Ph.D., Kiev Polytechnic Institute (Ukraine)—Professor, Microsystems, Mechatronics, Control Systems, Non-Linear Control

Parsian Katal Mohseni, BS, Ph.D., McMaster University (Canada)—Associate Professor, Nanomaterials Growth and Characterization, III-V Epitaxy, Nanofabrication, Optoelectronics, Photovoltaics, MacEtch

James Moon, BS, Carnegie Mellon University; MBA, University of Rochester; MS, Ph.D., University of California at Berkeley—Professor, Semiconductor and Solid State Physics, Integrated Circuit Design, Microfluidic MEMS

P. R. Mukund, BS, MS, Ph.D., University of Tennessee—Professor Emeritus, VLSI Design, Electronic Devices and Circuit Design

Kai Ni, BS, University of Science and Technology of China (China); MS, Ph.D., Vanderbilt University—Assistant Professor, Nanoelectronic Devices, Neuromorphic Computing, Novel Computing Paradigms

Dorin Patru, BS, MS, Technical University of Cluj-Napoca (Romania); Ph.D., Washington State University—Associate Professor, Domain Specific Computing Architectures, Artificial Neural Networks, Artificial Intelligence

Robert E. Pearson, BS, MS, Rochester Institute of Technology; Ph.D., State University of New York at Buffalo—Associate Professor, Advanced Device and Process Modeling, VLSI Design and Parameter Extraction

Dan Phillips, BS, State University of New York at Buffalo; MS, Ph.D., University of Rochester-Associate Professor, Biomedical Instrumentation, Signal Processing and Visualization, and Embedded Systems

Stefan Preble, BS, Rochester Institute of Technology; Ph.D., Cornell University—Professor, Quantum Silicon Photonics, Integrated Photonics, Hybrid Silicon Lasers

Ivan Puchades, BS, MS, Ph.D., Rochester Institute of Technology—Assistant Professor, MEMS Design and Fabrication, Carbon Nanotubes and Nanomaterials

Majid Rabbani, BS, Aria-Mehr University of Technology (Iran); MS, Ph.D., University of Wisconsin-Madison—Professor of Practice, Signal and Video Processing, Pattern Recognition, Image Compression

Sean L. Rommel, BS, Ph.D., University of Delaware—Microelectronic Engineering Program Director, Professor, Emerging Semiconductor Devices, Photonic Devices, Integration

Eli Saber, BS, State University of New York at Buffalo; MS, Ph.D., University of Rochester—Gleason Professor in Electrical Engineering, Professor, Signal Image and Video Processing, Communications, Biomedical Imaging, Computer Vision

Bruce W. Smith, BS, MS, Ph.D., Rochester Institute of Technology—Distinguished Professor, Microlithography, Nanopatterning and Nanomaterials, Thin Films Materials and Processes

Gill R. Tsouri, B.Sc., M.Sc., Ph.D., Ben-Gurion University (Israel)—Associate Professor, MIMO, OFDM/OFDMA Systems, Wireless Sensor Networks, Diversity Methods

Jayanti Venkataraman, BS, MS, Bangalore University (India); Ph.D., Indian Institute of Science (India)—Associate Department Head, Electrical Engineering Programs; Professor, Electromagnetics, Microwaves and Antennas

Bing Yan, BS, Renmin University of China; MS, Ph.D., University of Connecticut—Assistant Professor, Power, Smart Power Systems, Intelligent Manufacturing Systems

Jing Zhang, BS, Huazhong University (China); Ph.D., Lehigh University—Associate Professor, Devices fabrication of III-Nitride semiconductors for photonics

Industrial and Systems Engineering

Iris V. Rivero, BS, MS, Ph.D., Pennsylvania State University-Department Head, Kate Gleason Professor, Additive Manufacturing, Biomanufacturing, Hybrid Manufacturing, Friction Stir Welding

Nasibeh Azadeh Fard, BS, Iran University of Science and Technology; MS, Ph.D., Virginia Polytechnic Institute and State University—Assistant Professor, Data Analytics, Healthcare Systems Engineering, Risk Analysis, Early Warning Systems, Performance Measurement and Analysis

Denis R. Cormier, BS, University of Pennsylvania; MS, State University of New York at Buffalo; Ph.D., North Carolina State University—Earl W. Brinkman Professor, Additive Manufacturing and Direct-Write Printing Technology, Rapid Prototyping

Michael E. Kuhl, BS, Bradley University; MS, Ph.D., North Carolina State University—Professor, Simulation Modeling and Analysis applied to Manufacturing, Intelligent Materials Handling, Supply Chain, and Healthcare Systems

Rui Liu, BS, Beijing University (China); MS, Northeastern University; Ph.D., Georgia Institute of Technology—Assistant Professor, Advanced Manufacturing, Machining Process Optimization, Machine Process Simulation

Katie McConky, BS, MS, Rochester Institute of Technology; Ph.D., State University of New York at Buffalo—Associate Professor, Applied Statistics, Analytics, Operations Research, Optimization and Forecasting

Ruben A. Proaño, BS, Universidad San Francisco de Quito (Ecuador); MS, Ph.D., University of Illinois at Urbana-Champaign—Associate Professor, Operations Research, Logistics/ Supply Chain Management

Esa M. Rantanen, BS, MS, EmbryRiddle Aeronautical University; MS, Ph.D., Pennsylvania State University—Associate Professor

Ehsan Rashedi, BS, MS, Sharif University of Technology (Iran); MS, Ph.D., Virginia Polytechnic Institute and State University—Assistant Professor, Biomechanics, Ergonomics, Human Factors

Brian K. Thorn, BS, Rochester Institute of Technology; MS, Ph.D., Georgia Institute of Technology—Professor, Applied Statistics, Sustainable Design and Development, Life Cycle Assessment and Costing

Yunbo "Will" Zhang, BS, Shandong University (China); MS, Huazhong University of Science and Technology (China); Ph.D., The Chinese University of Hong Kong—Assistant Professor, Smart Manufacturing, Design for Additive Manufacturing, Geometric Processing, Human-Computer Interaction, Computer-aided Design/Computer-aided Manufacturing

Mechanical Engineering

Risa J. Robinson, BS, MS, Rochester Institute of Technology; Ph.D., State University of New York at Buffalo—Department Head, Professor, Bioengineering, Respiratory Device Technologies, Aerosol Transport in Biological Systems

Margaret Bailey, BS, Pennsylvania State University; Ph.D., University of Colorado at Boulder, PE—Senior Faculty Associate to the Provost for ADVANCE; Professor, Energy Systems, Thermodynamics, Building Systems

Stephen Boedo, BA, State University of New York at Buffalo; MS, Ph.D., Cornell University—Associate Professor, Tribology and Lubrication, Hip Joint Design, Computational Methods and Design Guidelines for Bearing Systems

Robert Carter, BS, University of Maine; Ph.D., Cornell University—Associate Department Head; Senior Lecturer

Agamemnon L. Crassidis, BS, MS, Ph.D., State University of New York at Buffalo—Associate Professor, Aerospace Engineering, Nonlinear Dynamics and Controls

Steven Day, BS, Ph.D., University of Virginia—Professor, Bioengineering, Implantable Devices, Fluids in Biosystems

Alfonso Fuentes-Aznar, MS, University of Murcia (Spain); Ph.D., National University of Distance Education (Spain)—Associate Professor, Gear Transmission, Enhanced Design Technologies for all Types of Gear Drives

Hany A. Ghoneim, BS, MS, Cairo University (Egypt); Ph.D., Rutgers University—Professor, Finite Elements, Vibrations

Amitabha Ghosh, B.Tech., M.Tech., Indian Institute of Technology (India); Ph.D., Mississippi State University—Professor, Computational Fluid Dynamics, Aerodynamics, Aerospace Engineering

Mario W. Gomes, BsE, Cornell University; MS, Georgia Institute of Technology; Ph.D., Cornell University—Assistant Professor, Sustainable Energy Systems

Surendra K. Gupta, B.Tech., Indian Institute of Technology (India); MS, University of Notre Dame; Ph.D., University of Rochester—Professor, Materials Science, Computer Software, Image Processing

Phillip Hutton, BS, University of Pittsburgh, MS, Old Dominion University, MS, Carnegie Mellon University, Ph.D., University of North Dakota—Lecturer

Patricia Iglesias Victoria, BSE, Ph.D., Polytechnic University of Cartagena (Spain)—Associate Professor, Friction and Wear, Tribology, Material Science

Sarilyn Ivancic, BS, MS, Ph.D., University of Rochester—Graduate Program Director; Senior Lecturer

Satish G. Kandlikar, BE, Marathwada University (India); M.Tech., Ph.D., Indian Institute of Technology (India)—James E. Gleason Professor, Thermal Systems and Energy

Jason R. Kolodziej, BS, MS, Ph.D., State University of New York at Buffalo—Associate Professor, Hybrid Vehicle Technology and Renewable Energy

Margaretha J. Lam, BS, MS, State University of New York at Buffalo; Ph.D., Virginia Polytechnic Institute and State University—Undergraduate Program Director; Principal Lecturer, Vibrations, Optimization

Kathleen Lamkin-Kennard, BS, Worcester Polytechnic Institute; MS, Ph.D., Drexel University—Associate Professor, Biomedical Engineering, Multi-physics Systems Modeling

Rui Liu, BS, Beijing University (China); MS, Northeastern University; Ph.D., Georgia Institute of Technology—Assistant Professor, Advanced Manufacturing, Machining Process Optimization, Machine Process Simulation

Ali Ogut, B.Ch.E., Hacettepe University (Turkey); MS, Ph.D., University of Maryland—Professor, Fluid Mixing, Thermal Fluid Sciences, Energy and Environment

Howard Qingsong Tu, BS, MS, Beijing Institute of Technology (China); Ph.D., University of California, Berkeley—Assistant Professor

Michael Schertzer, B.Eng.Mgt., M.A.Sc., McMaster University (Canada); Ph.D., University of Toronto (Canada)—Associate Professor, Lab on a Chip, Medical Diagnosis Devices, Energy Harvesting

Michael Schrlau, BS, University of Pittsburgh; Ph.D., University of Pennsylvania—Associate Professor, Bioengineering and Microsystems, Nanobiotechnology

Robert Stevens, BS, Swarthmore College; MS, North Carolina State University; Ph.D., University of Virginia—Associate Professor, Energy and Environment, MEMS, Thermal Properties, Energy Conversion, Thermoelectrics

The John D. Hromi Center for Quality and Applied Statistics

Mark W. Smith, BS, University of Virginia; MS, University of Rochester—Director

Vincent Buonomo, BS, ME, Rochester Institute of Technology—Sr. Program Manager, ASQ Certified Quality Engineer, Master Black Belt in Lean Six Sigma

Margaret Ochs, BA, Georgetown University; MBA, University of Rochester—Senior Program Manager, Master Black Belt in Lean Six Sigma

College of Engineering Technology

S. Manian Ramkumar, Dean
rit.edu/engineeringtechnology

Programs of Study

🖱 Online learning option available.

The diverse, graduate-level programs offered by the College of Engineering Technology represent RIT's commitment to curricular innovation, program flexibility, and academic rigor. The college is committed to advancing the state of the education we provide through research, the latest uses of technology, and current management theories and educational philosophies.

Please visit the college's website–**www.rit.edu/engineeringtechnology**–for in depth information on academics, faculty, facilities, research initiatives, advising, and more.

Admission requirements

Each college makes all decisions regarding graduate admission. Please refer to the individual program descriptions for information regarding specific admission criteria. For general graduate admission information, please refer to the Admission section of this bulletin.

Financial aid and scholarship

Please refer to the Financial Aid and Scholarship section of this bulletin for information regarding financial aid, scholarships, grants, loans, and graduate assistantships.

Communication Networks, MS

www.rit.edu/study/communication-networks-ms
James Lee, Associate Professor
585-475-2899, jhleme@rit.edu

Program overview

Telecommunications and communication networks are ever changing, with new services and products being created and offered through the internet, mobility via wireless technology, extreme capacity created by fiber optics, as well as the evolution of policy and regulation. These are all shaping the telecommunication industry and the networks of the future.

Master's in Communication Networks

The MS in communication networks develops an advanced level of skill and knowledge needed by the future leaders of the telecommunications industry. This program is designed for individuals who seek advancement into managerial roles in the dynamic, evolving communications environment. Courses cover converged and IP networks, fiber optic communications, wireless networks, and network design and management.

To help you achieve the level of expertise you are seeking, the program offers three options: fiber-optic and photonic communications, wireless communications, and network design and management. Each is designed to develop advanced knowledge in a specialty area. Alternatively, you may choose not pursue a program option. Instead, you may select specific electives from a number or RIT's graduate programs to achieve more specific career goals.

Experiential Learning

Cooperative Education

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Cooperative education is optional but strongly encouraged for graduate students in the communication networks MS degree.

Curriculum

Communication Networks (thesis option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
TCET-601	Programming & Problem Solving in Telecommunications*	3
TCET-715	Converged Network Concepts	3
TCET-740	Fiber Optic Communications	2
TCET-741	Fiber Optic Communications Lab	1
TCET-751	Wireless Communications	3
GRCS-701	Research Methods	3
	Electives	12
Second Year		
TCET-788	Thesis Planning	3
TCET-790	Thesis	3
Total Semester Credit Hours		**30**

Communication Networks (graduate project option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
TCET-601	Programming & Problem Solving in Telecommunications*	3
TCET-715	Converged Network Concepts	3
TCET-740	Fiber Optic Communications	2
TCET-741	Fiber Optic Communications Lab	1
TCET-751	Wireless Communications	3
GRCS-701	Research Methods	3
	Electives	12
Second Year		
TCET-797	Graduate Project	3
	Elective	3
Total Semester Credit Hours		**30**

Communication Networks (comprehensive exam option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
TCET-601	Programming & Problem Solving in Telecommunications*	3
TCET-715	Converged Network Concepts	3
TCET-740	Fiber Optic Communications	2
TCET-741	Fiber Optic Communications Lab	1
TCET-751	Wireless Communications	3
GRCS-701	Research Methods	3
	Electives	12
Second Year		
TCET-795	TCET Comprehensive Exam	0
	Electives	6
Total Semester Credit Hours		**30**

* TCET-601 is a bridge course that can be waived by qualification exam. Credits for course or waiver do not count toward degree.

Students must use the curriculum electives to complete at least 9 credits from a list of courses approved by the faculty to earn an option. Students may complete courses listed in any option or choose courses from a list of approved elective courses to complete the required number of electives. A student is not required to complete any option but may pick and choose courses that fulfill their educational objectives from any of the listed options of approved elective courses. The currently-approved courses by option are:

Options

Fiber Optic and Photonic Communications Option

COURSE	
Choose three from the list below for 9 credits	
TCET-745	Advanced Fiber-Optic Communications
TCET-748	Fiber Optic Test & Measurement
EEEE-771	Optoelectronics
MFET-655	Surface Mount Electronics Manufacturing

Network Design and Management Option

COURSE	
Choose three from the list below for 9 credits	
TCET-620	Applied Machine Learning
TCET-723	Telecommunications Network Engineering
TCET-747	Next Generation Networks
TCET-760	Network Planning and Design

Wireless Communications Option

COURSE	
All courses required for 9 credits	
TCET-750	Wireless Systems Regulation
TCET-752	Advanced Wireless Communication
TCET-753	Wireless Networks

Admission requirements

To be considered for admission to the MS program in communications networks, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college in engineering technology, engineering, or a related area.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Construction Management, MS

www.rit.edu/study/construction-management-ms

Yi Su, Visiting Lecturer
yxsite@rit.edu

Program overview

The master of science degree in construction management is specifically designed for experienced construction management professionals interested in advancing into leadership positions within the field. The program may also accommodate recent graduates of undergraduate programs in construction management or related disciplines. The program is offered entirely online.

The goal of the construction management master's degree is to provide students with the requisite strategic skills to lead and advance the construction industry. Graduates will develop competencies in leadership, construction cost analysis and control, construction operations management and productivity, construction business development, sustainable design and construction, and construction client relationship building. As part of the multidisciplinary nature of the program, a wide range of electives from different disciplines provides graduates with flexibility to take relevant courses across RIT. Core construction management courses in the program are taught by faculty with both field and research experience in the discipline.

Plan of study

The program is hosted completely online and designed with the working professional in mind. You will have the convenience and flexibility to plan your course work around your work or personal commitments. The program can be completed in as little as one and a half years of full-time study, or approximately two-to-three to years of part-time study. The curriculum consists of core courses, professional electives, and a choice of a graduate thesis, project, or a comprehensive exam.

Experiential Learning

Cooperative Education

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Cooperative education is optional but strongly encouraged for graduate students in the construction management MS degree.

Curriculum

Construction Management (comprehensive exam completion path), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
CONM-650	Principles of Construction Leadership and Management	3
CONM-690	Sustainable Building Construction and Design	3
CONM-718	Construction Operations and Productivity	3
CONM-720	Construction Cost Analysis and Management	3
GRCS-701	Research Methods	3
	Professional Electives	6
Second Year		
CONM-760	Construction Client Development	3
CONM-795	Comprehensive Exam	0
	Professional Electives	6
Total Semester Credit Hours		**30**

Construction Management (graduate capstone project completion path), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
CONM-650	Principles of Construction Leadership and Management	3
CONM-690	Sustainable Building Construction and Design	3
CONM-718	Construction Operations and Productivity	3
CONM-720	Construction Cost Analysis and Management	3
GRCS-701	Research Methods	3
	Professional Electives	6
Second Year		
CONM-760	Construction Client Development	3
CONM-797	Graduate Project	3
	Professional Elective	3
Total Semester Credit Hours		**30**

Construction Management (thesis completion path), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
CONM-650	Principles of Construction Leadership and Management	3
CONM-690	Sustainable Building Construction and Design	3
CONM-718	Construction Operations and Productivity	3
CONM-720	Construction Cost Analysis and Management	3
CONM-788	Thesis Planning	3
GRCS-701	Research Methods	3
	Professional Elective	3
Second Year		
CONM-760	Construction Client Development	3
CONM-790	Thesis	3
	Professional Elective	3
Total Semester Credit Hours		**30**

Admission requirements

To be considered for admission to the MS in construction management, candidates must fulfill the following requirements:

- Submit a graduate application.
- Submit official transcripts (in English) of all previously completed undergraduate and graduate course work.
- Hold a bachelor's degree with a minimum undergraduate GPA of 3.0 in construction management, civil engineering, civil engineering technology, or related program that includes at least 15 semester hours of college level math and science. Applicants holding other bachelor degrees with appropriate, related work experience will be considered for admission on an individual basis,
- Have course work or equivalent documented professional experience in cost estimating, planning & scheduling and project management.
- Business/management courses and a statistics course are strongly recommended.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Have at least one-year relevant construction management experience. Those who lack appropriate work experience may be required to complete one or more semesters of related graduate cooperative work experience;
- If academic and/or work preparation is needed before being admitted and beginning graduate studies, applicants are encouraged to develop a plan with the program chair. Preparatory course(s) may be completed at RIT or (with pre-approval) may be completed at other universities. Each course must be completed with a grade of B or higher.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Environmental, Health and Safety Management, MS

www.rit.edu/study/environmental-health-and-safety-management-ms
Joseph Rosenbeck, Professor
5854756469, jmrcem@rit.edu

Program overview

Management of environmental, health and safety issues has changed significantly in recent years. The emergence of voluntary standards and codes of conduct, including international standards, coupled with the need to manage costs and limited resources, has resulted in a trend to move beyond regulatory compliance. Now, companies work toward sustainability through the use of integrated environmental and management systems, which are woven into key business processes. The environmental management masters provides students with a solid foundation in the managerial aspects of developing and implementing environmental, health and safety management systems that can move organizations toward a more sustainable and socially responsible future.

Although they are distinct disciplines, environmental management, occupational health, and workplace safety share many technical, regulatory, and organizational characteristics. Today's professionals need to be educated in all three areas. Graduates of the program are employed by Fortune 100 companies, environmental health and safety consultancies, universities, and government agencies such as the Environmental Protection Agency, Occupational Safety and Health Administration, and the New York State Department of Environmental Conservation.

Environmental Health and Safety Courses

The MS degree in environmental, health and safety management provides students with a solid foundation in the managerial aspects of developing and implementing environmental, health and safety management systems that can move organizations toward a more sustainable and socially responsible future. In addition, students gain a solid technical foundation in air emissions, wastewater, solid and hazardous waste, occupational safety and occupational health (industrial hygiene). Elements of sustainability are integrated into most core courses and some electives.

The program may be completed entirely through online learning, or via a combination of online and traditional on-campus courses. The curriculum includes core courses, professional electives, and a choice of a thesis, capstone project, or comprehensive exam.

Professional electives can include courses in topics as diverse as fire protection, occupational health, solid and hazardous waste management, industrial wastewater management, air emissions management, occupational safety, mechanical and electrical controls and standards, environmental health and safety law, accounting and finance, project management, and organizational behavior and leadership. Additional professional electives are available in topics such as business management, quality, sustainability, and other areas.

Experiential Learning

Cooperative Education

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Full-time students are eligible to participate in RIT's cooperative education program. After completing two semesters (a minimum of 18 credit hours), students may request approval to complete up to one year of cooperative education employment related to their field of study.

Curriculum

Environmental, Health and Safety Management (thesis option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
ESHS-720	Environmental, Health and Safety Management	3
ESHS-740	EHS Management System Design	3
ESHS-755	Corporate Social Responsibility	3
ESHS-760	Integrating EHS Management	3
GRCS-701	Research Methods	3
	Professional Electives	6
Second Year		
ESHS-780	EHS Internal Auditing	3
ESHS-788	Thesis Planning	3
ESHS-790	Thesis	3
Total Semester Credit Hours		**30**

Environmental, Health and Safety Management (capstone project option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
ESHS-720	Environmental, Health and Safety Management	3
ESHS-740	EHS Management System Design	3
ESHS-755	Corporate Social Responsibility	3
ESHS-760	Integrating EHS Management	3
GRCS-701	Research Methods	3
	Professional Electives	6
Second Year		
ESHS-780	EHS Internal Auditing	3
ESHS-797	Graduate Project	3
	Professional Elective	3
Total Semester Credit Hours		**30**

Environmental, Health and Safety Management (comprehensive exam option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
ESHS-720	Environmental, Health and Safety Management	3
ESHS-740	EHS Management System Design	3
ESHS-755	Corporate Social Responsibility	3
ESHS-760	Integrating EHS Management	3
GRCS-701	Research Methods	3
	Professional Electives	6
Second Year		
ESHS-780	EHS Internal Auditing	3
ESHS-795	Comprehensive Exam	0
	Professional Electives	6
Total Semester Credit Hours		**30**

Admission requirements

To be considered for admission to the MS program in environmental, health and safety management, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit two writing samples to demonstrate written communication skills. Writing samples may include, but are not limited to reports, memos, investigations, procedures, position papers, essays and term papers
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- Applicants with acceptable professional certification(s) and/or work experience may have prerequisite science course work waived.
- Applicants without formal academic training or documented experience in air emissions, waste water, solid and hazardous waste, occupational health, or occupational safety may be required to take professional electives in these areas.
- Have completed at least 9 semester hours of college-level course work in the sciences, with at least 3 semester credit hours in each of the following categories: chemistry, biology, and physics.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Transfer Credit

With the permission of the department, relevant graduate course work may be transferred into the program, per the maximum number of credit hours allowed.

International Students

International students enrolled in courses at the RIT campus are required to take at least two traditional classroom courses and one or two online courses per semester. In addition, international students are solely responsible for meeting the requirements of their government and other sponsors, as applicable.

Manufacturing and Mechanical Systems Integration, MS

www.rit.edu/study/manufacturing-and-mechanical-systems-integration-ms
Martin K. Anselm, Associate Professor
585-475-2005, mkamet@rit.edu

Program overview

The MS in manufacturing and mechanical systems integration is a manufacturing engineering degree designed for individuals who wish to achieve a high level of aptitude, competence, and skill in mechanical or manufacturing engineering, or advanced mechanical systems. The program combines engineering, business, and management to effectively guide and lead in a range of manufacturing enterprises.

The program is offered by the department of manufacturing and mechanical engineering technology in collaboration with Saunders College of Business and the Kate Gleason College of Engineering.

Manufacturing Engineering Courses

The manufacturing engineering degree includes core courses that cover manufacturing and mechanical systems fundamentals, project management, advanced mechanical systems, integrated mechanical systems, manufacturing process improvements and efficiencies, and the business and financial aspects of manufacturing. You'll also complete a three-course option, elective courses, and a capstone project, thesis, or comprehensive exam.

Options are available in advanced mechanics, electronics packaging, polymer engineering and technology, product design, quality, and robotics and advanced manufacturing systems. Students may be required to take additional prerequisite courses depending on their background and the option selected. The graduate director may approve the waiver of courses in the prerequisite group from graduation requirements, depending on a student's academic and employment background.

- Advanced Mechanics: The advanced mechanics option analyzes classical and contemporary theoretical models of material structures. Practical methods and approaches, experimental results, and optimization of material properties and structure performance are put to use for capstones and thesis projects. Students who plan on careers in advanced mechanical modeling and design should consider this option.
- Electronics Packaging: Students in this option receive a detailed education in printed circuit board assembly design, manufacturing, materials, failure modes, and root causes. They'll also gain a broad understanding of best practices and learn the scope of the industry. Anyone who plans on designing or manufacturing products that contain circuit board assemblies, in either rigid or flexible formats, would benefit from this option. Topics of study include electronics miniaturization, defect analysis, solder reliability, and process optimization.
- Polymer Engineering and Technology: The purpose of this option is to equip future engineers with the unique skills necessary to enter the plastics industry, one of the largest manufacturing related industries in the United States. Successfully developing new plastics materials and products requires specialized knowledge of these complex manufacturing systems. A critical component of this option is the completion of a research project in the area of plastics and polymer technology. Some projects have focused on polymer composites, shape memory/self-healing materials, 3D printing, and biodegradable polymers.
- Product Design: Product design in the 21st century requires a skill set that has grown to be much more than just designing parts that fit together in a product. Parts and products must now be designed with consideration for the best choices of features, the ability to function

ideally under varying conditions and environments, and ease in manufacturing and assembly. These skills are all required by today's engineers and product designers and are equally important for engineering managers to understand.

- Quality: The quality option enables students to lead a problem-solving project within a quality management team. Students will learn to reduce unacceptable variability in materials, production, and manufacturing systems resulting in high quality finished products. Students will use skills in robust design, linear regression, and modeling to show that variability can be reduced and that a solution is sustainable. Students who select this option may be interested in pursuing a leadership role as a manufacturing engineer, senior quality engineer, continuous process improvement engineer, or process engineer.
- Robotics and Advanced Manufacturing Systems: Robotics is more than software. In addition to programming, students who choose this option will study how robotic systems are designed to complement a manufacturing system or aid in human assistance products with a focus on limitations and design improvements. Capstone and thesis projects involve optimization and improvement of designs to achieve a specific robotic behavior or task. Robotic integrators as well as robotic designers will benefit by learning robotic mechanical and electrical limitations and development.

Electives

The number of electives needed to complete the program is based on whether the student chooses to complete a thesis, capstone project, or comprehensive exam. The thesis option requires one elective, the capstone project requires two electives, and the comprehensive exam option requires three electives. Elective courses can be any course from a different concentration from the one chosen, a graduate-level course from another program (if approved by the graduate director and faculty member teaching the course), or an independent study course (if approved by the student's graduate program director).

Experiential Learning

Cooperative Education

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Full-time students are eligible to participate in RIT's cooperative education program. After completing two semesters (a minimum of 18 credit hours), students may request approval to complete up to one year of cooperative education employment related to their field of study.

Curriculum

Manufacturing and Mechanical Systems Integration (thesis option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
ACCT-603	Accounting for Decision Makers	3
MFET-600	MMSI Graduate Seminar	0
MFET-650	Manufacturing and Mechanical Systems Fundamentals	3
MFET-730	Six Sigma for Design and Manufacturing	3
MFET-788	MMSI Thesis Planning	3
STAT-670	Design of Experiments	3
	MMSI Option Courses	6
Second Year		
DECS-744	Project Management	3
MFET-790	MMSI Thesis	3
	Elective*	3
	MMSI Option Course	3
Total Semester Credit Hours		**33**

Manufacturing and Mechanical Systems Integration (capstone project option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
ACCT-603	Accounting for Decision Makers	3
MFET-600	MMSI Graduate Seminar	0
MFET-650	Manufacturing and Mechanical Systems Fundamentals	3
MFET-730	Six Sigma for Design and Manufacturing	3
STAT-670	Design of Experiments	3
	MMSI Option Courses	6
	Elective*	3
Second Year		
DECS-744	Project Management	3
MFET-797	MMSI Capstone Project	3
	MMSI Option Course	3
	Elective*	3
Total Semester Credit Hours		**33**

Manufacturing and Mechanical Systems Integration (comprehensive exam option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
ACCT-603	Accounting for Decision Makers	3
MFET-600	MMSI Graduate Seminar	0
MFET-650	Manufacturing and Mechanical Systems Fundamentals	3
MFET-730	Six Sigma for Design and Manufacturing	3
STAT-670	Design of Experiments	3
	MMSI Option Courses	6
	Elective*	3
Second Year		
MFET-795	MMSI Comprehensive Exam	0
DECS-744	Project Management	3
	MMSI Option Course	3
	Electives*	6
Total Semester Credit Hours		**33**

* Elective courses must be chosen from the list of option courses, but must be outside of the option the student has chosen as part of their program of study.

Options

COURSE		SEMESTER CREDIT HOURS
Robotics and Advanced Manufacturing Systems		
ISEE-610	Systems Simulation	3
RMET-671	Automation Systems Design and Control	3
RMET-685	Robots & Automation	3
RMET-687	Robotics: Sensors & Vision	3
TCET-620	Applied Machine Learning	3
Electronics Packaging		
MFET-655	Surface Mount Electronics Manufacturing	3
MFET-656	Advanced Concepts in Semiconductor Packaging	3
MTSE-601	Materials Science	3
TCET-740	Fiber Optic Communications	2
TCET-741	Fiber Optic Communications Lab	1
Product Design		
MCET-620	Robust Design & Production Systems	3
MCET-670	Concept Design & Critical Parameter Management	3
MCET-683	Plastics Product Design	3
MCET-720	Product & Production System Development & Integration	3
Quality		
MCET-620	Robust Design & Production Systems	3
STAT-621	Statistical Quality Control	3
STAT-641	Applied Linear Models - Regression	3
Polymer Engineering & Technology		
MCET-730	Polymer Engineering Research (REQUIRED)	3
MCET-674	Plastics and Composites Materials	2
MCET-675	Plastics and Composites Materials Laboratory	1
MCET-680	Plastics Manufacturing Technology	3
MCET-683	Plastics Product Design	3
MTSE-602	Polymer Science	3
Advanced Mechanics		
MCET-621	Structural Analysis	3
MCET-683	Plastics Product Design	3
MCET-695	Applied Finite Element Analysis	3

Admission requirements

To be considered for admission to the MS program in manufacturing and mechanical systems integration, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college in the field of engineering, engineering technology, or computing. Students with degrees in other disciplines will be considered on an individual basis.
- Recommended minimum cumulative GPA of 3.0 (or equivalent). Applicants with a lower GPA will be evaluated on a case-by-case basis and may be admitted on a probationary basis. These students will have to secure a B or better average in the first three graduate courses to be considered for full admission.
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Packaging Science, MS

www.rit.edu/study/packaging-science-ms

Erin Aaron,
585-475-2278, eeaast@rit.edu

Program overview

Designed for packaging professionals to become experts in the packaging development process, the master's in packaging science focuses on selecting raw materials, developing environmentally friendly packaging solutions, and creating functional packaging that withstands environmental, chemical, and physical stresses during distribution and transportation. The program will also help you to keep these functional aspects in mind as you develop attractive packaging designs that are aesthetically pleasing as they pique consumer interest. This master's in packaging science combines theoretical and hands-on learning experiences that enable you to gain comprehensive knowledge related to packaging design, package testing, product marketing, project management, and quality control.

What is Packaging Science?

Packaging science is a dynamic field that integrates engineering, design, and business to develop and design product packaging for a range of consumer goods. Packaging engineers and packaging designers focus on understanding the packaging needs of a product and what it must accomplish. These needs can range from maintaining food freshness and safety, keeping products safe from damage during transportation, appealing to consumers at the point of purchase, communicating product information, sustaining transportation efficiency, complying with sustainable practices for post-use recycling and reuse, and more. It's the role of packaging engineers and packaging designers to responsibility weigh these factors into the conceptualization, design, and development of product packaging.

Packaging Engineering Courses

The master's in packaging science consists of core courses, elective courses, and either a comprehensive exam, capstone project, or thesis. The total number of elective courses depends on the student's choice of the exam, project, or thesis option. Faculty advisors assist in selecting an option that best meets a student's career aspirations.

Core courses cover topics such as packaging dynamics, packaging and the environment, product packaging for end use, and distribution systems including supply chain management. Elective courses are approved by the student's advisor and must meet degree requirements. In certain circumstances, with pre-approval by the graduate advisor and where individual need indicates appropriateness, a limited number of upper-level undergraduate courses may be used to fulfill elective credit. Students, with advisor permission, may include independent study as part of their elective credits. However, independent study may not be used toward the required packaging core course work. Courses selected for elective credit may be combined to create special areas of focus with program chair approval.

Green Belt – Lean Six Sigma

Students may elect to pursue Green Belt certificate in Lean Six Sigma with the completion of the thesis or capstone project. Certification requires students to complete the Lean Six Sigma Yellow Belt Certification training program as one of their electives. Upon completion, students must implement the fundamentals of Lean Six Sigma within their thesis or capstone project.

Experiential Learning

Cooperative Education

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Full-time students may choose to complete cooperative education. After completing two semesters of study (a minimum of 18 credit hours), students may request approval to complete up to one year of cooperative education related to packaging.

Curriculum

Packaging Science (thesis option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
GRCS-701	Research Methods	3
PACK-730	Packaging and the Environment	3
PACK-742	Distribution Systems	3
PACK-763	Packaging for End Use	3
	Packaging Electives	12
Second Year		
PACK-783	Advanced Packaging Dynamics	3
PACK-790	Research Thesis	6
	Packaging Elective	3
Total Semester Credit Hours		**36**

Packaging Science (capstone project option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
GRCS-701	Research Methods	3
PACK-742	Distribution Systems	3
PACK-730	Packaging and the Environment	3
PACK-763	Packaging for End Use	3
	Packaging Electives	12
Second Year		
PACK-783	Advanced Packaging Dynamics	3
PACK-797	Graduate Project	3
	Packaging Electives	6
Total Semester Credit Hours		**36**

Packaging Science (comprehensive exam option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
GRCS-701	Research Methods	3
PACK-742	Distribution Systems	3
PACK-730	Packaging and the Environment	3
PACK-763	Packaging for End Use	3
	Packaging Electives	12
Second Year		
PACK-783	Advanced Packaging Dynamics	3
PACK-795	Comprehensive Examination	0
	Packaging Electives	9
Total Semester Credit Hours		**36**

Admission requirements

To be considered for admission to the MS program in packaging science, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent) in the final two years of undergraduate course work.
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- Applicants who do not have an equivalent bachelor's degree in packaging science will be evaluated and the appropriate undergraduate bridge courses will be prescribed. These courses may not be used for credit toward the MS degree.
- Have completed at least one semester of physics (mechanics focus), one semester of calculus, one year of chemistry (including organic chemistry), statistics, and basic computer literacy.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Print and Graphic Media Science, MS

www.rit.edu/study/print-and-graphic-media-science-ms

Bruce Myers, Associate Professor
585-475-5224, blmppr@rit.edu

Program overview

The MS program in print and graphic media science offers students an opportunity to explore new areas of research in the graphic communications field. The program's faculty and curriculum focus on establishing quality and efficiencies pertaining to business, technology, and processes in graphic communications. Recent student research includes 3D printing quality analysis, consumer preferences for printed textiles, user experience in digital publishing, and implementation of lean techniques in printing. Our faculty are experts in many different areas, including print, business, color management, web and IT, digital publishing, imaging, and typography. Students have the opportunity to get hands-on experience by working with faculty as graduate assistants either in the classroom or assisting with faculty research. Graduates are employed as industry leaders in advertising, publishing, business operations, communication processes, and product developments.

Print and Graphic Media Science Courses

The print and graphic media science degree includes core courses, electives, and a thesis. The thesis provides an opportunity for students to explore in-depth research and present their findings.

Electives: The program encourages cross-disciplinary and interdepartmental collaboration. Students may choose elective courses from a variety of courses offered in the department of graphic media science and technology or with other graduate departments and programs at RIT with approval of the graduate director.

Capstone/Research/Thesis Options: As part of the program, students must complete a capstone project, a research option, or a thesis. This choice of option provides flexibility for students to choose the path that bests aligns with their career goals.

- Capstone Option: Students interested in developing an individual interest in an aspect of print media and/or the graphic communication industry may complete a unique capstone project. This option includes one additional elective course.
- Research Applications and Problem-Solving Option: Students interested in focusing on the application of their knowledge in a team-based environment may choose to complete a research course. This option includes one additional elective course.
- Thesis Option: Students are required to complete a research thesis that demonstrates original thinking and creativity in the search for new knowledge in the graphic communication industry. Students work with expert faculty and focus on a particular topic of thesis research in areas including content management, publishing workflows, typography and layout, business trends, color management, media processes, materials, and applications of printing.

Experiential Learning

Cooperative Education and Internships

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Co-op is optional but strongly encouraged for graduate students in the MS in print and graphic media science.

Curriculum

Print and Graphic Media Science, MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
GRCS-701	Research Methods	3
PPRT-600	Graduate Seminar	0
PPRT-602	Tone and Color Analysis	3
PPRT-641	Digital Printing and Publishing	3
PPRT-703	Cross Media Workflow	3
PPRT-705	Graphic Standards and Specifications	3
PPRT-751	Advanced Materials in Graphic Communication	3
	Technical Electives	6
Second Year		
		Choose one of the following:
PPRT-790	Thesis	6
or		
PPRT-796	Capstone Research Applications and Problem Solving	3
	Technical Elective	3
or		
PPRT-797	Capstone	3
	Technical Elective	3
Total Semester Credit Hours		**30**

Admission requirements

To be considered for admission to the MS program in print and graphic media science, candidates must fulfill the following requirements:

- Complete a graduate application.
- Hold a baccalaureate degree (or equivalent) from an accredited university or college.
- Submit official transcripts (in English) of all previously completed undergraduate and graduate course work.
- Have a minimum cumulative GPA of 3.0 (or equivalent). Applicants with a GPA below 3.0 may be considered, but are required to submit standard GRE scores.
- Submit a personal statement of educational objectives.
- Submit a current resume or curriculum vitae.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit two letters of recommendation from academic or professional sources.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Workplace Learning and Instruction, Adv. Cert.

www.rit.edu/study/workplace-learning-and-instruction-adv-cert
Linda Tolan, Professor
585-475-5078, latcad@rit.edu

Program overview

Senior leaders in the most successful businesses agree that leveraging the human capital of an organization is vital to survival in today's competitive business climate. This requires businesses to align employee development plans with strategy and provide targeted learning experiences to ensure they equip their workforce to perform at the peak of their capability, attract the best candidates, and retain the most qualified employees.

The advanced certificate in workplace learning and instruction provides professionals with the competencies required to develop highly effective learning materials that drive strategic employee development, boost performance, and manage the employee development efforts of an organization.

What is a Graduate Certificate?

A graduate certificate, also called an advanced certificate, is a selection of up to five graduate level courses in a particular area of study. It can serve as a stand-alone credential that provides expertise in a specific topic that enhances your professional knowledge base, or it can serve as the entry point to a master's degree. Some students complete an advanced certificate and apply those credit hours later toward a master's degree.

Curriculum

Workplace Learning and Instruction, advanced certificate, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
EDLI-730	Theories of Learning	3
Choose one of the following:		3
EDLI-733	Instructional Design	
	Approved Graduate Elective	
EDLI-755	Learning Assessment and Evaluation	3
EDLI-756	Learning Design and Technology	3
Total Semester Credit Hours		**12**

Approved Graduate Electives

EDLI-723	Group Dynamics and Facilitation Skills
EDLI-750	Strategic Career Development
EDLI-751	Career Counseling Techniques
EDLI-752	Assessments and Measurements in Human Resource Development
EDLI-753	The Student Experience in Higher Education
EDLI-754	Critical Systems in Higher Education
EDLI-757	Organization and Leadership in Higher Education
EDLI-758	Design for On-Line

Admission requirements

To be considered for admission to the advanced certificate in workplace learning and instruction, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate coursework, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Faculty

Dean's Office

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Michael Eastman, BS, MS, Rochester Institute of Technology, Ph.D., University at Buffalo—Associate Dean for Academic Programs and Continuous Improvement; Professor

Rebecca L. Sumner, AB, Franklin and Marshall College; MA, Ph.D., University of Rochester—Assistant Dean for Research Development

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School of Engineering Technology

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Electrical and Computer Engineering Technology

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Packaging and Graphic Media Science

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Irma Abu-Jumah, BS, Dr. Jose Matias Delgado University (El Salvador); MS, Rochester Institute of Technology—Lecturer

Malcolm Keif, BS, California Polytechnic State University; MA, California State University; Ph.D., University of Missouri—Professor of Practice

Bruce Myers, BFA, Montclair State University; MS, Ph.D., New York University—Associate Professor

Karen L. Proctor, BS, Michigan State University; MBA, Rochester Institute of Technology—Professor

Alexis Rich, BS, ME, Rochester Institute of Technology—Enterprise Lab Manager; Senior Lecturer

College of Health Sciences and Technology

Yong Tai Wang, Dean
rit.edu/healthsciences

Programs of Study

🖧 Online learning option available.

The United States faces a looming shortage of many types of health care professionals, including nurses, physicians, dentists, pharmacists, and allied health workers. The college, housed in the Institute of Health Sciences and Technology, serves as an independent academic and research entity designed to provide a focused, interdisciplinary, and systems approach to innovative health care education, applied/translational research, and community outreach. The institute incorporates three major thrusts: the College of Health Sciences and Technology, a Health Science Research Center, and a Health Science Community Collaboration and Outreach Center.

The college offers clinically related and biomedical research-based programs to meet both the present and future needs of the health care system. The college's faculty and staff are committed to delivering high quality educational programs. Building on a foundation of liberal arts and basic sciences, students will gain advanced knowledge in theoretical science and practical applications in experiential learning environments. These experiences prepare students to serve as practitioners, scientists, and leaders through their contribution to, and the provision of, high-quality patient care, health care service, and/or applied, translational biomedical research.

Please visit the college's website–**www.rit.edu/healthsciences**–for in depth information on academics, faculty, facilities, research initiatives, advising, and more.

Admission requirements

Each college makes all decisions regarding graduate admission. Please refer to the individual program descriptions for information regarding specific admission criteria. For general graduate admission information, please refer to the Admission section of this bulletin.

Financial aid and scholarships

Please refer to the Financial Aid and Scholarship section of this bulletin for information regarding financial aid, scholarships, grants, loans, and graduate assistantships.

Health and Well-Being Management, MS

www.rit.edu/study/health-and-well-being-management-ms
Barbara Lohse, Professor
585-475-4208, balihst@rit.edu

Program overview

Individual and community health, disease prevention, and engaging in healthful habits to promote well-being are at the fore-front of public interest. Health and wellness is a mosaic of nutrition, physical activity, stress management, and environmental features that are critical for a productive, efficient, and healthy society. Corporations, small businesses, government agencies, and institutions are employing health and well-being professionals to help people lead healthier lives and contribute to corporate, agency, and business productivity.

RIT's Health and Wellness Degree

The MS in health and well-being management is a health and wellness degree that prepares you for a career in health and well-being program design, administration, and research. It is the perfect choice for those interested in going to medical or dental school or pursing doctoral studies in nutrition, health promotion, exercise science, or public health.

To provide high-quality, population-based health care, the future health care workforce needs a skill set that includes the ability to:

- apply systems thinking,
- design interventions,
- practice dissemination and implementation science,
- engage with communities, and
- understand and utilize team dynamics, negotiation, and advocacy skills.

RIT's health and wellness degree offers evidence-informed guidance to develop and apply these skills.

Choose From Two Options

The MS in health and well-being management offers two options, both of which prepare you for a career in health and well-being as well as offer research experiences for those interested in pursuing further doctoral and post-graduate studies.

- Content development, implementation, and evaluation focuses on helping students learn how to design and execute health and well-being programs, focusing on development of content and expertise in a particular area of health or wellness, such as exercise, behavior, and nutrition.
- Health and well-being program management relates to leading an organization's health and wellness program or an employee assistance program within corporate setting or in self-employment venues.

Health and Wellness Degree: Educational Outcomes

1. Demonstrate skills in the design, delivery, and evaluation of individual and group interventions/programs that are consistent with evidence based social and behavioral theories. You will learn health education and program evaluation concepts, examine evidence and research-based content and apply learning behavior theory constructs to health and well-being activities.
2. Demonstrate the ability to assist with health, physical, nutrition, behavioral screenings or policy analysis to plan and manage a safe and effective health promotion program for both healthy and health-impaired individuals. You will acquire a knowledge base in nutrition, physical activity, and health law including screening and assessment and utilize this knowledge in health and well-being dissemination or implementation science activities.
3. Develop skills and experience necessary to promote program services to appropriate community recipients including the ability to categorize subsets of the worksite/organization population and identify appropriate intervention strategies for each subset. You will be able to describe and conduct needs assessments and apply findings appropriately. Also, you will demonstrate the acquisition of marketing concepts to a health and well-being problem.
4. Apply the requisite skills to plan and conduct inquiries into problems and outcomes used to develop and manage health and well-being activities, programs and campaigns. You will apply behavior change theory concepts and research and evaluation criteria to examine, critique, and assess health and well-being programs and activities.
5. Collaborate with multiple disciplines to promote and administer health related research, activities, and policy at the organizational, community, state, and federal level. You will develop verbal and written communication strategies and skills and apply them to tasks involving collaboration, interpretation, and critical thinking for health and well-being activities. Also, be well versed in health and well-being policy development and strategic application at multiple levels of governments and organizations.
6. Design and execute a comprehensive project or research-based inquiry relevant to the health promotion industry. You will integrate your learning in a research, inquiry, or review project on a topic pertinent to designing, planning, implementing, evaluating, managing, or marketing health and well-being.

Careers in Health and Wellness

The health and well-being management program prepares graduates for careers that provide services to enhance employee health and consequent workforce productivity, including:

- Administrator or manager of a health and well-being program/initiative for government, industry, or organizational entities.
- Health and well-being educator/communicator, instructional program designer, developer, or implementer.
- Preparation for future medical and dental education, doctoral training in fields related to nutrition, health promotion, exercise science, and public health.

Learn More

Download our program brochure for more information.

Experiential Learning

Cooperative Education

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Curriculum

Health and Well-being Management, MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
WSHN-700	Research Methods in Health and Well-being	3
WSHN-701	Health and Nutrition Education and Evaluation	3
WSHN-702	Dissemination and Implementation Science for Health and Well-being	3
	Statistics Elective*	3
	Professional Electives	12
Choose one of the following:		3
WSHN-710	Health Risk Identification and Management (Emphasis Plan 1)	
HLTH-710	Health Care Economics and Policy (Emphasis Plan 2)	
Choose one of the following:		6
WSHN-790	Health & Well-being Management Thesis	
WSHN-797	Health & Well-being Management Project, plus one additional Professional Elective	
Total Semester Credit Hours		**33**

* Choose from PSYC-640 Graduate Statistics or MATH-655 Biostatistics

Emphasis Plan 1- Content Development, Implementation & Evaluation Recommended Electives

EXSC-650	Exercise Physiology
EXSC-690	Exercise Science Research
HRDE-726	Technology and the Future of Work
NUTR-610	Integrative Approaches to Health
NUTR-650	Community Nutrition
NUTR-655	Nutrition Throughout the Lifecycle
NUTR-680	Global Food and Nutrition Perspectives
PSYC-713	Graduate Developmental Psychology
PSYC-716	Graduate Social Psychology
SERQ-723	Service Analytics
SERQ-747	Design Thinking and Creativity
STAT-672	Survey Design and Analysis
WSHN-600	Principles and Practices of Health Education
WSHN-720	Topics in Health and Nutrition
WSHN-799	Independent Study

Emphasis Plan 2- Health & Well-being Program Management Recommended Electives

BUSI-710	Project Management
EDLI-733	Instructional Design
HLTH-706	Leading Health Systems I
HLTH-718	Evidence-based Management in Healthcare
HLTH-725	Healthcare Strategic Marketing & Communications
HLTH-730	Health Care Financial Management I: Principles & Practice
HLTH-733	Health Systems Quality and Organizational Learning
HLTH-746	Leading Health Systems II
HRDE-726	Technology and the Future of Work
HRDE-735	Leading Human Resources
HRDE-742	Leading Change
HRDE-765	Diversity in Global Workplace
MKTG-761	Marketing Concepts and Commercialization
MKTG-772	Internet Marketing: Strategy & Tactics
SERQ-720	Foresight for Innovation
SERQ-722	Customer Centricity
SERQ-723	Service Analytics
SERQ-740	Leading Innovation
SERQ-747	Design Thinking and Creativity
STAT-672	Survey Design and Analysis
WSHN-720	Topics in Health and Nutrition
WSHN-799	Independent Study

Admission requirements

To be considered for admission to the MS program in health and well-being management, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Three letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Health Care Finance, Adv. Cert.

www.rit.edu/study/health-care-finance-adv-cert
Carla Stebbins, Senior Lecturer
585-475-4761, casihst@rit.edu

Program overview

The advanced certificate in health care finance is an ideal way for health care professionals to deepen their understanding of health care financial management. The four-course, 12 credit hour curriculum supports student understanding how the US health care system is financed, the impact of efforts to reform the system, as well as the development of financial management skills within for-profit and not-for-profit health care organizations. To meet the needs of working professionals, courses in this advanced certificate are available online.

The advanced certificate may serve as a stand-alone credential, or, at a later date be applied to the MS program in health systems management.

What is a Graduate Certificate?

A graduate certificate, also called an advanced certificate, is a selection of up to five graduate level courses in a particular area of study. It can serve as a stand-alone credential that provides expertise in a specific topic that enhances your professional knowledge base, or it can serve as the entry point to a master's degree. Some students complete an advanced certificate and apply those credit hours later toward a master's degree.

Curriculum

Health Care Finance, advanced certificate, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
HLTH-710	Health Care Economics and Policy	3
HLTH-730	Health Care Financial Management I: Principles & Practice	3
HLTH-731	Health Care Financial Management II: Concepts/ Applications	3
HLTH-732	Health Insurance and Reimbursement	3
Total Semester Credit Hours		**12**

Admission requirements

To be considered for admission to the advanced certificate in health care finance, candidates must fulfill the following requirements:

- Complete a graduate application.
- Hold a baccalaureate degree (or equivalent) from an accredited university or college.
- Submit official transcripts (in English) of all previously completed undergraduate and graduate course work.
- Have a minimum cumulative GPA of 3.0 (or equivalent).
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit two letters of recommendation from individuals who have the opportunity to observe the applicant's work output.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Please note: Certain countries are subject to comprehensive embargoes under US Export Controls, which prohibit virtually ALL exports, imports, and other transactions without a license or other US Government authorization. Learners from Syria, Sudan, North Korea, the Crimea region of the Ukraine, Iran, and Cuba may not register for RIT online courses. Nor may individuals on the United States Treasury Department's list of Specially Designated Nationals or the United States Commerce Department's table of Deny Orders. By registering for RIT online courses, you represent and warrant that you are not located in, under the control of, or a national or resident of any such country or on any such list.

Health Systems Management, MS

www.rit.edu/study/health-systems-management-ms
Carla Stebbins, Senior Lecturer
585-475-4761, casihst@rit.edu

Program overview

A health systems management degree driven by today's health care imperatives.

Critical success factors driving health care systems today are often referred to as the Quadruple Aim:

7. Improve the health of populations
8. Enhance the quality of care for individuals
9. Reduce the per capita cost of health care
10. Improve the work life of care providers

Successfully managing strategy, finance, patient experience, and operations in the highly regulated and unique health care sector requires specialized competencies and expertise beyond a traditional MBA. The master of science in health systems management is the currency needed to advance and perform in health care systems today.

A Master's of Health Care Management

Our health systems management degree is a graduate-level, applied, competency-based, and industry-focused online degree program. Students are provided the flexibility to pursue the degree full- or part-time, with 12-month and 24-month degree plans available, to accommodate professional schedules.

Unique to this degree, you will have the opportunity to attend two on-campus leadership immersions and a faculty-led travel experience to study another health care system. The faculty strive to blend the flexibility of online learning with the value of face-to-face networking, interaction, and travel. All courses use a case-based, dynamic, and interactive focus on key health care topics including economics and policy, health IT and decision support, ethics, systems quality, and organizational learning.

Business and leadership courses prepare you to tackle issues involving financial management, quality improvement, operations, and strategy formulation—all within the context of real-world health care trends and challenges. You'll be well prepared to develop, direct, and implement strategy and tactics that will shape the health care organizations of the future.

Develop Your Health Care Leadership Skills

The MS in health systems administration program was built to support a set of professional competencies identified by the program's advisory board, faculty and alumni. These 19 competencies fall under five domains and support students for success in the field of management and leadership in health care:

- Knowledge of health care systems in the U.S.
- Communications and interpersonal effectiveness
- Critical thinking, analysis, and problem-solving skills
- Management and leadership skills
- Professionalism and ethics theory and practice

To develop your leadership skills, you will have the opportunity to attend two on-campus, hands-on, application-based learning and networking experiences. You will work closely with your classmates and faculty on case analysis, problem-solving, critical thinking, teamwork, and leadership skills during these four-day sessions. This face-to-face training delivers skills and competencies which will continue to be developed in

a virtual environment within the online courses to maximize your return on investment in skill development and practice.

A Flexible Degree Built Around Your Schedule
This online degree offers five start dates per year and an accelerated course format which will allow you to complete your degree in half the time of a traditional, semester-based program. A full-time student can complete this degree in one year; a part-time student can complete the degree in 24 months.

Stackable Credentials
You may earn a graduate-level credential and advance your career while you work toward your MS. The advanced certificate in health care finance stands alone, and may also be applied to your MS degree.

A Health Systems Management Immersive Experience

One of the most distinguishing and attractive benefits of this health administration degree is the culminating travel course. During the final summer term, you will have the opportunity for a faculty-led travel experience in which you will conduct an intensive study of the locale's health system in comparison to your native system. As your final project, you will use that experience to innovate a product or service. For those unable to travel, an alternative study option will be provided.

Top Health Care Faculty

The program is led by a team of faculty who are practice-based scholars with extensive experience in the field. Faculty members are accessible, offer constructive feedback on course projects and assignments, and are at the forefront of providing an educational experience in which students can learn and directly apply classroom theories and concepts to the real-world practice of health care management.

An advisory board of health administrators from around the country guides the development of the degree program to ensure the curriculum addresses today's most pressing challenges for health care leaders.

Careers in Health Systems Management

Health care is the largest industry in the U.S. and the second largest employer, representing 20 percent of the Gross National Product, and employing more than 11 million people. Employment opportunities for health systems managers and administrators will increase by 20 percent over the next 10 years, according to the Bureau of Labor Statistics.

Experiential Learning

Cooperative Education

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Curriculum

Health Systems Management, MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
HLTH-608	Integrated Health Systems & Population Health	3
HLTH-706	Leading Health Systems I	3
HLTH-710	Health Care Economics and Policy	3
HLTH-718	Evidence-Based Management in Health Care	3
HLTH-730	Health Care Financial Management I: Principles & Practice	3
HLTH-731	Health Care Financial Management II: Concepts/ Applications	3
HLTH-746	Leading Health Systems II	3
Second Year		
HLTH-725	Healthcare Strategic Marketing & Communications	3
HLTH-733	Health Systems Quality & Organizational Learning	3
HLTH-736	Health Care Operations: Building High Reliability Systems	3
HLTH-760	Health IT and Decision Support	3
HLTH-796	Healthcare Strategy: Analysis & Formulation	3
HLTH-798	Health Systems Analysis & Innovation	3
Total Semester Credit Hours		**39**

Accreditation

The master of science in health systems management was approved for Candidacy Status with the Commission on Accreditation of Healthcare Management Education (CAHME) in May 2020. Candidate status is an indication that a program in health care management has voluntarily committed to participate in a plan of self-improvement and is actively progressing toward the status of accreditation. Candidate status is not accredited status and does not guarantee eventual accredited status.

Admission requirements

To be considered for admission to the MS program in health systems management, candidates must fulfill the following requirements:

- Complete a graduate application.
- Hold a baccalaureate degree (or equivalent) from an accredited university or college.
- Submit official transcripts (in English) of all previously completed undergraduate and graduate course work.
- Have a cumulative GPA of 3.0 (or equivalent). Applicants with GPAs below a 3.0 are encouraged to apply.
- Submit two letters of recommendation from individuals who have the opportunity to observe the applicant's work.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

For Online Scholars Only: International students are permitted to participate in the US-based courses of this program only if they have and maintain a valid immigration status which permits part-time study (examples: J-2, H-4). This program does not qualify for F-1 visa status. B-1/B-2 (or the Visa Waiver Program equivalent statuses) should not be used to engage in these courses, as taking credit-bearing courses towards a degree would violate the terms of the visitor visa status.

Please note: Certain countries are subject to comprehensive embargoes under US Export Controls, which prohibit virtually ALL exports, imports, and other transactions without a license or other US Government authorization. Learners from Syria, Sudan, North Korea, the Crimea region of the Ukraine, Iran, and Cuba may not register for RIT online courses. Nor may individuals on the United States Treasury Department's list of Specially Designated Nationals or the United States Commerce Department's table of Deny Orders. By registering for RIT online courses, you represent and warrant that you are not located in, under the control of, or a national or resident of any such country or on any such list.

Medical Illustration, MFA

www.rit.edu/study/medical-illustration-mfa
James Perkins, Professor
585-475-2443, japfaa@rit.edu

Program overview

A medical illustrator is a professional artist with advanced education in the biomedical sciences, cutting edge digital media, and the principles of visual communication. RIT's medical illustration degree is one of only five such programs in North America and the only program in the northeast. It combines training in human anatomy (with illustration students observing complete cadaver dissection in RIT's Cadaver Lab), immunology, histology (the cellular structure of organs), and pathophysiology (the study of disease) with extensive training in 2D and 3D digital graphics, interactive media, and animation.

What is a Medical Illustrator?

Collaborating with scientists, physicians, and other health care professionals, medical illustrators translate complex scientific information into visual images that support medical education, science research, patient care, advertising, and litigation. Illustration projects are designed for use in print, projection, broadcast media, and distribution via the web and mobile devices.

RIT's Medical Illustration Degree

This is a two-year, graduate-level medical illustration degree where you'll earn a master of fine arts (MFA). The program emphasizes visual problem solving to determine the best approach to communicate a difficult concept. Students also gain real world experience by collaborating with medical researchers and observing live surgery in operating rooms. The program culminates with the production of a thesis project, which requires extensive background research and an original body of artwork on a complex medical topic.

Becoming a Medical Illustrator

Successful medical illustrators must possess exceptional illustration skills and artistic ability while also having in depth knowledge of the biological sciences in order to fully understand and effectively communicate complex medical information. In the MFA in medical illustration degree, you'll accomplish the following outcomes:

Demonstrate an advanced level of knowledge in the biomedical sciences

- Demonstrate advanced knowledge of human anatomy, molecular biology, physiology, and related biomedical sciences

Visualize scientific structures, processes, and concepts

- Visualize and accurately render anatomic, tissue, cellular, and molecular structures
- Illustrate physiological processes and abstract scientific concepts through visual storytelling

List instructional objectives to communicate biomedical content to a variety of target learners

- Identify the target learners (audience) for each set of instructional illustrations
- Describe the level of scientific literacy of each group of target learners
- Create a set of instructional objectives for each instructional illustration

Solve complex communication problems with appropriate application of verbal and visual content, realism, symbolism, graphic conventions, and motion or interactive media.

- Select the most appropriate medium for delivery of content to target learners
- Select appropriate level of realism, symbolism, and graphic conventions for optimal delivery of instructional objectives to target learners

Utilize a variety of media and production techniques in appropriate applications and understand production processes sufficiently to communicate with pre-press companies, art directors, etc.

- Create artwork in a variety of media
- Select the appropriate dimensions, color space, resolution, file format, and other criteria for delivery to client
- Use industry standard terminology when discussing production and output processes

Communicate effectively with clients, subject matter experts, co-workers, supervisors, and vendors in oral and written form

- Use correct anatomic and medical terminology when discussing scientific content

Demonstrate knowledge of professional and ethical conduct

- Describe HIPAA regulations regarding the use of patient information
- Follow operating room protocols at affiliated hospitals
- Describe US and international copyright laws and how they apply to the use of reference materials
- Describe copyright infringement and the criteria for determining Fair Use

Demonstrate awareness of established business and management practices

- Describe standard employment practices in the profession
- Describe business models and taxation of independent illustrator
- Describe pricing strategies and calculate prices for illustration projects
- Create a personal identity package and marketing materials
- Generate sample contracts, licensing agreements, and invoices

Demonstrate competency in the academic research process through a graduate research project or thesis

- Conduct background research on a proposed biomedical topic
- Develop a set of instructional objectives to deliver the topic to a specific group of target learners
- Create a body of artwork to meet the instructional objectives
- Exhibit the body of work during one of the thesis shows or at a screening of digital media productions
- Complete a written thesis paper summarizing the project

Medical Illustrator Jobs

Graduates of RIT's medical illustration degree find employment with hospitals, medical schools, research centers, museums, medical publishers, advertising agencies, web design firms, animation studios, law firms, and a variety of other creative agencies. Since the MFA is considered the terminal degree in the arts, graduates may also teach in academic institutions or in a wide range of computer graphics, scientific illustration, or art programs. Organizations that employ our graduates include:

- Science magazine (American Association for the Advancement of Science)
- Department of Neurobiology and Anatomy, University of Rochester Medical Center
- New England Journal of Medicine
- Roswell Park Cancer Center, Buffalo, NY
- MIT Center for Biomedical Innovation
- Cell Press (publishers of Cell and other scientific journals)
- Nucleus Global (medical communications)
- Custom Learning Designs (pharmaceutical advertising)
- The Presentation Group (courtroom graphics)
- Bryan Christie Design (pharmaceutical advertising)
- Emmi Solutions (web and interactive media)
- Cleveland Institute of Art (scientific illustration program)
- Illustrated Verdict (courtroom graphics)
- National Capital Area Medical Simulation Lab, Uniformed Services University of the Health Sciences (developing virtual surgical simulators)
- Visible Body/Argosy Medical Publishing (medical publishing and interactive media)
- Department of Imaging Sciences, University of Rochester Medical Center
- Smithsonian National Museum of Natural History
- Springer Healthcare Communications (medical publishing)
- Legal Art Works (courtroom graphics)

Experiential Learning

Cooperative Education and Internships

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

In the College of Art and Design experiential learning includes cooperative education and internships, international experiences, multidisciplinary projects, industry partnerships, and more. Participating in these opportunities is not only possible at RIT, but passionately encouraged.

Cooperative education, internships, and other experiential learning opportunities are optional but strongly encouraged for graduate students in the MFA in medical illustration.

Curriculum

Medical Illustration, MFA degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
ILLM-601	Human Gross Anatomy	6
ILLM-602	Anatomic Studies	3
ILLM-603	3D Modeling of Biomedical Forms	3
ILLM-606	3D Animation of Biomedical Forms	3
ILLM-607	Computer Applications in Medical Illustration	3
ILLM-608	Scientific Visualization	3
ILLM-890	Thesis	1
MEDS-615	Medical Pathophysiology	3
MEDS-630	Human Immunology	3
	Studio Elective	3
Second Year		
ILLM-612	Surgical Illustration	3
ILLM-615	Interactive Media I	3
ILLM-616	Interactive Media II	3
ILLM-617	Portfolio and Business Practices	3
ILLM-890	Thesis	9
MEDS-620	Histology and Histopathology	4
	Studio Elective	3
Total Semester Credit Hours		**59**

Studio Electives

COURSE	
HCIN-610	Foundations of Human-Computer Interaction
HCIN-620	Information and Interaction Design
HCIN-660	Fundamentals of Instructional Technology
ILLM-618	Eye Ear and Nose Prosthetics
ILLM-627	Advanced Digital Technology for Medical Instruction
ILLM-628	Medical and Scientific Animation
ILLM-689	Special Topics
ILLM-799	Independent Study
	Any graduate studio course offered in the College of Art and Design

Admission requirements

To be considered for admission to the MFA in medical illustration, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college in a field of the arts, sciences, or education. The undergraduate degree should include one year of general or introductory biology (for biology majors), and a minimum of three advanced biology courses, such as vertebrate anatomy, physiology, neurobiology, cell biology, molecular biology, immunology, microbiology, genetics, developmental biology, or pathology.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a portfolio. Refer to Graduate Portfolio Requirements for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Students in medical illustration come from a variety of backgrounds including biology, chemistry, anthropology, fine arts, illustration, photography, and graphic design. Students who have no prior experience in illustration, fine art, drawing, or medical illustration must demonstrate outstanding drawing skills and a strong aptitude for the life sciences.

Faculty

Dean's Office

Yong "Tai" Wang, BS, MS, Wuhan Sports University; MA, Ball State University at Muncie; Ph.D., University of Illinois at Urbana-Champaign—Dean; Professor

Carla Stebbins, BA, University of Northern Iowa; MHA, Des Moines University; Ph.D., Iowa State University—Associate Dean

Department of Medical Sciences, Health, and Management

Craig Foster, BFA, University of Michigan; MS, Medical College of Georgia—Assistant Professor, Medical Illustration Program

Glen Hintz, BA, Lafayette College; MS, The Medical College of Georgia—Associate Professor, Medical Illustration Program

James Perkins, BA, Cornell University; MFA, Rochester Institute of Technology; ABD, University of Rochester—Head, Department of Medical Sciences, Health, and Management; Graduate Program Director; Distinguished Professor, Medical Illustration Program

Patricia Poteat, BA, University of Rochester; MS, Rochester Institute of Technology; Ph.D., University of Rochester—Senior Lecturer, Health Systems Management Program

Carla Stebbins, BA, University of Northern Iowa; MHA, Des Moines University; Ph.D., Iowa State University—Program Director; Senior Lecturer, Health Systems Management Program

Wegmans School of Health and Nutrition

Barbara A. Lohse, BS, University of Wisconsin-Eau Claire; MS, RD, University of Wisconsin-Stout; Ph.D., University of Wisconsin-Madison—Head, Wegmans School of Health and Nutrition; Professor

Brenda Ariba Zarhari Abu, BSc, University for Development Studies (Ghana); MPhil, University of Ghana (Ghana); Ph.D., University of the Free State (South Africa); RD, Iowa State University—Assistant Professor

Zachary W. Bevilacqua, BS, State University College at Brockport; MS, University at Buffalo; Ph.D., Indiana University Bloomington—Visiting Assistant Professor

William S. Brewer, BS, State University College at Cortland; MS, Empire State College—Program Director; Senior Lecturer

Elizabeth A. Kmiecinski, BS, The Ohio State University; RD, Charleston Area Medical Center; MS, University of Kentucky—Associate Professor

Elizabeth H. Ruder, BS, Cornell University; RD, Cleveland Clinic Foundation; Ph.D., Pennsylvania State University; MPH, Johns Hopkins Bloomberg School of Public Health—Program Director, Associate Professor

University Studies

James C. Hall, Executive Director
rit.edu/sois

Programs of Study

Online learning option available.

The School of Individualized Study is about the individual students' ideas, interests and goals. Through the school, students can combine multiple disciplines to create a singular master's degree program, the MS in professional studies. The school also offers an advanced certificate in project management.

Please visit the college's website–**www.rit.edu/sois**–for in depth information on academics, faculty, facilities, research initiatives, advising, and more.

Admission requirements

Each college or degree-granting entity makes all decisions regarding graduate admission. Please refer to the individual program descriptions for information regarding specific admission criteria. For general graduate admission information, please refer to the Admission section of this bulletin.

Financial aid and scholarship

Please refer to the Financial Aid and Scholarship section of this bulletin for information regarding financial aid, scholarships, grants, loans, and graduate assistantships.

Professional Studies, MS

www.rit.edu/study/professional-studies-ms
Peter Boyd, Senior Lecturer
585-475-6320, plbcms@rit.edu

Program overview

RIT's master's in professional studies enables you to create an individualized plan of study tailored around your personal and professional goals. The degree offers you the opportunity to draw upon graduate courses from more than 50 of RIT's master's degree to gain the advanced knowledge and skills necessary to respond successfully to new and emerging career opportunities.

What Can I Do with a Degree in Individualized Studies?

In short, anything you want. An individualized studies degree is the freedom to craft a master's degree around your interests, career goals, and professional aspirations. You'll work with dedicated, professional academic advisors that will help you develop a plan of study around the topics that interest you most. And your plan of study will be crafted toward the professional goals you set. You'll choose two to three concentration areas, that consist of four to five courses each, in topics that will provide you with the skills you need to further your career or launch a new professional endeavor.

The professional studies degree can be completed on campus or online.

RIT's Master's in Professional Studies

You'll begin your studies with Contexts and Trends, the program's foundation course. You'll explore your personal career objectives and research RIT's portfolio of graduate programs to identify courses that best match your professional and personal goals.

Once you decide upon the areas you want to study, you'll create two or three concentrations. These concentrations make up the required course work for the degree program. Each concentration is a selection of courses drawn from existing RIT graduate programs. Credit hours not required to fulfill a concentration area may be used as electives. All electives and transferred graduate courses need to be integrated into the proposed plan of study. With certain concentrations, the degree may be completed entirely through online learning.

Some common concentration areas may include:

Applied and Computational Mathematics
Applied Statistics/Quality
Bioinformatics
Business (Marketing, Management, etc.)
Chemistry
Color Science
Communication and Media Technology
Computer Engineering
Computer Science
Construction Management
Criminal Justice
Education Learning Instruction
Electrical Engineering
Environmental, Health and Safety Management
Health Systems Administration
Human Resource Development
Imaging Science
Industrial and Systems Engineering
Information Sciences and Technologies
Microelectronics Manufacturing Engineering
Packaging Science
Product Development and Design
Project Management
Public Policy
School Psychology
Secondary Education of Students Who Are Deaf or Hard of Hearing
Service Management
Software Engineering
Sustainability

This individualized studies degree also includes a capstone project. This is an applied, hands-on project directly related to your customized plan of study.

The program can be completed through full- or part-time study.

Experiential Learning

Cooperative Education and Internships

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Co-op is optional but strongly encouraged for graduate students in the MS in professional studies.

Curriculum

Professional Studies, MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
PROF-705	Context and Trends	3
	Concentration A courses	9
	Concentration B courses	6
Second Year		
PROF-770	Proposal Seminar	0
PROF-775	Capstone Project	3
	Concentration A or elective course	6
	Concentration B course	3
	Concentration B or elective course	3
Total Semester Credit Hours		**33**

Admission requirements

To be considered for the MS program in professional studies, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent), or superior endorsements.
- Submit a current resume or curriculum vitae.
- Two letters of recommendations are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Require-

ments for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.
- Before submitting an application, all applicants are encouraged to discuss their educational goals with a graduate advisor from the professional studies program.

School of Individualized Study

Project Management, Adv. Cert.

www.rit.edu/study/project-management-adv-cert
Peter Boyd, Senior Lecturer
585-475-6320, plbcms@rit.edu

Program overview

In today's business-oriented society, project-based organizations and project management have become much more than just a way of conducting business. New growth within these organizations has changed the shape of project management to reveal what is becoming an exciting new career path for many individuals. The advanced certificate in project management will prepare you to effectively manage projects by successfully planning, organizing, and executing specific projects or one-time efforts.

Why Study Project Management?

Project managers have quickly become a necessary asset for many businesses. Encountering the challenges of cultural and social differences, along with an assortment of industrial focuses, a project manager must be aware of a project's goals on a daily and, sometimes, hourly basis. The advanced certificate in project management will prepare you to plan, develop, and execute successful business projects from initiation to completion.

Project Management Courses

The advanced certificate in project management consists of three core courses and one elective. Courses cover the fundamentals of project management as well as agile leadership, and design thinking. The certificate can be completed entirely online, on campus, or through a combination of both options.

RIT's School of Individualized Study is a Project Management Institute (PMI) Authorized Training Partner.

What is a Graduate Certificate?

A graduate certificate, also called an advanced certificate, is a selection of up to five graduate level courses in a particular area of study. It can serve as a stand-alone credential that provides expertise in a specific topic that enhances your professional knowledge base, or it can serve as the entry point to a master's degree. Some students complete an advanced certificate and apply those credit hours later toward a master's degree.

Curriculum

Project Management, advanced certificate, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
PROF-710	Project Management	3
PROF-714	Agile Project Management	3
Second Year		
	Graduate Elective	3
Choose one of the following:		3
PROF-711	Advanced Project Management	
PROF-712	International Project Management	
PROF-715	Agile Leadership and Self Organizing Teams	
PROF-716	Agile and Design Thinking	
Total Semester Credit Hours		**12**

Graduate Electives

COURSE	
PROF-711*	Advanced Project Management
PROF-712*	International Project Management
PROF-713	Program Management for Product and Service Development
PROF-715*	Agile Leadership and Self Organizing Teams
PROF-716*	Agile and Design Thinking
PROF-720	Individual Leadership Development
PROF-721	Leading and Developing Teams
HRDE-720	Theories of Organizational Development
HRDE-721	Organizational Learning and Knowledge Management
HRDE-722	Talent Development
HRDE-731	Team Process and Facilitation Skills
MGIS-715	Information Technology and Globalization
MGMT-740	Leading Teams in Organizations
MGMT-741	Managing Organizational Change
MGMT-755	Negotiations
SERQ-710	Service Design Fundamentals
ISEE-682	Lean Six Sigma Fundamentals

* if not used for 3rd required course of certificate

Admission requirements

To be considered for admission to the advanced certificate in project management, candidates must fulfill the following requirements:
- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendations are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Faculty

Peter Boyd, BA, Nazareth College; MA, Columbia University—Graduate Program Coordinator; Senior Lecturer

James Hall, BA, Wilfrid Laurier University (Canada); MTS, Waterloo Lutheran Seminary (Canada); MA, Ph.D., University of Iowa—Executive Director; Professor

Stephen Aldersley, BS, University of Surrey (United Kingdom); MS, University of Lancaster (United Kingdom); Graduate Education Certificate, St. Martin's College (United Kingdom); MS, College of St. Rose; Ed.D., University of Rochester—Professor

Leonie Fernandes, BS, University of Michigan; MS, Rochester Institute of Technology; PMI—Project Management Coordinator; Senior Lecturer

Clarence Sheffield, BS, University of Utah; MA, University of Colorado at Boulder; Ph.D., Bryn Mawr College—Professor

David P. Wick, BS, MS, Ph.D., Clarkson University—Associate Professor

College of Liberal Arts

Anna Westerstahl Stenport, Dean
rit.edu/liberalarts

Programs of Study

The College of Liberal Arts offers master of science degrees in the following areas: communication and media technologies; criminal justice; experimental psychology; science, technology, and public policy; and school psychology. The college also offers three advanced certificates in communication and digital media, engineering psychology, and school psychology.

Elective graduate courses complement the professional emphasis of our degree programs by exploring the broader knowledge and social implications embodied in these areas of study. By providing this humanistic perspective, these courses play an integral role in professional education, making a direct and distinct contribution to the student's preparation for a specialized career.

The college also provides a number of graduate courses that serve as electives for graduate degree programs offered by other RIT colleges.

Please visit the college's website–**www.rit.edu/liberalarts**–for in depth information on academics, faculty, facilities, research initiatives, advising, and more.

Admission requirements

Each college makes all decisions regarding graduate admission. Please refer to the individual program descriptions for information regarding specific admission criteria. For general graduate admission information, please refer to the Admission section of this bulletin.

Financial aid and scholarships

Please refer to the Financial Aid and Scholarship section of this bulletin for information regarding financial aid, scholarships, grants, loans, and graduate assistantships.

Communication, MS

www.rit.edu/study/communication-ms
Eun Sook Kwon, Assistant Professor
585-475-5209, exkgpt@rit.edu

Program overview

Communication in all its forms is at the center of our personal lives and professional careers. Whether it's interpersonal or mediated communication, professional communicators need to know how to develop creative and impactful messaging to successfully engage their audiences.

Technology has changed everything about the field of communication. Social media platforms like Twitter, Instagram, and Facebook are the first places people go to get breaking news. Retargeting ads, geofencing, and native advertising are influencing how to reach and connect with audiences. Add in the proliferation of big data and marketing coordinators, brand managers, and marketing executives now have access to information that impacts real-time decision-making around creative messaging, audience tracking, and the impact of an organization's marketing investment.

The best communication master's will prepare you to leverage the latest in tech in the dynamic and ever-changing field of communication.

RIT's communication master's degree hosts an innovative curriculum that is grounded in today's social sciences and humanities concepts and applications. You'll engage with our diverse and dynamic faculty of accomplished communication researchers and practitioners, who will teach you how to research a communication challenge, create compelling messages, and analyze media content and audience engagement.

RIT's Communication MS

With communication courses spanning artificial intelligence, digital storytelling, digital advertising, social media analytics, and strategic communication, RIT's communication master's prepares you to excel in the ever-changing fields of communication, public relations, marketing, and branding. You'll learn how to leverage technology to reach and engage audiences, craft compelling messages that stand out, analyze media content, and understand how analytics and big data drive smart decision-making. You'll become an effective content, brand, or marketing manager; social media strategist; or PR/communication officer who can deliver the results an organization is looking for. If pursuing a doctoral degree is a future career aspiration, RIT's program will help you grow into an accomplished researcher as you develop an in-depth understanding of the communication field.

Why Get Your Communication MS from RIT?

RIT is known for creativity and innovation. In fact, U.S. News & World Report ranked RIT 50th on the list of "Most Innovative Schools" for 2021. What does this mean for you as a communication professional?

It means unprecedented access to vast resources in technology and innovation that can only be found at RIT. Diverse and dynamic faculty, comprised of accomplished communication researchers and practitioners, adds depth and real-world insight to your courses. Access to classes from across the university allows you to differentiate yourself by pairing your communication master's degree with elective courses in marketing, analytics, information technology, new media, management, design thinking, data analytics, and more. Smart classrooms, makerspaces, and an entrepreneurial ecosystem are designed for you to connect, share, and develop your ideas. All of this is designed for you to have an outstanding academic experience through hands-on learning and real-world application of knowledge. You'll graduate with a degree and the experience needed to stand out in a competitive job market.

Jobs in Communications

According to the U.S. Bureau of Labor Statistics, jobs in communication fields are expected to grow by seven percent over the next ten years. Communications professionals with graduate degrees earn an average salary of $86,433.

Types of jobs in communication vary depending on what kind of work interests you most. Graduates of RIT's communication master's degree hold positions as:

- Marketing Specialist
- Communication Coordinator
- Account Coordinator
- Communication Assistant
- Digital Marketing and Communication Analyst
- Social Media Manager
- Digital Marketing Specialist
- Customer Sales Director
- Marketing Analyst
- Technical Writer

Relevant, Future-Focused Research

The communication MS offers research opportunities in timely, urgent areas affecting today's communication and marketing professionals, including the use of artificial intelligence in journalism, social media, visual communication, health communication, and civic engagement.

Experiential Learning

Cooperative Education

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Cooperative education is optional but strongly encouraged for graduate students in the communication master's degree.

Curriculum

Communication, MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
COMM-702	Communication Theories	3
COMM-703	Research Methods in Communication	3
COMM-714	Strategic Communication	3
COMM-720	Thesis Preparation Seminar	0
	Communication Electives	6
	Professional Core	9
Choose one of the following:		6
COMM-800	Communication Thesis/Project	
COMM-801	Comprehensive Exam, plus two additional courses*	
Total Semester Credit Hours		**30**

* Courses may be professional core courses, communication electives, or a combination of both.

Professional Core courses are chosen by students based on their professional interests. In consultation with their academic advisor, students will choose from graduate courses offered across the university to round out their coursework.

Communication electives

COMM-605	Social Media Analytics and Research
COMM-606	Digital Storytelling
COMM-709	Digital Advertising
COMM-710	Visual Communication
COMM-715	Communication Design Principles
COMM-716	Communication and Identity
COMM-717	Artificial Intelligence and Communication

Admission requirements

To be considered for admission to the MS program in communication, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a writing portfolio consisting of at least three writing samples, such as academic papers written for class, work-related brochures and pamphlets, or newspaper or magazine articles.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Scholarships and Graduate Assistantships

Scholarships of up to 30 percent of tuition are awarded to qualified applicants. Graduate assistantships could also be available.

Criminal Justice, MS

www.rit.edu/study/criminal-justice-ms

Jason Scott, Associate Professor
585-475-2393, jxsgcj@rit.edu

Program overview

RIT's criminal justice master's degree fosters the creation of new knowledge through active research in agencies and the community. You will learn and apply problem-solving skills rooted in areas of individual interest with an emphasis on applied research. The degree enables graduates to enter successful careers in criminal justice agencies, policy analysis, or pursue further education in a criminal justice doctoral program.

The MS in criminal justice emphasizes a multidisciplinary approach to urban studies with a focus on public safety. The program stresses training in policy analysis and practice, particularly as it is relevant to the community and urban issues.

The master's degree in criminal justice builds on a foundation of locally relevant policy research by providing you with the critical skills to carry out such work and the experience to assure success in employment or in pursuit of further graduate studies. RIT's criminal justice master's program provides you with a strong foundation in criminological, criminal justice theory, and social science research skills, enabling you to have a successful career in the policy analysis arena or to be prepared to pursue advanced study beyond the master's degree.

Recent criminal justice ms graduates have entered careers in prosecutorial investigation, criminal justice program evaluation, and crime analysis. Many have also pursued law degrees and doctoral degrees.

Students applying to the program should have a strong undergraduate foundation in criminology and research methods. Students that do not possess these skills may be required to complete additional undergraduate course work (e.g., Criminology, Theories of Crime, and Research Methods) or demonstrate equivalent skills for completion of the degree.

Experiential Learning

Cooperative Education

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Cooperative education is optional but strongly encouraged for graduate students in the criminal justice master's degree.

Curriculum

Criminal Justice (thesis option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
CRIM-700	Pro-Seminar In Criminal Justice Theory	3
CRIM-701	Statistics	3
CRIM-702	Pro-Seminar in Research Methods	3
CRIM-703	Advanced Criminology	3
CRIM-704	Crime, Justice and Community	3
CRIM-705	Interventions and Change in Criminal Justice	3
	Electives	6
Second Year		
CRIM-800	Thesis in Criminal Justice	6
Total Semester Credit Hours		**30**

Criminal Justice (project option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
CRIM-700	Pro-Seminar In Criminal Justice Theory	3
CRIM-701	Statistics	3
CRIM-702	Pro-Seminar in Research Methods	3
CRIM-703	Advanced Criminology	3
CRIM-704	Crime, Justice, and Community	3
CRIM-705	Interventions and Change in Criminal Justice	3
	Electives	6
Second Year		
CRIM-775	Criminal Justice Capstone	3
	Elective	3
Total Semester Credit Hours		**30**

Criminal Justice Graduate Electives

CRIM-660	Project Based Learning in Criminal Justice
CRIM-706	Current Issues in CJ
CRIM-711	Directed Readings in Criminal Justice
CRIM-712	Crime And Media

Admission requirements

To be considered for admission to the MS program in criminal justice, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- Have completed a statistics course (students may be required to take a data analysis or a statistics course if not taken previously).
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Engineering Psychology, Adv. Cert.

www.rit.edu/study/engineering-psychology-adv-cert

Esa Rantanen, Associate Professor
585-475-4412, emrgsh@rit.edu

Program overview

Engineering psychology focuses on exploring and understanding the relationship between humans and machines. It's the science of human behavior and our interactions with the technologies that go into the design and operation of machines, equipment, and more.

An Innovative Engineering Psychology Program

The advanced certificate in engineering psychology will expand your core knowledge of engineering psychology by exploring course work in cognition, perception, ergonomics, industrial design, and more. The advanced certificate provides you with formal recognition of your knowledge in engineering psychology and establishes a credential for seeking a career in the human factors or ergonomics fields. Students enrolled in the MS degree in experimental psychology may be awarded the advanced certificate by taking the certificate's required courses as part of their master's program.

What is a Graduate Certificate?

A graduate certificate, also called an advanced certificate, is a selection of up to five graduate-level courses in a particular area of study. It can serve as a stand-alone credential that provides expertise in a specific topic that enhances your professional knowledge base, or it can serve as the entry point to a master's degree. Some students complete an advanced certificate and apply those credit hours later toward a master's degree.

Curriculum

Engineering Psychology, advanced certificate, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
PSYC-712	Graduate Cognition	3
PSYC-714	Graduate Engineering Psychology	3
PSYC-715	Graduate Perception	3
	PSYC Elective or Open Elective*	6
Total Semester Credit Hours		**15**

* Any graduate level course except PSYC-640, PSYC-642.

Admission requirements

To be considered for admission to the advanced certificate in engineering psychology, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.

- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- Have completed at least 15 semester hours of course work in undergraduate psychology or a related field (e.g., engineering, computer science, information technology), including one course in experimental psychology and one course in statistics.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Prerequisite Courses

Students may meet the prerequisite requirements by taking the designated prerequisite courses at RIT, having sufficient background from their undergraduate education, or if prerequisite requirements are explicitly waived by the course instructor.

Experimental Psychology, MS

www.rit.edu/study/experimental-psychology-ms

Tina Sutton, Associate Professor
585-475-6773, tmsgsh@rit.edu

Program overview

The experimental psychology master's degree is a broad and flexible program that provides a solid stepping-stone into careers or further study in psychology. A choice of tracks–in experimental psychology or engineering psychology–allows you to customize the program around your career goals and aspirations.

What is Experimental Psychology?

In experimental psychology, students are trained to apply scientific methods to basic psychological processes in perception, brain and behavior relationships, thinking, memory, learning, social interactions, human development, and related areas. RIT's master's in experimental psychology builds on the strengths of faculty research and student interests in experimental psychology broadly defined. The program as a whole provides a foundation for further advanced academic study in human factors and/or experimental psychology.

Master's in Experimental Psychology Courses

The experimental psychology master's degree includes core courses, elective courses, and a thesis. It also offers two tracks to choose from: experimental psychology and engineering psychology.

The experimental psychology track embraces the application of the scientific method to the study of behavior. Faculty are experts in a variety of fields including addiction, attention, cognition, development, evolutionary psychology, forensic psychology, perception, psychopathology, and social psychology, among others.

The engineering psychology track examines human capabilities to sense, perceive, store, and process information and how these human factors impact interactions with technology. This knowledge is applied to the design, use, and maintenance of human-machine systems. Courses emphasize the role of human behavior and performance in both simple and complex human-machine systems. Students are trained in both research methods of experimental psychology and the application of the results to contemporary problems in industry. This track prepares students to function as effective engineering psychologists in industrial, governmental, or consulting organizations.

Electives

If you choose the engineering psychology track must select two electives. Any graduate course at RIT can be taken as an elective, assuming prerequisites are met.

Capstone or Thesis

As part of the MS in experimental psychology, you will choose either a capstone project or a thesis. Students who select the capstone project will embark on a range of projects to demonstrate their ability to apply this knowledge in various assignments. A variety of written projects (white paper, focused literature review, and a resume) and an oral presentation are required for students to show proficiency in their areas of expertise.

Students who select to complete a thesis will select a thesis adviser in the first year, followed in the second year by a thesis topic and research proposal. Students will conduct their thesis, including the collection and analysis of data, in the second year. Ongoing research activity is expected through the summer term of the program. At the completion of the thesis, students will publicly present their findings and defend their research before a thesis committee.

Experiential Learning

Cooperative Education

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

The program includes an optional cooperative education component. Co-op is generally completed in the summer after the first year of the program. The co-op experience provides experiential learning that integrates with classroom education and allows students to apply psychological principles to problems in a variety of work environments. Co-op may be completed in any business or industrial setting.

Curriculum

Experimental Psychology, MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
PSYC-640	Graduate Statistics	3
PSYC-751	Graduate Research Seminar	0
Choose one of the following:		3
PSYC-752	Thesis Proposal (Thesis Option)	
	Specialized PSYC Elective (Non-Thesis Option)	
	PSYC Elective	3
	Institute Electives	6
Choose one of the following:		3
PSYC-641	Applied Psychology Methods	
PSYC-642	Graduate Research Methods	
Choose one of the following:		3
PSYC-714	Graduate Engineering Psychology (Engineering Psychology track)	
	PSYC Elective (Experimental track)	
Second Year		
Choose one of the following:		3
PSYC-753	Thesis (Thesis Option)	
PSYC-754	Graduate Psychology Capstone (Non-Thesis Option)	
	PSYC Elective	3
Choose one of the following:		3
	PSYC Elective	
	Institute Elective	
Total Semester Credit Hours		**30**

PSYC Electives

COURSE	
PSYC-711	Graduate Biopsychology
PSYC-712	Graduate Cognition
PSYC-713	Graduate Development Psychology
PSYC-715	Graduate Perception
PSYC-716	Graduate Social Psychology
PSYC-717	Advanced Graduate Statistics
PSYC-718	Clinical and Experimental Neuropsychology
PSYC-798	Advanced Research in Psychology

Institute Electives

COURSE	
BIOL-673	Marine Biology
BIOL-675	Advanced Conservation Biology
HCIN-600	Research Methods
HCIN-610	Foundations of Human-Computer Interaction
HCIN-620	Information and Interaction Design
HCIN-630	Usability Testing
HCIN-661	Interactive Courseware
HCIN-700	Current Topics in HCI
HCIN-705	Topics in HCI for Biomedical Informatics
HCIN-715	Agent-based and Cognitive Modeling
HCIN-720	Prototyping Wearable and Internet of Things Devices
HCIN-722	Human-Computer Interaction with Mobile, Wearable, and Ubiquitous Devices
HCIN-730	User-Centered Design Methods
HCIN-735	Collaboration, Technology, and the Human Experience
HRDE-711	Program Evaluation and Design
ISEE-730	BioMechanics of Human Movement
ISEE-731	Advanced Topics in Human Factors and Ergonomics
ISEE-732	Systems Safety Engineering
MATH-655	Biostatistics
MKTG-761	Marketing Concepts and Commercialization
MSSE-704	Teaching Deaf and Hard of Hearing Learners with Special Educational Needs
PSYC-631	Cognitive Assessment
PSYC-632	Social-Emotional Assessment
PSYC-650	Applied Behavior Analysis
PSYC-720	Advanced Consultation
PSYC-721	Academic Intervention
PSYC-723	Systems and Organizational Interventions
STAT-611	Statistical Software
STAT-641	Applied Linear Models - Regression
STAT-701	Foundations of Experimental Design
STAT-756	Multivariate Analysis
STAT-775	Design and Analysis of Clinical Trials
STSO-621	Graduate Biodiversity and Society

Admission requirements

To be considered for admission to the MS in experimental psychology, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. If you are applying for the thesis option you should identify one or more mentors based on a match to our psychology research areas. Refer to Application Instructions and Requirements for additional information.
- Have completed at least 15 semester hours of course work in undergraduate psychology or a related field (e.g., engineering, computer science, information technology), including one course in experimental psychology and one course in statistics.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Science, Technology and Public Policy, MS

www.rit.edu/study/science-technology-and-public-policy-ms
Franz Foltz,
fafgsh@rit.edu

Program overview

This master's in public policy enables you to work at the intersection of engineering, science, technology, and public policy. The program builds on RIT's strengths as a technological university, enabling students to interact with faculty and researchers who are working on scientific developments and technological innovations that drive new public policy considerations. This technology policy master's degree is interdisciplinary and draws significantly from disciplines and courses throughout RIT. It is geared toward producing graduates who will make significant contributions in the private, public, and not-for-profit sectors.

A Technical Master's in Public Policy For Today's Innovative World

Self-driving cars, cybersecurity threats, data protection and privacy, and artificial intelligence are just a few of the hot button topics in the rapidly evolving intersection of technology, innovation, and public policy.

To effectively create public policy around issues impacted by technology and innovation, you must be knowledgeable of both the science and technology behind the issue as well as the system of laws, regulatory measures, and courses of action that guide the creation of effective public policy.

In RIT's science, technology, and public policy MS, students include those with science or engineering backgrounds seeking to broaden their career opportunities in government or business settings, as well as those with undergraduate degrees in the liberal arts (e.g., economics, public policy) who are interested in science, technology, and policy issues.

Courses in Technology and Public Policy

All students in the public policy master's program complete a set of policy core courses that emphasize analysis, problem-solving, and interdisciplinary approaches. Students work with an adviser to choose electives that focus their policy studies in a particular area, such as environmental policy, climate change policy, health care policy, STEM education policy, telecommunications policy, or energy policy. The program consists of required core courses, elective courses, and the completion of a thesis or comprehensive exam. The thesis option allows students to work with a faculty adviser on an independent research project in their area of interest.

Elective courses are based on students' individual interests and career goals. Elective courses may be offered in various colleges throughout the university, including the colleges of Business, Engineering, Engineering Technology, and Science. Course selection is completed jointly with a faculty adviser and typically aims to develop a specialized area of interest for the student (e.g., biotechnology policy, environmental policy, energy policy, communications policy, etc.).

Experiential Learning

Cooperative Education and Internships

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Co-op is optional but strongly encouraged for graduate students in the MS in science, technology, and public policy.

Curriculum

Science, Technology and Public Policy, MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
PUBL-700	Readings in Public Policy	3
PUBL-701	Graduate Policy Analysis	3
PUBL-702	Graduate Decision Analysis	3
PUBL-703	Evaluation and Research Design	3
STSO-710	Graduate Science and Technology Policy Seminar	3
	Graduate Electives*	9
Second Year		
Choose one of the following:		6
PUBL-785	Capstone Experience	
PUBL-790	Public Policy Thesis	
PUBL-798	Comprehensive Exam plus 2 Graduate Electives*	
Total Semester Credit Hours		**30**

* Graduate Electives are chosen by students based on their professional interests. In consultation with their academic advisor, students will choose from graduate courses offered across the university to round out their coursework.

Admission requirements

To be considered for admission to the MS program in science, technology and public policy, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendations are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit two writing samples, one of which should be a statement of interest.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- Have completed course work in calculus and statistics. Students may be required to take a course in data analysis or statistics course and an introductory calculus course, if not taken previously.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

School Psychology, MS

www.rit.edu/study/school-psychology-ms
Vincent Pandolfi, Associate Professor
585-475-2875, vxpgla@rit.edu

Program overview

Please Note: This program is no longer accepting students.

A school psychologist works with young children; elementary, junior high, and high school students; teachers and administrators; parents; and various educational professionals to offer services to prevent or improve existing student difficulties and enhance the educational success of all children. Through diagnostic testing, counseling, consultation, and intervention, school psychologist programs help students deal with learning and behavioral difficulties and help improve students' adjustment to school and their community. The school psychology masters prepares students for provisional New York state certification as school psychologists. Designed to provide students with a strong background in psychological foundations, the program develops professional skills and competencies in assessment, counseling, consultation, and program evaluation.

Designed to provide students with a strong background in psychological foundations, our school psychology master's degree develops professional skills and competencies in assessment, counseling, consultation, and program evaluation. The program prepares students for provisional New York state certification as school psychologists. The MS degree in school psychology is approved by the National Association of School Psychologists, and is awarded after students have completed all course work, an internship, and have passed a portfolio review.

Curriculum

School Psychology, MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
PSYC-600	Field Experience I: Professional School Psychology Foundations	3
PSYC-601	Field Experience II: Professional School Psychology Foundations	3
PSYC-620	Interpersonal Intervention Skills	3
PSYC-630	Academic Assessment	3
PSYC-631	Cognitive Assessment	3
PSYC-632	Social-Emotional Assessment	3
PSYC-640	Graduate Statistics	3
PSYC-650	Applied Behavior Analysis	3
PSYC-713	Graduate Developmental Psychology	3
PSYC-721	Academic Intervention	3
Second Year		
PSYC-603	Ethical and Legal Issues	3
PSYC-641	Applied Psychology Methods	3
PSYC-701	Advanced Practicum I: Issues in Diversity	3
PSYC-620	Interpersonal Intervention Skills	3
PSYC-702	Advanced Practicum II: Issues in Diversity	
Choose one of the following:		3
PSYC-711	Graduate Biopsychology	
PSYC-718	Clinical and Experimental Neuropsychology	
PSYC-720	Advanced Consultation	3
PSYC-722	Advanced Counseling	3
PSYC-723	Systems and Organizational Interventions	3
PSYC-730	Comprehensive Assessment Integration	3
Third Year		
PSYC-750	Internship	6
Total Semester Credit Hours		**66**

Admission requirements

To be considered for admission to the MS program in school psychology, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendations are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- Have completed at least 18 semester hours of course work in behavioral sciences with a grade of B (3.0) or better.
- Have completed prerequisite undergraduate courses in general psychology, elementary statistics, child or developmental psychology, and abnormal psychology.
- Participate in an individual interview.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English requirements. International applicants may be considered for an English test requirement waiver. Refer to Additional Requirements for International Applicants to review waiver eligibility.

Accreditation

RIT's MS degree in school psychology is conditionally accredited by the National Association of School Psychologists. Learn more about Program Annual Report and Student Outcomes Data.

School Psychology, Advanced Certificate

www.rit.edu/study/school-psychology-adv-cert
Suzanne Bamonto, Associate Professor
585-475-2765, sbggsp@rit.edu

Program overview

Please Note: This program is no longer accepting students.

The advanced certificate in school psychology is designed for students who are interested in learning aspects of school psychology but may not be interested in pursuing an advanced degree.

Curriculum

School Psychology, advanced certificate, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
PSYC-620	Interpersonal Intervention Skills	3
PSYC-630	Academic Assessment	3
PSYC-641	Applied Psychology Methods	3
PSYC-650	Applied Behavior Analysis	3
Second Year		
PSYC-640	Graduate Statistics	3
PSYC-720	Advanced Consultation	3
PSYC-723	Systems and Organizational Interventions	3
Total Semester Credit Hours		**21**

Admission requirements

To be considered for admission to the advanced certifcate in school psychology, candidates must fulfill the following requirements:

- Complete an online graduate application. Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendations are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- Have completed at least 18 semester hours of course work in behavioral sciences with a grade of B (3.0) or better.
- Have completed prerequisite undergraduate courses in general psychology, elementary statistics, child or developmental psychology, and abnormal psychology.
- Participate in an individual interview.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English requirements. International applicants may be considered for an English test requirement waiver. Refer to Additional Requirements for International Applicants to review waiver eligibility.

Faculty

Dean's Office

Anna Westerstahl Stenport, BA, MA, Uppsala University (Sweden); Ph.D., University of California-Berkeley—Dean; Professor

Michael Laver, BA, Purdue University; MA, Ph.D., University of Pennsylvania—Associate Dean; Professor

Kelly Norris Martin, BA, John Carroll University; MS, Ph.D., North Carolina State University—Associate Dean; Professor

School of Communication

Tracy R. Worrell, BA, Otterbein College; MA, University of Cincinnati; Ph.D., Michigan State University—Director; Professor

Bruce A. Austin, BA, Rider College; MS, Illinois State University; Ph.D., Temple University—Professor

Claudia Bucciferro, BA, MA, University of Concepcion (Chile); Ph.D.,University of Colorado at Boulder—Assistant Professor

Grant C. Cos, BA, University of Massachusetts at Amherst; MA, Emerson College; Ph.D., Kent State University—Professor

Keith B. Jenkins, BA, University of Arkansas; MA, Ph.D., Florida State University—Vice President and Associate Provost for Diversity and Inclusion; Professor

Hinda Mandell, BA, Brandeis University; MA, Harvard University; Ph.D., Syracuse University—Professor

Eun Sook Kwon, BA, Hannam University (Korea); MA, University of Texas at Austin; Ph.D., University of Georgia—Director of Graduate Programs; Associate Professor

David R. Neumann, BA, Ithaca College; MA, Ph.D., Bowling Green State University—Professor

Kelly Norris Martin, BA, John Carroll University; MS, Ph.D., North Carolina State University—Associate Dean; Professor

Katrina Overby, BA, Rust College; MS, Oklahoma State University; Ph.D., Indiana University, Bloomington—Assistant Professor

Rudy Pugliese, BA, State University College at Oneonta; MA, State University College at Brockport; Ph.D., Temple University—Professor

Jonathan E. Schroeder, BA, University of Michigan; MA, Ph.D., University of California at Berkeley—William A. Kern Professor in Communications

Xiao Wang, BA, Beijing University of Aeronautics and Astronautics (China); MA, Marquette University; Ph.D., Florida State University—Professor

Criminal Justice

Christopher Schreck, BA, University of Florida; MA, University of Arizona; Ph.D., Pennsylvania State University—Department Chair; Professor

Irshad Altheimer, BA, Alabama State University; MA, Ph.D., Washington State University—Professor

John McCluskey, BA, MA, Ph.D., State University of New York at Albany—Professor

LaVerne McQuiller Williams, BS, Rochester Institute of Technology; MS, State University of New York College at Buffalo; JD, Albany Law School; Ph.D., University at Buffalo—Associate Provost for Faculty Affairs; Professor

Judy Porter, BA, University of Northern Colorado; MA, New Mexico State University; Ph.D., University of Nebraska at Omaha—Undergraduate Director; Professor

O. Nicholas Robertson, BA, State University College at Geneseo; MA, State University College at Brockport; Ph.D., State University of New York at Buffalo— Assistant Professor

Jason Scott, BS, Roberts Wesleyan College; MA, Ph.D., State University of New York at Albany—Graduate Director; Associate Professor

Tony Smith, BA, MA, Ph.D., State University of New York at Albany—Associate Professor

Joe Williams, BS, Rochester Institute of Technology; MA, State University College at Brockport—Lecturer; Field Experience Coordinator

Humanities

Jessica Lieberman, BA, University of Pennsylvania; Ph.D., University of Michigan—Associate Professor, Visual Culture

Katie Terezakis, BA, Central Connecticut State University; MA, Ph.D., New School for Social Research—Professor

Psychology

Joseph Baschnagel, BA, MA, Ph.D., State University of New York at Buffalo—Department Chair; Associate Professor

Suzanne Bamonto, AA, Finger Lakes Community College; BA, State University College at Geneseo; Ph.D., University of Oregon—Associate Professor

Kirsten Condry, BA, Swarthmore College; Ph.D., University of Minnesota—Associate Professor

Caroline DeLong, BA, New College of Florida; MA, Ph.D., University of Hawaii—Undergraduate Program Director; Professor

John E. Edlund, BS, MA, Ph.D., Northern Illinois University—Professor

Allison Fitch, BA, University of Connecticut; Ph.D., University of Massachusetts Boston—Assistant Professor

Stephanie A. Godleski, BA, Hamilton College; MS, Ph.D., University of Buffalo—Associate Professor

Andrew M. Herbert, B.Sc., McGill University (Canada); MA, Ph.D., University of Western Ontario (Canada)—Professor

Rebecca Houston, BS, University of Arkansas at Little Rock; MA, Ph.D., University of New Orleans, Louisiana—Associate Professor

Cecilia Ovesdotter Alm, BA, Universitat Wien (Austria); MA, Ph.D., University of Illinois—Professor, English

Vincent Pandolfi, BA, Lafayette College; MA, Ph.D., Hofstra University—Graduate Program Director, School Psychology; Associate Professor

Marjorie Prokosch, BA, Florida State University; MS, Ph.D., Texas Christian University—Assistant Professor

Esa Rantenen, BS, MS, Embry-Riddle Aeronautical University; MS, Ph.D., Pennsylvania State University—Associate Professor

Lindsay Schenkel, BA, St. John Fisher College; MA, Ph.D., University of Nebraska at Lincoln—Associate Professor

Alan Smerbek, BA, University of Rochester; Ph.D., State University of New York at Buffalo—Associate Professor

Tina Sutton, BS, Union College; MA; Ph.D., State University of New York at Albany—Graduate Director: Experimental Psychology; Associate Professor

Public Policy

Sandra Rothenberg, BS, Syracuse University; MS, Ph.D., Massachusetts Institute of Technology—Department Chair, Professor

Eric Hittinger, BS, MS, Case Western Reserve University; Ph.D., Carnegie Mellon University—Graduate Program Director; Associate Professor

Nathan Lee, BS, University of Pennsylvania; MS, Massachusetts Institute of Technology; Ph.D., Stanford University—Assistant Professor

Qing Miao, BA, Nanjing University (China); MS, University of Michigan; Ph.D., Syracuse University—Assistant Professor

Science, Technology and Society

Christine Keiner, BA, Western Maryland College; Ph.D., Johns Hopkins University—Department Chair; Professor

Deborah Blizzard, BA, Smith College; MS, Ph.D., Rensselaer Polytechnic Institute—Professor

M. Ann Howard, BS, Cornell University; JD, Rutgers University—Professor

Kaitlin Stack Whitney, BS, Cornell University; Ph.D., University of Wisconsin-Madison—Assistant Professor

Kristoffer J. Whitney, BS, Rochester Institute of Technology; Ph.D., University of Pennsylvania—Associate Professor

National Technical Institute for the Deaf

Gerard Buckley, President, NTID; Vice President and Dean, RIT
rit.edu/ntid

Programs of Study

Online learning option available.

The National Technical Institute for the Deaf is one of the nine colleges of Rochester Institute of Technology, and is home to the world's first and largest technological college for deaf and hard-of-hearing students. RIT/NTID serves more than 1,100 deaf and hard-of-hearing students from across the United States and the world.

NTID offers a master of science degree in secondary education of students who are deaf or hard of hearing. All full-time students in the MS program are eligible for graduate assistantships. NTID offers a master of science degree in health care interpretation as well. Students also can pursue graduate and doctoral degrees through RIT's other mainstream colleges and degree-granting units.

Please visit the college's website for in depth information on academics, faculty, facilities, research initiatives, advising, and more.

Admission requirements

Each college makes all decisions regarding graduate admission. Please refer to the individual program descriptions for information regarding specific admission criteria. For general graduate admission information, please refer to the Admission section of this bulletin.

Health Care Interpretation, MS

www.rit.edu/study/health-care-interpretation-ms
Jeni Rodrigues, Lecturer
585-975-9353, Jeni.Rodrigues@rit.edu

Program overview

The MS in health care interpretation is designed to meet the demands of nationally certified sign language interpreters desiring a master's degree specific to working in health care environments. The National Technical Institute for the Deaf'sDepartment of American Sign Language and Interpreting Education administers the program with some course work contributed by RIT's College of Health Sciences and Technology. This unique program:

- Meets the growing demand for specialized sign language health care interpreters as more deaf and hard-of-hearing professionals enter medical/health care fields.
- Increases the number of specialized sign language interpreters working in patient health care settings.
- Prepares interpreters to work in leadership roles in the health care interpreting field.

The program is offered exclusively online. It is estimated that each course will require 9-12 hours per week for class assignments. Course materials will be delivered online asynchronously. In your final semester, you will complete a capstone project consisting of either a research paper or project.

The program curriculum employs an online pedagogical approach, including accelerated courses as its primary delivery system.

The program may be completed on a full- or part-time basis: one academic year (with two summers) for full-time students or two academic years (with two summers) for part-time students.

Experiential Learning

Cooperative Education and Internships

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Curriculum

Health Care Interpretation (full-time), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
HCIA-610	Interpreting Research Setting (summer)	3
HCIA-705	Professional Seminar (summer)	3
HCIA-719	Theories of Translation and Interpretation (summer)	3
HCIA-715	Human Body Systems/Diseases I*	3
HCIA-720	Health Care Practical Interpreting I*	3
HCIA-730	Human Body Systems/Diseases II**	3
HCIA-740	Health Care Practical Interpreting II**	3
HCIA-760	Research Methods in Interpreting	3
	HLTH Elective	3
Second Year		
HCIA-750	Health Care Interpreting Within a Diverse Deaf Community (summer)	3
HCIA-770	Capstone Prof Proj/Rsrch Paper (summer)	3
Total Semester Credit Hours		**33**

* HCIA-715 and HCIA-720 are taken in session 1 (first 7 weeks) of the semester.
** HCIA-730 and HCIA-740 are taken in session 2 (last 7 weeks) of the semester.

Health Care Interpretation (part-time), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
HCIA-705	Professional Seminar (summer)	3
HCIA-719	Theories of Translation and Interpretation (summer)	3
HCIA-715	Human Body Systems/Diseases I*	3
HCIA-720	Health Care Practical Interpreting I*	3
HCIA-730	Human Body Systems/Diseases II**	3
HCIA-740	Health Care Practical Interpreting II**	3
Second Year		
HCIA-610	Interpreting Research Setting (summer)	3
HCIA-750	Health Care Interpreting Within a Diverse Deaf Community (summer)	3
HCIA-760	Research Methods in Interpreting	3
HCIA-770	Capstone Prof Proj/Rsrch Paper	3
	HLTH Elective	3
Total Semester Credit Hours		**33**

* HCIA-715 and HCIA-720 are taken in session 1 (first 7 weeks) of the semester.
** HCIA-730 and HCIA-740 are taken in session 2 (last 7 weeks) of the semester.

Admission requirements

To be considered for admission to the MS program in health care interpretation, candidates must fulfill the following requirements:

- Complete a graduate application.
- Submit a current resume or curriculum vitae.
- Submit official transcripts (in English) of all previously completed undergraduate and graduate course work.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Enrollment in the program is open to students residing in the United States and other countries. Current ASL/English certification, Board for Evaluation of Interpreters (BEI), or state licensure is required. Applicants must email a copy of their credentials to ntidadmissions@rit.edu.
- Have a cumulative GPA of 3.0 or above (or superior endorsement) from an accredited college or university.
- Submit two letters of reference from interpreter colleagues, mentors, or Deaf community members who have had the opportunity to observe the applicant's interpreting work.
- Submit a personal statement describing the applicant's educational objectives. (This may include reasons for applying to the program, how the program will relate to long-range career objectives, any personal or non-academic qualities that might contribute to success in the program, any prior experience, or any reasons why the applicant wants to attend RIT.)
- Submit an ASL interpretation sample. Learn more about instructions and video submission requirements.
- Deaf and hard-of-hearing applicants must submit an audiogram.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Applicants accepted into the program are required to complete a self-paced online course in medical terminology called Language of Medicine prior to the beginning of the summer term, which starts each June.

Secondary Education of Students Who Are Deaf or Hard of Hearing, MS

www.rit.edu/study/secondary-education-students-who-are-deaf-or-hard-hearing-ms

Patrick Graham, Associate Professor
585-475-6480, pjgnmp@rit.edu

Program overview

The master of science degree in secondary education of students who are deaf or hard of hearing is designed for deaf, hard-of-hearing, and hearing students with a passion for teaching. As a teacher-candidate in the program, you'll earn dual certification to teach a secondary school content area for students who are hearing or deaf as well as in deaf education for grades K-12. The curriculum is taught by renowned faculty at RIT, one of the most innovative campuses in the world. The program prepares teachers to be effective and ethical practitioners and also to be scholars and leaders in the profession.

As a graduate student in the program, you will enjoy small class sizes, one-to-one discussions, and advisement with world-renowned faculty in small classes that allow you to build your strengths and develop your skills.

RIT's Deaf Education Degree

RIT and the National Technical Institute for the Deaf (NTID) have created a unique educational community with a diverse communication environment. All community members share responsibility for effective communication and are expected to respect the language preferences of students, faculty, and staff. The rich inclusive communication environment at RIT/NTID prepares you for the broad array of communication styles you will encounter in the classroom as a teacher of the deaf.

Faculty members are international leaders in research and are highly skilled in the education of deaf people. A carefully designed system of faculty advisement is a prominent feature of the program. On-campus facilities, state-of-the-art technology, and a well-established system of educational access services combine to make this a vital program for both deaf and hearing students who desire careers as professional educators of deaf students.

How to Become a Teacher for the Deaf

Course work requires a minimum of five semesters. A cumulative grade point average of at least 3.0 must be maintained. Before graduation, students are expected to have at least intermediate-level signing skills as determined by a Sign Language Proficiency Interview.

Degree and Certification

When you successfully complete the program, you will have earned:

- A master of science degree
- Initial Certification from New York State to teach in an academic subject area at the secondary school level (grades 7-12). Subject areas include biology, chemistry, earth science, English, math, physics, social studies, or American Sign Language
- Initial certification from New York State in education of students who are deaf or hard of hearing, grades K-12
- Initial certification from Council on Education of the Deaf Note: To be eligible for initial certification, you are required to take and pass the New York State Teacher Certification Examinations (NYSTCE). There are four tests: Educating All Students (EAS)Content Specialty Test (CST), Deaf and Hard of HearingContent Specialty Test (CST), in the academic subject area for which you wish to become certified to teach. edTPA (Teacher Performance Assessment)

Is the RIT/NTID's Deaf Education Degree right for you?

How do you know if the MS degree in secondary education is the right program for you? Use the following questions to assess your interest in the education field and in teaching students who are deaf and hard of hearing:

- Do you want to teach deaf and hard-of-hearing students?
- Do you want to teach math, science, social studies, or English and respond to the need for more high school teachers?
- Do you want to teach in a variety of K-12 mainstream and residential/center school settings?
- Are you fascinated by the cognitive, cultural, and language characteristics of deaf and hard-of-hearing students?
- Are you looking for personal attention and advisement from faculty and staff who are leaders in the field?
- Would you like to learn, live and work on a campus designed for collaboration between deaf and hearing students?
- Do you want training in evidence-based instructional approaches?

Why choose RIT/NTID's Deaf Education Degree

With the pressing need for more secondary education teachers, especially in science and mathematics, the strong foundation RIT provides in these areas creates an exceptional environment for deaf, hard-of-hearing, and hearing students to pursue a teaching degree. The RIT/NTID's deaf education degree offers the following advantages:

- Personal attention from program faculty members.
- Dual certification in a secondary school content area in grades 7-12 for students who are hearing or deaf as well as in deaf education for grades K-12.
- Strong faculty with expertise in pedagogy, language development, teaching and curriculum, speech development, research, educational technology, youth and adolescent development, student advisement and placement, and educational issues.
- Variety of student-teaching placement options.
- Access to a wide array of research materials.
- Extensive library resources on the education of students who are deaf or hard of hearing, Deaf culture, sign language, and curriculum materials.
- Thorough and thoughtful personal advising.
- Close proximity to schools for deaf students and mainstream programs.
- A vibrant Deaf community in Rochester, N.Y.
- Numerous seminars and workshops focused on contemporary educational and cultural topics.
- Immersion in American Sign Language.
- Collaborative projects with faculty, staff members, and students.

The RIT 4+2 Teacher Education Program

Be part of an exciting new program that creates a bridge between a four-year RIT bachelor's degree and RIT's two-year master of science degree in secondary education. The RIT 4+2 Teacher Education Program is an exceptional value and an outstanding choice designed to give you the skills you need for a successful teaching career. In the 4+2 program you will:

- Receive dual certification in the education of students who are deaf or hard-of-hearing as well as in an academic subject such as science or math.
- Enjoy small class sizes and one-to-one discussions with faculty who are international leaders in research and the art of teaching.
- Have the opportunity to gain valuable real-world teaching experience before you graduate.
- Enjoy a top-quality education at a substantially reduced tuition rate.

For more information on the RIT 4+2 Teacher Education Program, contact the NTID Office of Admissions.

How the Program Works

- You must be accepted to an RIT bachelor's degree program in one of the following areas: Any major in the College of ScienceAny major in the College of Engineering that requires 30 credits in math or scienceAny major in the College of Liberal Arts that requires 30 credits in English or history/social studiesAn applied arts and sciences program requiring 30 credits in either math, science, or English, history/social studies
- Once you are enrolled in one of the bachelor's degree programs for at least two years, you can complete the application for graduate study to the MS degree in secondary education (during your 4th year of study). You must interview with the department chairperson prior to your admission to qualify for the program.
- Upon completion of your bachelor's degree program, you must have: A cumulative GPA of 3.25 or higher, Graduate Record Exam (GRE) is not needed.A cumulative GPA of 2.8-3.24, GRE scores must be submitted (combined score of at least 280 and analytic writing score of 3.0 or better).Completed 30 credits and earned a 3.0 GPA in your academic subject area (ex. math, science, history/social studies, or English)Successfully taken and passed at least ASL I and ASL II through RIT's College of Liberal Arts, or earned credit by exam.

For more information on the RIT 4+2 Teacher Education Program, contact the NTID Office of Admissions.

Curriculum

Secondary Education of Students who are Deaf or Hard of Hearing, MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
MSSE-700	History of Deaf Educational Thought and Practice	3
MSSE-701	Psychology and Human Development	3
MSSE-702	Educational and Cultural Diversity	3
MSSE-703	Special Education in the Social Context	3
MSSE-704	Teaching Deaf and Hard of Hearing Learners with Special Educational Needs	3
MSSE-710	General Instructional Methods	3
MSSE-712	Practicum	2
MSSE-713	Assessment Principles and Practices	3
MSSE-725	Structures of American Sign Language and English	3
MSSE-726	Language Acquisition and Learning	3
MSSE-727	American Sign Language in Instructional Delivery	3
MSSE-785	Foundations of Educational Research	3
Second Year		
MSSE-714	Curriculum Content and Methods of Instruction	3
MSSE-715	Issues in Mainstreamed Education	3
MSSE-722	Educational Audiology and Spoken Language Development	3
MSSE-728	Literacy and the Deaf Adolescent	3
MSSE-760	Student Teaching I	6
MSSE-761	Student Teaching II	6
MSSE-790	Professional Portfolio	3
MSSE-794	Inquiry in Teaching (optional elective)	(3)
Total Semester Credit Hours		**62**

Admission requirements

To be considered for admission to the MS program in secondary education of students who are deaf or hard of hearing, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a writing sample, of which you are the sole author, which should be a report or paper from previous academic or professional work that reflects your critical thinking and writing abilities.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- Participate in an individual interview.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.
- Within the application you'll be asked to provide information about your teaching content course work and associated credits.

Additionally, 30 semester credit hours in a content area are required by the New York State Education Department for initial certification to teach a secondary content area (grades 7-12). Students who do not have the required number of hours must complete the additional credits before applying for New York State certification. Secondary academic subjects include American Sign Language, English, mathematics, social studies, or science. Please note: The social studies content area includes economics and government, and requires at least 21 semester hours in the history and geography of the United States and the world.

Financial Aid

NTID graduate tuition rates are less than one-half of RIT's tuition for U.S. citizens. Students who are interested in applying for financial assistance need to complete the Free Application for Federal Student Aid (FAFSA). International applicants should contact the NTID Admissions Office for additional information. Questions related to the program, including scholarship opportunities, should be directed to the NTID Office of Admissions.

Faculty

Dean's Office

Gerard J. Buckley, BS, Rochester Institute of Technology; MSW, University of Missouri; Ed.D., University of Kansas—President, NTID and Vice President and Dean, RIT; Associate Professor

Health Care Interpretation

Robyn K. Dean, BA, Maryville College; MA, Colgate Rochester Crozer Divinity School; Ph.D., Heriot-Watt University (United Kingdom)—Associate Professor, Health Care Interpretation

Kim B. Kurz, BS, MS, Rochester Institute of Technology; Ph.D., University of Kansas—Professor, Health Care Interpreting Within a Diverse Deaf Community

Jason Listman, BS, MS, Rochester Institute of Technology; Ed.D., St. John Fisher College—Associate Professor, Healthcare Professional Seminar

Daniel V. Maffia, BS, Rochester Institute of Technology; MA, Western Oregon University—Senior Lecturer, Theories of Translation and Interpretation

Secondary Education of Students Who are Deaf and Hard of Hearing

Patrick J. Graham, BS, MS, Rochester Institute of Technology; Ph.D., University of Georgia—Associate Professor; Director, Curriculum and Teaching

Christopher A. N. Kurz, BS, Rochester Institute of Technology; MS, Ph.D., University of Kansas—Professor, Special Education: Education of Deaf Students

Amanda L. Picioli, BS, State University College at Geneseo; MED, Smith College; MS, Syracuse University; AuD., University of Florida—Audiologist, Audiology

Thomastine Sarchet, BS, MS, Rochester Institute of Technology; Ed.D., University of Rochester—Assistant Dean for International Educational Outreach; Assistant Professor

Sara Schley, BA, Reed College; MA, Northeastern University; Ed.D., Harvard University—Professor, Human Development and Language Acquisition

Jessica W. Williams, BS, University of Georgia; M.Ed., Ph.D., Georgia State University—Associate Professor, Deaf Education

College of Science

André Hudson, Interim Dean
rit.edu/science

Programs of Study

Online learning option available.

The College of Science offers a unique complement of graduate programs featuring curricula designed with sufficient flexibility to prepare students for direct entry into a variety of careers or further study toward a more advanced graduate degree in a chosen discipline. The college also houses four doctorate programs featuring internationally-recognized, cutting-edge research activities. Whether the focus is on the foundations of matter, the origins of the universe, the modeling of mathematics, the role of chemists in our daily lives, the encoding of life within DNA, the specialized properties of advanced materials, our impact on the environment, or the science and technology of advanced imaging systems, the college's graduate faculty provide a valuable and integrated understanding of today's most important fundamental problems, applied research issues, and industrial applications.

Please visit the college's website–**www.rit.edu/science**–for in depth information on academics, faculty, facilities, research initiatives, advising, and more.

Admission requirements

Each college makes all decisions regarding graduate admission. Please refer to the individual program descriptions for information regarding specific admission criteria. For general graduate admission information, please refer to the Admission section of this bulletin.

Financial aid and scholarship

Please refer to the Financial Aid and Scholarship section of this bulletin for information regarding financial aid, scholarships, grants, loans, and graduate assistantships.

School of Chemistry and Materials Science

Chemistry, MS

www.rit.edu/study/chemistry-ms
Nathan Eddingsaas, Associate Professor
585-475-4605, ncesch@rit.edu

Program overview

With a chemistry master's degree, you'll be able to solve scientific problems with agility and accuracy. Conduct research specific to your field of interest as you develop skills that translate to infinite career opportunities. With an emphasis on leadership, many graduates excel in leadership positions in dynamic fields such as sustainability, public policy, lobbying, sales, government, imaging science, space exploration, medicine, and much more.

The School of Chemistry and Materials Science has research- and teaching-oriented faculty, as well as excellent equipment and facilities that enable full-time graduate students to carry on a program of independent study and develop the ability to attack scientific problems at the fundamental level. The research can result in either a thesis or a project report.

Through course work and research activities, the program strives to increase the breadth and depth of the student's background in chemistry. Students develop the ability to attack scientific problems with minimal supervision.

RIT's Master's Degree in Chemistry

This master's of chemistry will prepare you for the next step, whether that is a Ph.D. program, getting a new job, or advancing your career at the company you are already working for. Our program emphasizes independent research with faculty mentors on a wide range of possible topics. You will also focus on improving your written and oral scientific communication skills.

With RIT's master's degree in chemistry, you'll have an opportunity to conduct research in many areas of chemistry. Research currently underway in the School of Chemistry and Materials Science:

- Synthesis of cancer imaging agents
- Synthesis, design, and construction of organic solar cells
- Synthesis and characterization of electrical and optical nanomaterials
- Study of aerosols from nicotine delivery devices
- Study of microplastics in the environment
- Biochemical research including RNA and DNA structure, protein biochemistry, structural biology, and immunology
- Research into chemical education

Chemistry Master's Program

Together with an advisor, you will choose courses to create a customized curriculum that best meets your interests, needs, and career aspirations. A deliberate effort is made to strengthen any areas of weakness indicated by the undergraduate records and the placement examinations.

The chemistry master's program consists of the following requirements:

1. A minimum of 30 semester credit hours beyond the bachelor's degree.
Courses in chemistry consist of core and focus area courses. Core courses are designed to increase your breadth of chemical knowledge, while focus area courses increase depth. Core courses include four semester credit hours in Graduate Chemistry Seminar and one credit hour in Chemistry Writing (CHEM-670). Focus area courses are chosen to address the you career goals and any undergraduate deficiencies in chemistry. Focus area courses must be at the graduate level and are chosen in consultation between you and your graduate advisor. Focus area courses outside of chemistry are acceptable provided they are approved by your graduate advisor.

The program offers two options: a thesis or a project. Concentrations are available in organic chemistry, analytical chemistry, inorganic chemistry, physical chemistry, polymer chemistry, materials science, and biochemistry. Customized concentrations are available to accommodate specific student interests and needs relating to graduate study in chemistry.

2. Research
Ten semester credit hours of research are required with the thesis option. If you opt for the project option, four semester hours of project research are required.

3. Capstone
If enrolled in the thesis option you will be expected to complete an independent research thesis and pass an oral defense. Typically, all requirements are met within two years. While enrolled in the project option you will have numerous ways of satisfying the capstone requirement for their project. These include but are not limited to conference presentations, papers, journal articles, patents, and seminars.

Equipment and Resources

The School of Chemistry and Materials Science has modern instrumentation in the areas of spectroscopy (NMR, IR, UV-vis, fluorescence, atomic absorption, fluorimetry), chromatography (gas chromatography, high-performance liquid chromatography, capillary electrophoresis, etc.), mass spectrometry (high-performance lc- and gc-mass spectrometry and electrospray mass spectrometry), and materials characterization (rheometry, thermal gravimetric analysis, differential scanning calorimetry, hot-stage microscopy and contact angle goniometry).

Part-time Study

Courses are offered in the late afternoons and evenings to encourage practicing chemists to pursue the MS degree without interrupting their employment. Part-time students may take the project option, which includes a capstone project in place of a thesis. Students employed full-time normally take one course each semester. At this pace, coursework can be completed within four to five years.

Experiential Learning

Cooperative Education

Cooperative education, or co-op for short, is full-time, paid work experience in your field of study. And it sets RIT graduates apart from their competitors. It's exposure–early and often–to a variety of professional work environments, career paths, and industries. RIT co-op is designed for your success.

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Students at the master's level who have, or are able to obtain, industrial employment may be able to earn cooperative education credit for their work experiences. Semesters of co-op can be interspersed with semesters of full-time academic work.

National Labs Career Fair

Hosted by RIT's Office of Career Services and Cooperative Education, the National Labs Career Fair is an annual event that brings representatives to campus from the United States' federally funded research and development labs. These national labs focus on scientific discovery, clean energy development, national security, technology advancements, and more. Students are invited to attend the career fair to network with lab professionals, learn about opportunities, and interview for co-ops, internships, research positions, and full-time employment.

Curriculum

Chemistry (thesis option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
CHEM-670	Graduate Chemistry Writing	1
CHEM-771	Graduate Chemistry Seminar I	1
CHEM-772	Graduate Chemistry Seminar II	1
CHEM-790	Research & Thesis	5
	Graduate Chemistry Focus Courses	12
Second Year		
CHEM-773	Graduate Chemistry Seminar III	1
CHEM-774	Graduate Chemistry Seminar IV	1
CHEM-790	Research & Thesis	5
	Graduate Chemistry Focus Course	3
Total Semester Credit Hours		**30**

Chemistry (project option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
CHEM-771	Graduate Chemistry Seminar I	1
CHEM-772	Graduate Chemistry Seminar II	1
CHEM-670	Graduate Chemistry Writing	1
	Graduate Chemistry Focus Courses	12
Second Year		
CHEM-773	Graduate Chemistry Seminar III	1
CHEM-774	Graduate Chemistry Seminar IV	1
CHEM-780	Chemistry Project	1-4*
	Graduate Chemistry Focus Courses	9-12*
Total Semester Credit Hours		**30**

* Students must complete at least 1 semester credit hour (sch) of CHEM-780, but may elect to take up to 4 sch of CHEM-780 in place of one (1) Chemistry Focus Course.

Chemistry Focus Courses

COURSE		SEMESTER CREDIT HOURS
CHMA-621	Advanced Instrumental Analysis Lab	3
CHMA-650	Separations and Mass Spectroscopy in Biological Chemistry	3
CHMA-670	Advanced Concepts of Environmental Chemistry	3
CHMA-711	Advanced Instrumental Analysis	3
CHMA-725	The Magnetic Resonance Family	3
CHMA-740	Practical NMR	3
CHMA-750	NMR Spectrometer Maintenance	3
CHMB-610	Advanced Protein Biochemistry: Structure and Function	3
CHMB-702	Protein Conformation and Dynamics	3
CHMB-704	Advanced Nucleic Acids Biochemistry; Structure and Function	3
CHMI-664	Modern Inorganic Chemistry	3
CHMO-636	Spectrometric Identification of Organic Compounds	3
CHMO-637	Advanced Organic Chemistry	3
CHMO-640	Mechanisms of Drug Interactions	3
CHMO-710	Literature Exploration of Organic Synthesis	1
CHMO-739	Advanced Physical Organic Chemistry	3
CHMP-747	Principles of Magnetic Resonance	3
CHMP-751	Colloid & Interface Science	3
CHMP-752	Molecular Photophysics and Photochemistry	3
CHMP-753	Computational Chemistry	3
CHPO-706	Polymer Synthesis	3
CHPO-707	Polymer Chemistry II	3
CHPO-708	Polymer Synthesis & Characterization Lab	3
IMGS-730	Magnetic Resonance Imaging	3
MTSE-602	Polymer Science	3

Admission requirements

To be considered for admission to the MS program in chemistry, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college in chemistry. Applicants with an undergraduate degree in another scientific discipline and the equivalent of a full year of work in analytical chemistry, organic chemistry, physical chemistry, physics, and calculus will also be considered for admission.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Visit RIT

As a supplement to the normal application process, it is strongly recommended that students visit RIT.

Assistantships

Merit scholarships and teaching assistantships are available. All candidates for teaching assistantships must participate in a personal interview with the department head and/or the director of the chemistry MS program. International students can complete the interview by phone or internet.

Nonmatriculated Students

An applicant with a bachelor's degree from an approved undergraduate institution and the background necessary for specific courses is permitted to take graduate courses as a nonmatriculated student. If the student is subsequently admitted to the graduate program, courses taken for credit usually can be applied toward the master's degree. A maximum of 6 semester credit hours (from courses taken at RIT as a nonmatriculated student) may be transferred to the degree program.

Any applicant who wishes to register for a graduate course as a nonmatriculated student must obtain permission from the chair of the graduate program and the course instructor.

Materials Science and Engineering, MS

www.rit.edu/study/materials-science-and-engineering-ms
Scott Williams, Professor
585-475-3033, sawppr@rit.edu

Program overview

In the materials science master's degree you'll receive a serious interdisciplinary learning experience in materials studies, crossing over the traditional boundaries of such classical disciplines like chemistry, physics, and engineering.

The objectives of the materials science degree are threefold:

- With the advent of new classes of materials and instruments, the traditional practice of empiricism in the search for and selection of materials is rapidly becoming obsolete. Therefore, the program offers a serious interdisciplinary learning experience in materials studies, crossing over the traditional boundaries of such classical disciplines like chemistry, physics, and electrical, mechanical, and microelectronic engineering.
- The program provides extensive experimental courses in diverse areas of materials-related studies.
- The program explores avenues for introducing greater harmony between industrial expansion and academic training.

RIT's Materials Science Master's

Our materials science master's degree spans across three colleges: Science, Engineering and Sustainability. This gives you broad access that is not found in other programs that might be in a single college. In addition, the applied nature of the research and our co-op connections are unrivaled.

- Take part in extensive experimental courses in diverse areas of materials-related studies.
- Explore avenues for introducing greater harmony between industrial expansion and academic training.
- Gain the independent thinking and project management skills to grow professionally and prepare yourself for a wide range of careers.

Materials Science and Engineering Master's Courses

The materials science degree includes three required core courses, graduate electives, and either a thesis or project.

Courses: The core courses are specially designed to establish a common base of materials-oriented knowledge for students with baccalaureate degrees in chemistry, chemical engineering, electrical engineering, mechanical engineering, physics, and related disciplines.

There also is an emphasis on experimental techniques, with one required experimental course as part of the curriculum. This aspect of the masters in materials science will enhance your confidence when dealing with materials-related problems.

Electives: Elective courses may be selected from advanced courses offered by the School of Chemistry and Materials Science or, upon approval, from courses offered by other RIT graduate programs. Elective courses are scheduled on a periodic basis. Transfer credit may be awarded based on academic background beyond the bachelor's degree or by examination, based on experience.

Thesis/Project: Choose to complete a thesis or a project as the conclusion to your program. If you pursue the thesis option, you will take four graduate electives, complete nine credit hours of research, and produce a thesis paper. Alternatively, the project option includes six graduate electives and a 3 credit hour project.

Part-Time Study: The materials science degree offers courses in the late afternoon and evenings to encourage practicing scientists and engineers to pursue the program without interrupting their employment. (This may not apply to courses offered off campus at selected industrial sites.) Students employed full time are normally limited to a maximum of two courses, or 6 credit hours, each semester. If you wish to register for more than 6 credit hours, then you must obtain the permission of your advisor.

Experiential Learning

Cooperative Education

What makes an RIT science and math education exceptional? It's the ability to complete science and math co-ops and gain real-world experience that sets you apart. Co-ops in the College of Science include cooperative education and internship experiences in industry and health care settings, as well as research in an academic, industry, or national lab. These are not only possible at RIT, but are passionately encouraged.

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

National Labs Career Fair

Hosted by RIT's Office of Career Services and Cooperative Education, the National Labs Career Fair is an annual event that brings representatives to campus from the United States' federally funded research and development labs. These national labs focus on scientific discovery, clean energy development, national security, technology advancements, and more. Students are invited to attend the career fair to network with lab professionals, learn about opportunities, and interview for co-ops, internships, research positions, and full-time employment.

Curriculum

Materials Science and Engineering (thesis option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
MTSE-601	Materials Science	3
MTSE-704	Theoretical Methods in Materials Science and Engineering	3
MTSE-705	Experimental Techniques	3
MTSE-790	Research & Thesis	6
	Graduate Electives	12
Second Year		
MTSE-790	Research & Thesis	3
Total Semester Credit Hours		**30**

Materials Science and Engineering (project option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
MTSE-601	Materials Science	3
MTSE-704	Theoretical Methods in Materials Science and Engineering	3
MTSE-705	Experimental Techniques	3
MTSE-777	Graduate Project	3
	Graduate Electives	15
Second Year		
	Graduate Elective	3
Total Semester Credit Hours		**30**

Electives

COURSE	
MTSE-602	Polymer Science
MTSE-617	Material Degradation
MTSE-632	Solid State Science
MTSE-704	Theoretical Methods in Materials Science and Engineering
MTSE-780	Theory of Microsensors and Actuators
MTSE-799	Independent Study

* Additional approved electives comprise graduate courses offered by programs in the College of Science, Kate Gleason College of Engineering, College of Engineering Technology, Golisano Institute for Sustainability, School of Individualized Studies, and the Saunders College of Business. Prerequisites for all approved electives include Graduate Standing and may require permission of instructor.

Admission requirements

To be considered for admission to the MS program in materials science and engineering, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college in chemistry, physics, chemical engineering, electrical engineering, mechanical engineering, or a related field.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Candidates not meeting the general requirements may petition for admission to the program. In such cases, it may be suggested that the necessary background courses be taken at the undergraduate level. However, undergraduate credits that make up deficiencies may not be counted toward the master's degree.

Any student who wishes to study at the graduate level must first be admitted to the program. However, an applicant may be permitted to take graduate courses as a nonmatriculated student if they meet the general requirements mentioned above.

Materials Science and Engineering, Adv. Cert.

www.rit.edu/study/materials-science-and-engineering-adv-cert
Scott Williams, Professor
585-475-3033, sawppr@rit.edu

Program overview

The advanced certificate in materials science and engineering is specially designed to establish a common base of materials-oriented knowledge for students with baccalaureate degrees in chemistry, chemical engineering, electrical engineering, mechanical engineering, physics, and related disciplines. The program provides a new intellectual identity to those interested in the study of advanced materials and offers a serious interdisciplinary learning experience in materials studies, crossing over the traditional boundaries of such classical disciplines as chemistry, physics, and electrical, mechanical, and microelectronic engineering.

The advanced certificate may be completed on a full- or part-time basis. Part-time students are normally limited to a maximum of two courses, or 6 credit hours, each semester.

Students who are interested in further study may apply the credits earned in thew advanced certificate to the MS degree in materials science and engineering.

What is a Graduate Certificate?

A graduate certificate, also called an advanced certificate, is a selection of up to five graduate level courses in a particular area of study. It can serve as a stand-alone credential that provides expertise in a specific topic that enhances your professional knowledge base, or it can serve as the entry point to a master's degree. Some students complete an advanced certificate and apply those credit hours later toward a master's degree.

Curriculum

Materials Science and Engineering, advanced certificate, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
MTSE-601	Materials Science	3
MTSE-704	Theoretical Methods in Materials Science and Engineering	3
MTSE-705	Experimental Techniques	3
	Elective	9
Total Semester Credit Hours		**18**

Electives

COURSE	
MTSE-602	Polymer Science
MTSE-617	Material Degradation
MTSE-632	Solid State Science
MTSE-780	Theory of Microsensors and Actuators
MTSE-799	Independent Study

* Additional approved electives comprise graduate courses offered by programs in the College of Science, Kate Gleason College of Engineering, College of Engineering Technology, Golisano Institute for Sustainability, School of Individualized Studies, and the Saunders College of Business. Prerequisites for all approved electives include Graduate Standing and may require permission of instructor.

Admission requirements

To be considered for admission to the advanced certificate in materials science, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college in chemistry, physics, chemical engineering, electrical engineering, mechanical engineering, or a related field.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Candidates not meeting the general requirements may petition for admission to the program. In such cases, it may be suggested that the necessary background courses be taken at the undergraduate level. However, undergraduate credits that make up deficiencies may not be counted toward the advanced certificate.

Any student who wishes to study at the graduate level must first be admitted to the program. However, an applicant may be permitted to take graduate courses as a nonmatriculated student if they meet the general requirements mentioned above.

Integrated Sciences Academy

Color Science, MS

www.rit.edu/study/color-science-ms
Susan Farnand, Assistant Professor
585-475-4567, susan.farnand@rit.edu

Program overview

At the only university in the nation offering this program of study, you will be exposed to the rich, dynamic field of color science through theory and practical application.

The study of color is a fundamental field of science that is dedicated to understanding the creation of colored stimuli, sources of illumination, and ultimately the human perception of color.

RIT's color science degree provides a graduate-level study in both scientific theory and practical application. The program provides you with a broad exposure to the field of color science and affords them the unique opportunity of specializing in an area appropriate for their background and interest. This objective is accomplished through the program's core courses, selection of electives, and completion of a thesis or graduate project.

RIT's Color Science Degree

The color science degree is designed for students from a wide range of undergraduate degrees. If you completed a program in physics, biology, chemistry, mathematics, computer science, engineering, neuroscience, experimental psychology, imaging, or any applied discipline pertaining to the quantitative description of color, this program could be a good fit for you

Color science is used everyday: in the design and control of most man-made colored materials including textiles, coatings, and polymers; to specify such diverse materials as soil and wine; and, in digital photography, desktop and projection display, and printing.

Where other programs may address just optics or just materials, just lighting or just perception; here you'll learn the full range of color science. This includes the fundamental concepts of color science and its applications, as well as how to do research in the field and present it successfully.

RIT Color Science students work on projects including:

- Color Perception in Assisted Reality/Virtual Reality
- Color in Agriculture
- Color Imaging (Cameras and Displays, e.g. smartphones)
- Individual Differences in Human Color Perception
- Limits of Human Color Vision

Study color at the world-renowned Munsell Color Science Laboratory, only offered here at RIT.

The Study of Color

The color science degree is a combination of required courses in color science, elective courses appropriate for the candidate's background, and either a research thesis or graduate project.

For full-time students, the program requires three to four semesters of study. Part-time students generally require two to four years of study.

The color science program is designed for students with an undergraduate degree in a scientific or another technical discipline. Those with adequate undergraduate work in related sciences start the program as matriculated graduate students.

Students without adequate undergraduate work in related sciences must take foundation courses prior to matriculation into the graduate program. A written agreement between the candidate and the program coordinator will identify the required foundation courses.

Color Science Careers

Alumni of our programs are in high demand and uniquely qualified to address the full breadth of color science in multidisciplinary teams. Color science degree graduates have accepted positions in electronic imaging, color instrumentation, colorant formulation, and basic and applied research. A sample of companies that have hired our graduates include Apple, Dolby Laboratories, Google, Benjamin Moore, Canon Corp., Hallmark, Hewlett Packard Corp., Microsoft Corp., Pantone, Qualcomm Inc., Ricoh Innovations Inc., LG Electronics, and Samsung.

Experiential Learning

Cooperative Education

What makes an RIT science and math education exceptional? It's the ability to complete science and math co-ops and gain real-world experience that sets you apart. Co-ops in the College of Science include cooperative education and internship experiences in industry and health care settings, as well as research in an academic, industry, or national lab. These are not only possible at RIT, but are passionately encouraged.

At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

National Labs Career Fair

Hosted by RIT's Office of Career Services and Cooperative Education, the National Labs Career Fair is an annual event that brings representatives to campus from the United States' federally funded research and development labs. These national labs focus on scientific discovery, clean energy development, national security, technology advancements, and more. Students are invited to attend the career fair to network with lab professionals, learn about opportunities, and interview for co-ops, internships, research positions, and full-time employment.

Curriculum

Color Science, MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
CLRS-601	Principles of Color Science	3
CLRS-602	Color Physics and Applications	3
CLRS-720	Computational Vision Science	3
CLRS-750	Historical Research Perspectives	1
CLRS-751	Research and Publication Methods	2
CLRS-820	Modeling Visual Perception	3
	Graduate Electives	6
Second Year		
CLRS-890	Research & Thesis	6
	Elective	3
Total Semester Credit Hours		**30**

Admission requirements

To be considered for admission to the MS program in color science, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Scholarships and Assistantships

Currently, assistantships are only available for qualified color science applicants to the doctoral program. Students seeking RIT-funded scholarships and assistantships should consider apply to the doctoral program, which is identical to the MS program in the first two years. Partial tuition scholarships are available for the MS program. Applicants seeking financial assistance from RIT should contact the Office of Graduate and Part-time Enrollment for current application materials and deadlines.

Color Science, Ph.D.

www.rit.edu/study/color-science-phd
Susan Farnand, Assistant Professor
585-475-4567, susan.farnand@rit.edu

Program overview

Color has been an intense topic of interest for thousands of years. Mathematicians, philosophers, physicists, physiologists, poets, and other disciplines have all contributed to our understanding of color. RIT's color science Ph.D. program allows you to contribute to knowledge creation and practical application of color science. You will conduct extensive research that encompasses diverse fields and multiple disciplines of science.

As a generalization, color science can be defined as the quantification of our perception of color. Its mastery requires a multidisciplinary educational approach encompassing physics, chemistry, physiology, statistics, computer science, neuroscience, and psychology. Color science is used in the design and control of most man-made colored materials including textiles, coatings, and polymers and to specify such diverse materials as soil and wine. It is used extensively in color reproduction including digital photography, desktop and projection display, and printing. Color science is ubiquitous.

The program is designed for students whose undergraduate degrees are in physics, biology, chemistry, mathematics, computer science, engineering, neuroscience, experimental psychology, imaging, or any applied discipline pertaining to the quantitative description of color, for example, textiles, graphic arts, animation, material science, and polymer science. All students must earn 60 credit hours as a graduate student. For full-time students, entering with a baccalaureate degree, the program requires about four years of study at the graduate level.

Plan of Study

The curriculum is a combination of required courses in color science, elective courses appropriate for the candidate's background and interests, a research project during the second year of study, and a research dissertation. Students must pass a qualifying examination during their second year of study and a candidacy examination at least one year prior to completing their dissertation. Candidates who wish to enter the program, but lack adequate preparation, might be required to complete undergraduate foundation courses in mathematics, statistics, computer science, and general science before matriculating with graduate status.

Core courses
The following core courses are completed during the first year of study: Principles of Color Science (CLRS-601), Computational Vision Science (CLRS-720), Color Physics and Applications (CLRS-602), Modeling Visual Perception (CLRS-820), Historical Research Perspectives (CLRS-750), and Research and Publication Methods (CLRS-751).

Electives
Elective courses are selected depending on the student's interests and background. The program director must approve all electives.

Second year project
During the second year, students engage in graduate-level research under the supervision of a graduate program faculty member. The topic may or may not be the same as the dissertation topic. One of the purposes of this project is to evaluate the student's research capabilities and suitability for doctorate-level research.

Years three and beyond
After completing the required courses, students follow their study plan which consists of research and thesis credits and elective courses.

Qualifying examination
All students must pass a qualifying examination, which determines whether the student has a sufficient depth of knowledge in color science and the ability to perform research at the doctoral level.

The qualifying exam consists of a written test and an evaluation of the second-year research project. The written test is given twice each year and is based on the core curriculum in color science and any material deemed appropriate by the committee. Note that the required readings for these courses include textbooks and current literature. An evaluation of the second-year research project includes depth of research, productivity, quality, analytical skills, and the ability to communicate results. A written document is submitted in the style of a published proceedings paper.

Students must successfully pass the qualifying examination to continue in the program. Those who do not pass the qualifying examination may make a written request to the color science program director to change to the MS program. Requests must be received before the end of the semester in which the second written test is taken. Students with permission to enter the MS program will use their second year research project as an MS research thesis topic. A written thesis is required. Students can then graduate with an MS in color science.

Dissertation research advisor and committee
After students pass the qualifying examination, a dissertation research adviser is selected from the graduate program faculty based on the student's research interests, faculty research interests, and discussions with the color science graduate coordinator. A four-member dissertation committee is appointed for the duration of the student's tenure in the program. The committee includes the dissertation research advisor, one other member of the color science faculty, and an external chair appointed by the dean of graduate education. The external chair must be a tenured member of the RIT faculty who is not a current member of the color science faculty. The fourth member may be an RIT faculty member or a professional affiliated with industry or another institution. The color science graduate program director must approve committee members who are not RIT faculty.

The dissertation committee prepares and administers the examination for admission to candidacy; assists in planning and coordinating research; provides research advice; supervises the writing of the dissertation; and conducts the final examination of the dissertation.

Developing a study plan
During the first semester of study, students work with the color science graduate program director to develop a study plan. This plan may be revised as necessary, subject to approval by the graduate program director. For example, the dissertation research adviser or the dissertation committee might recommend a revised study plan to include specific graduate electives.

Admission to candidacy
When the student thoroughly understands the dissertation research topic, the dissertation committee administers an examination to determine if the student can be admitted to candidacy for the doctoral degree in color science. The purpose of the examination is to ensure the student has the necessary intellectual skills and background knowledge to carry out their specific doctoral-level research project. The dissertation research adviser defines the type of examination and any requirements prior to the examination. Requirements include a dissertation proposal and may additionally include a review of literature, preliminary experiments, and the preparation of an oral presentation. The examination must be administered no later than one year prior to defending the dissertation.

Final examination of dissertation
Once the dissertation has been written, distributed to the dissertation committee, and the committee agrees to administer the final examination, the doctoral candidate can schedule the final examination.

The final examination of the dissertation is open to the public and is primarily a defense of the dissertation research. The examination consists of an oral presentation by the student, followed by questions from the audience. The dissertation committee may also elect to privately question the candidate following the presentation. The dissertation committee immediately notifies the candidate and the color science graduate program director of the result of the examination.

Teaching experience
All candidates for the Ph.D. must serve as a teaching assistant for a minimum of one course before scheduling the final examination of the dissertation. Candidates are encouraged to serve as a teaching assistant for two or more courses.

Public presentation experience
All candidates for the Ph.D. must present research in a public forum before scheduling the final examination of the dissertation. The preferred public forum is a technical conference.

Publication requirement
Prior to scheduling the Ph.D. dissertation defense (final examination), all candidates for the Ph.D. must have at least two refereed journal publications on the dissertation research accepted for publication (or published). The student must be a principal (not always first) author on both papers.

Color science MS graduates
Graduates from the color science master's degree program, who are interested in the doctoral program, should contact the color science graduate program director to discuss their suitability for doctoral-level research. Before matriculating into the program, students must pass the qualifying examination. Once the examination has been passed successfully, students can be admitted into the doctoral program. The doctoral degree can be completed on a full- or part-time basis as long as the residency requirements are met.

MS and MA graduates from related disciplines
Because of the interdisciplinary nature of color science, students with MS and MA degrees often apply to the Ph.D. program. Graduate courses in related disciplines can be used as elective courses toward the degree. Furthermore, for degrees that required a research thesis, the second year research project might be waived. Thus, it might be possible for students with graduate degrees in a related discipline to take the qualifying examination during their first year of study. The color science graduate program director determines the specific courses and credit hours that can be applied toward the Ph.D. in color science.

Residency
All students in the program must spend at least two consecutive semesters (summer may be excluded) as resident full-time students to be eligible to receive the Ph.D.

Time limitations
All candidates for the Ph.D. must maintain continuous enrollment during the research phase of the program. The maximum number of research credits that apply to the degree does not limit such enrollment. Normally, full-time students complete the course of study for the doctorate in approximately four years. Requirements for the degree must be completed within seven years of the date students pass the qualifying examination.

National Labs Career Fair
Hosted by RIT's Office of Career Services and Cooperative Education, the National Labs Career Fair is an annual event that brings representatives to campus from the United States' federally funded research and development labs. These national labs focus on scientific discovery, clean energy development, national security, technology advancements, and more. Students are invited to attend the career fair to network with lab professionals, learn about opportunities, and interview for co-ops, internships, research positions, and full-time employment.

Curriculum

Color Science, Ph.D. degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
CLRS-601	Principles of Color Science	3
CLRS-602	Color Physics and Applications	3
CLRS-720	Computational Vision Science	3
CLRS-750	Historical Research Perspectives	1
CLRS-751	Research and Publication Methods	2
CLRS-820	Modeling Visual Perception	3
	Graduate Electives	6
Second Year		
CLRS-890	Research & Thesis (and/or Electives)	18
Third Year		
CLRS-890	Research & Thesis (and/or Electives)	12
Fourth Year		
CLRS-890	Research & Thesis (and/or Electives)	9
Total Semester Credit Hours		**60**

Admission requirements

To be considered for admission to the Ph.D. program in color science, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Candidates without adequate undergraduate work in related sciences must take foundation courses prior to matriculation into the graduate program. A written agreement between the candidate and the program director will identify the required foundation courses. Foundation courses must be completed with an overall B average before a student can matriculate into the graduate program.

The foundation courses, representative of those often required, are as follows: one year of calculus, one year of college physics (with laboratory), one course in computer programming, one course in matrix algebra, one course in statistics, and one course in introductory psychology. Other science courses (with laboratory) might be substituted for physics.

Assistantships
Students receiving fully funded assistantships tend to have minimum undergraduate cumulative grade point averages of 3.5 and exceptional GRE scores. International applicants who must submit TOEFL scores, must have scores above 100 (internet-based). Students who submit IELTS scores must have a minimum score of 7.0. Applicants seeking financial assistance should contact the Office of Graduate and Part-time Enrollment for current application materials and deadlines.

Chester F. Carlson Center for Imaging Science

Imaging Science, MS

www.rit.edu/study/imaging-science-ms
Charles Bachmann, Associate Professor
585-475-7238, cmbpci@rit.edu

Program overview
As digital image use continues to expand there is an increasing demand to fill dynamic imaging science careers. RIT's imaging science MS provides the training and research opportunities needed to excel in industries like computer vision, astronomical imaging, satellite-based imaging systems and applications, virtual and augmented reality, and the use of UAVs (drones) in precision agriculture.

Master's in Imaging Science at RIT
Housed within the Chester F. Carlson Center for Imaging Science, RIT's master's in imaging science is geared toward advancing and broadening the skills of professionals working and researching in the many industries where various imaging modalities are used to research and solve problems in engineering and science. This emerging field integrates engineering, math, physics, computer science, and psychology to understand and develop imaging systems and technology.

Students choose two courses from a variety of tracks such as: digital image processing, computer vision, electro-optical imaging systems, remote sensing, color imaging, optics, hard copy materials and processes, and nanoimaging. Tracks may be created for students interested in pursuing additional fields of study.

Research Thesis Option
The research thesis is based on experimental evidence obtained by the student in an appropriate field, as arranged between the student and their adviser. The minimum number of thesis credits required is four and may be fulfilled by experiments in the university's laboratories. In some cases, the requirement may be fulfilled by work done in other laboratories or the student's place of employment, under the following conditions:

1. The results must be fully publishable.
2. The student's advisor must be approved by the graduate program coordinator.
3. The thesis must be based on independent, original work, as it would be if the work were done in the university's laboratories.

Faculty within the Chester F. Carlson Center for Imaging Science supervise thesis research in areas of the physical properties of radiation-sensitive materials and processes, digital image processing, remote sensing, nanoimaging, electro-optical instrumentation, vision, computer vision, color imaging systems, and astronomical imaging. Interdisciplinary efforts are possible with the Kate Gleason College of Engineering and the College of Science.

Graduate Paper/Project Option
Students with demonstrated practical or research experience, approved by the graduate program coordinator, may choose the graduate project option (3 credit hours). This option takes the form of a systems project course. The graduate paper is normally performed during the final semester of study. Both part- and full-time students may choose this option, with the approval of the graduate program coordinator.

MS in Imaging Science Careers

Our master's in imaging science students are in high demand across many government and industrial sectors including the mobile phone industry, consumer electronics, aerospace, precision agriculture and remote sensing, national defense, and a wide array of other application areas. Many of our students work in industry on internships during their graduate career at RIT, further expanding their education. Recent students have been hired as either interns or in permanent positions by companies such as Apple, Google, Motorola, Lockheed Martin, L3Harris, Corning, Los Alamos National Laboratory, MITRE Corporation, and many others.

Experiential Learning

Cooperative Education

What makes an RIT science and math education exceptional? It's the ability to complete science and math co-ops and gain real-world experience that sets you apart. Co-ops in the College of Science include cooperative education and internship experiences in industry and health care settings, as well as research in an academic, industry, or national lab. These are not only possible at RIT, but are passionately encouraged.

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires..

National Labs Career Fair

Hosted by RIT's Office of Career Services and Cooperative Education, the National Labs Career Fair is an annual event that brings representatives to campus from the United States' federally funded research and development labs. These national labs focus on scientific discovery, clean energy development, national security, technology advancements, and more. Students are invited to attend the career fair to network with lab professionals, learn about opportunities, and interview for co-ops, internships, research positions, and full-time employment.

Curriculum

Imaging Science (thesis option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
IMGS-606	Graduate Seminar I	1
IMGS-607	Graduate Seminar II	1
IMGS-616	Fourier Methods for Imaging	3
Choose two of the following:		6
IMGS-619	Radiometry	
IMGS-620	The Human Visual System	
	IMGS Elective	
Choose three of the following:		9
IMGS-613	Probability, Noise, and System Modeling	
IMGS-633	Optics for Imaging	
IMGS-682	Image Processing and Computer Vision	
	IMGS Elective	
Second Year		
IMGS-790	Research & Thesis	4
	IMGS Specialty Track Course	3
Choose one of the following:		3
IMGS-790	Research & Thesis	
	IMGS Elective	
Total Semester Credit Hours		**30**

Imaging Science (project option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
IMGS-616	Fourier Methods for Imaging	3
Choose two of the following:		6
IMGS-619	Radiometry	
IMGS-620	The Human Visual System	
	IMGS Elective	
Choose three of the following:		9
IMGS-613	Probability, Noise, and System Modeling	
IMGS-633	Optics for Imaging	
IMGS-682	Image Processing and Computer Vision	
	IMGS Elective	
Second Year		
IMGS-740	Imaging Science MS Systems Project Paper	3
	IMGS Specialty Track Course	3
	IMGS Electives	6
Total Semester Credit Hours		**30**

Electives

COURSE		SEMESTER CREDIT HOURS
ASTP-613	Astronomical Observational Techniques and Instrumentation	3
CLRS-601	Principles of Color Science	3
CLRS-602	Color Physics and Applications	3
CLRS-720	Computational Vision Science	3
CLRS-820	Modeling Visual Perception	3
CSCI-603	Computational Problem Solving	3
CSCI-630	Foundations of Artificial Intelligence	3
CSCI-631	Foundations of Computer Vision	3
CSCI-737	Pattern Recognition	3
EEEE-780	Digital Video Processing	3
ENVS-650	Hydrologic Applications of Geographic Information Systems	4
IMGS-606	Graduate Seminar I	1
IMGS-607	Graduate Seminar II	1
IMGS-609	Graduate Laboratory I	2
IMGS-613	Probability, Noise, and System Modeling	3
IMGS-616	Fourier Methods for Imaging	3
IMGS-619	Radiometry	3
IMGS-620	The Human Visual System	3
IMGS-622	Vision Sciences Seminar	1
IMGS-624	Interactive Virtual Env	3
IMGS-628	Design and Fabrication of Solid State Cameras	3
IMGS-632	Advanced Environmental Applications of Remote Sensing	3
IMGS-633	Optics for Imaging	3
IMGS-635	Optical System Design and Analysis	3
IMGS-639	Principles of Solid State Imaging Arrays	3
IMGS-640	Remote Sensing Systems and Image Analysis	3
IMGS-642	Testing of Focal Plane Arrays	3
IMGS-682	Image Processing and Computer Vision	3
IMGS-684	Deep Learning for Vision	3
IMGS-699	Imaging Science Graduate Co-op	0
IMGS-712	Multi-view Imaging	3
IMGS-719	Radiative Transfer I	3
IMGS-720	Radiative Transfer II	3
IMGS-723	Remote Sensing: Spectral Image Analysis	3
IMGS-724	Introduction to Electron Microscopy	3
IMGS-730	Magnetic Resonance Imaging	3
IMGS-740	Imaging Science MS Systems Project Paper	3
IMGS-765	Performance Modeling and Characterization of Remote Sensing System	3
IMGS-766	Geometric Optics and Lens Design	3
IMGS-789	Graduate Special Topics: Robot Vision	1-3
IMGS-790	Research & Thesis	1-6
IMGS-799	Imaging Science Independent Study	1-4
IMGS-830	Advanced Topics in Remote Sensing	3
IMGS-890	Research & Thesis	1-6
MATH-605	Stochastic Processes	3
MATH-645	Graph Theory	3
MATH-711	Advanced Methods in Scientific Computing	3
MCSE-712	Nonlinear Optics	3
MCSE-713	Lasers	3
MCSE-731	Integrated Optical Devices & Systems	3
STAT-641	Applied Linear Models - Regression	3
STAT-758	Multivariate Statistics for Imaging Science	3

Admission requirements

To be considered for admission to the MS in imaging science, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- Have completed courses in mathematics (through calculus and including differential equations), and a full year of calculus-based physics (including modern physics). It is assumed that students can write a common computer program.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Applicants seeking financial assistance from the center must have all application documents submitted to the Office of Graduate and Part-time Enrollment Services by January 15 for the next academic year.

Bridge courses

Applicants who lack adequate preparation may be required to complete bridge courses in mathematics or physics before matriculating with graduate status.

Imaging Science, Ph.D.

www.rit.edu/study/imaging-science-phd
Charles Bachmann, Associate Professor
585-475-7238, cmbpci@rit.edu

Program overview

The Ph.D. in imaging science signifies high achievement in scholarship and independent investigation in the diverse aspects of imaging science. Students contribute their fundamental body of knowledge in science and engineering that is associated with this field of study. As an imaging Ph.D. candidate, you'll acquire the capabilities, skills, and experience to continue to expand the limits of the discipline and meet future scholarly, industrial, and government demands on the field.

Candidates for the doctoral degree must demonstrate proficiency by:

- Successfully completing course work, including a core curriculum, as defined by the student's plan of study;
- Passing a series of examinations; and
- Completing an acceptable dissertation under the supervision of the student's research advisor and dissertation committee.

Plan of Study

All students must complete a minimum of 60 credit hours of course work and research. The core curriculum spans and integrates a common body of knowledge essential to an understanding of imaging processes and applications. Courses are defined by the student's study plan and must include core course sequences plus a sequence in a topical area such as remote sensing, digital image processing, color imaging, digital graphics, electro-optical imaging systems, and microlithographic imaging technologies.

Students may take a limited number of credit hours in other departments and must complete research credits including two credits of research associated with the research seminar course, Graduate Seminar.

Graduate elective courses offered by the Chester F. Carlson Center for Imaging Science (and other RIT academic departments in fields closely allied with imaging science) allow students to concentrate their studies in a range of imaging science research and imaging application areas, including electro-optical imaging, digital image processing, color science, perception and vision, electrophotography, lithography, remote sensing, medical imaging, electronic printing, and machine vision.

Advancement to Candidacy

Advancement to candidacy occurs through the following steps:

- Advisor selection
- Submission and approval of a preliminary study plan
- Passing a written qualifying exam
- Study plan revision based on the outcome of qualifying exam and adviser recommendation
- Research committee appointment
- Candidacy exam based on thesis proposal

Following the qualifying exam, faculty decide whether a student continues in the doctoral program or if the pursuit of an MS degree or other program option is more acceptable. For students who continue in the doctoral program, the student's plan of study will be revised, a research committee is appointed, candidacy/proposal exams are scheduled, and, finally, a dissertation defense is presented.

Research Committee

Prior to the candidacy exam, the student, in consultation with an advisor, must present a request to the graduate program coordinator for the appointment of a research committee. The committee is composed of at least four people: an advisor, at least one faculty member who is tenured

(or tenure-track) and whose primary affiliation is the Carlson Center for Imaging Science (excluding research faculty), a person competent in the field of research who is an RIT faculty member or affiliated with industry or another university and has a doctorate degree, and the external chair. The external chair must be a tenured member of the RIT faculty who is not a faculty member of the center and who is appointed by the dean of graduate education. The committee supervises the student's research, beginning with a review of the research proposal and concluding with the dissertation defense.

Research Proposal

The student and their research advisor select a research topic for the dissertation. Proposed research must be original and publishable. Although the topic may deal with any aspect of imaging, research is usually concentrated in an area of current interest within the center. The research proposal is presented to the student's research committee during the candidacy exam at least six months prior to the dissertation defense.

Final Examination of the Dissertation

The research advisor, on behalf of the student and the student's research committee, must notify the graduate program coordinator of the scheduling of the final examination of the dissertation by forwarding to the graduate program coordinator the title and abstract of the dissertation and the scheduled date, time, and location of the examination. The final examination of the dissertation may not be scheduled within six months of the date on which the student passed the candidacy exam (at which the thesis proposal was presented and approved).

Barring exceptional circumstances (requiring permission from the graduate program coordinator), the examination may not be scheduled sooner than four weeks after formal announcement (i.e. center-wide hallway postings and email broadcast) has been made of the dissertation title and abstract and the defense date, time, and location.

The final examination of the dissertation is open to the public and is primarily a defense of the dissertation research. The examination consists of an oral presentation by the student, followed by questions from the audience. The research committee may also elect to privately question the candidate following the presentation. The research committee will immediately notify the candidate and the graduate program coordinator of the examination result.'

Residency

All students in the program must spend at least two consecutive semesters (summer excluded) as resident full-time students to be eligible to receive the doctoral degree. If circumstances warrant, the residency requirement may be waived via petition to the graduate program coordinator, who will decide on the student's petition in consultation with the advisor and graduate faculty. The request must be submitted at least nine months prior to the thesis defense.

Maximum Time Limit

University policy requires that doctoral programs be completed within seven years of the date of the student passing the qualifying exam. Bridge courses are excluded.

All candidates must maintain continuous enrollment during the research phase of the program. Such enrollment is not limited by the maximum number of research credits that apply to the degree. Normally, full-time students complete the course of study for the doctorate in approximately three to five years. A total of seven years is allowed to complete the degree after passing the qualifying exam.

National Labs Career Fair

Hosted by RIT's Office of Career Services and Cooperative Education, the National Labs Career Fair is an annual event that brings representatives to campus from the United States' federally funded research and development labs. These national labs focus on scientific discovery, clean energy development, national security, technology advancements, and more. Students are invited to attend the career fair to network with lab professionals, learn about opportunities, and interview for co-ops, internships, research positions, and full-time employment.

Curriculum

Imaging Science, Ph.D. degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
IMGS-606	Graduate Seminar I	1
IMGS-607	Graduate Seminar II	1
IMGS-609	Graduate Laboratory I	2
IMGS-613	Probability, Noise, and Systems Modeling	3
IMGS-616	Fourier Methods for Imaging	3
IMGS-619	Radiometry	3
IMGS-620	The Human Visual System	3
IMGS-633	Optics for Imaging	3
IMGS-682	Image Processing and Computer Vision	3
	IMGS Elective (optional)*	3
Second Year		
IMGS-890	Research & Thesis	1
	IMGS Electives	12
Third Year		
IMGS-890	Research & Thesis	10
Fourth Year		
IMGS-890	Research & Thesis	10
Fifth Year		
IMGS-890	Research & Thesis	2 or 5*
Total Semester Credit Hours		**60**

* Students opting to take the optional Elective in the first year would take 2 units of IMGS-PHD in the final year. Students opting not to take the optional elective would take 5 units of IMGS-PHD in the final year.

Electives

COURSE		SEMESTER CREDIT HOURS
ASTP-613	Astronomical Observational Techniques and Instrumentation	3
CLRS-601	Principles of Color Science	3
CLRS-602	Color Physics and Applications	3
CLRS-720	Computational Vision Science	3
CLRS-820	Modeling Visual Perception	3
CSCI-603	Computational Problem Solving	3
CSCI-630	Foundations of Artificial Intelligence	3
CSCI-631	Foundations of Computer Vision	3
CSCI-737	Pattern Recognition	3
EEEE-780	Digital Video Processing	3
ENVS-650	Hydrologic Applications of Geographic Information Systems	4
IMGS-606	Graduate Seminar I	1
IMGS-607	Graduate Seminar II	1
IMGS-609	Graduate Laboratory I	2
IMGS-613	Probability, Noise, and System Modeling	3
IMGS-616	Fourier Methods for Imaging	3
IMGS-619	Radiometry	3
IMGS-620	The Human Visual System	3
IMGS-622	Vision Sciences Seminar	1
IMGS-624	Interactive Virtual Env	3
IMGS-628	Design and Fabrication of Solid State Cameras	3
IMGS-632	Advanced Environmental Applications of Remote Sensing	3
IMGS-633	Optics for Imaging	3
IMGS-635	Optical System Design and Analysis	3
IMGS-639	Principles of Solid State Imaging Arrays	3
IMGS-640	Remote Sensing Systems and Image Analysis	3
IMGS-642	Testing of Focal Plane Arrays	3
IMGS-682	Image Processing and Computer Vision	3
IMGS-684	Deep Learning for Vision	3
IMGS-699	Imaging Science Graduate Co-op	0
IMGS-712	Multi-view Imaging	3
IMGS-719	Radiative Transfer I	3
IMGS-720	Radiative Transfer II	3
IMGS-723	Remote Sensing: Spectral Image Analysis	3
IMGS-724	Introduction to Electron Microscopy	3
IMGS-730	Magnetic Resonance Imaging	3
IMGS-740	Imaging Science MS Systems Project Paper	3
IMGS-765	Performance Modeling and Characterization of Remote Sensing System	3
IMGS-766	Geometric Optics and Lens Design	3
IMGS-789	Graduate Special Topics: Robot Vision	1-3
IMGS-790	Research & Thesis	1-6
IMGS-799	Imaging Science Independent Study	1-4
IMGS-830	Advanced Topics in Remote Sensing	3
IMGS-890	Research & Thesis	1-6
MATH-605	Stochastic Processes	3
MATH-645	Graph Theory	3
MATH-711	Advanced Methods in Scientific Computing	3
MCSE-712	Nonlinear Optics	3
MCSE-713	Lasers	3
MCSE-731	Integrated Optical Devices & Systems	3
STAT-641	Applied Linear Models - Regression	3
STAT-758	Multivariate Statistics for Imaging Science	3

Admission requirements

To be considered for admission to the Ph.D. program in imaging science, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college in engineering, computer science, applied mathematics, or one of the natural sciences.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- Have completed courses in calculus, university physics (one year), modern physics, and a computer language.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Imaging science encompasses a wide variety of scientific disciplines. Exceptional candidates from other fields and with diverse backgrounds are accepted into the program.

Admission decisions are made by a committee comprised of graduate faculty of the Center for Imaging Science.

Students with an MS degree in a related field may be granted credit toward the doctoral degree after successful completion of the qualifying examination and approval of their study plan. (Students should consult their academic adviser for more information.) The required research credits may not be waived by experience or examination.

Financial aid, scholarships, and assistantships

Graduate assistantships and tuition remission scholarships are available to qualified students. Applicants seeking financial assistance from the center should contact the Office of Graduate and Part-time Enrollment for current application materials and deadlines. Students whose native language is not English are advised to obtain as high a TOEFL or IELTS score as possible if they wish to apply for a teaching or research assistantship. These candidates also are encouraged to take the Test of Spoken English in order to be considered for financial assistance.

Thomas H. Gosnell School of Life Sciences

Bioinformatics, MS

www.rit.edu/study/bioinformatics-ms
Michael Osier, Associate Professor
585-475-4392, mvoscl@rit.edu

Program overview

RIT's bioinformatics master's degree combines biotechnology, computer programming, and computational mathematics to prepare you to utilize and create technologies that discover, treat, and cure a range of medical illnesses. With a strong foundation in biotechnology, computer programming, computational mathematics, statistics, and database management, you will be well-prepared for academia and careers in the biotechnology, bioinformatics, pharmaceutical, and vaccine industries.

RIT's Bioinformatics Master's Degree

Bioinformatics is a field that has been developing over the last thirty years. It is a discipline that represents a marriage between biotechnology and computer technologies and has evolved through the convergence of advances in each of these fields. Today bioinformatics is a field that encompasses all aspects of the application of computer technologies to biological data. Computers are used to organize, link, analyze, and visualize complex sets of biological data to discover, treat, and cure a range of medical illnesses.

RIT's bioinformatics master's degree is focused on cutting-edge computational techniques, such as data mining, to understand biomedical data. In laboratory exercises and assignments, you will learn to sequence DNA and use computer programs to analyze DNA sequences and predict molecular models. You are also encouraged to pursue cooperative education opportunities to gain hands-on career experience in industry.

Current bioinformatics students have worked on projects including:

- Database development
- Cancer vaccine design
- Literature mining
- Molecular dynamics simulation

The program provides you with the capability to enter the bioinformatics workforce and become a leader in the field. The curriculum is designed to fulfill the needs of students with diverse educational and professional backgrounds. Individuals entering the program typically have degrees in biology, biotechnology, chemistry, statistics, computer science, information technology, or a related field. To prepare applicants from various backgrounds, the curriculum includes a comprehensive bridge program that includes courses in biology, mathematics, computer science, statistics, or other related fields. The program offers two tracks, one for students with backgrounds in the life sciences and one for those with backgrounds in the computational sciences.

Careers in Bioinformatics

With the advent of high-throughput technologies such as Next Generation Sequencing and proteomics, bioinformatics has become essential to the biological sciences in general. In the past, laboratories were able to manage and analyze their experimental data in spreadsheets. Many research labs now require the expertise of dedicated bioinformatics core centers or their own in-house bioinformaticists.

Graduates of the bioinformatics master's program have entered such laboratories, both in industry and academia, as bioinformaticists. Some have also gone on to leverage their biotechnology experiences as wet lab experimentalists. The diversity of skills you will cultivate in the program give you access to a wide range of career choices.

The job market is rich with opportunities for those with graduate degree in bioinformatics, particularly when coupled with research as thesis work. This research provides exposure to real-world problems—and their solutions—not otherwise attainable in an academic setting.

Graduates of the bioinformatics master's degree currently work senior analysts/programmers, associate systems analysts, bioinformaticist, bioinformatics analysts, bioinformatics engineers, computational biologists, and software engineers.

Experiential Learning

Cooperative Education

What makes an RIT science and math education exceptional? It's the ability to complete science and math co-ops and gain real-world experience that sets you apart. Co-ops in the College of Science include cooperative education and internship experiences in industry and health care settings, as well as research in an academic, industry, or national lab. These are not only possible at RIT, but are passionately encouraged.

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

National Labs Career Fair

Hosted by RIT's Office of Career Services and Cooperative Education, the National Labs Career Fair is an annual event that brings representatives to campus from the United States' federally funded research and development labs. These national labs focus on scientific discovery, clean energy development, national security, technology advancements, and more. Students are invited to attend the career fair to network with lab professionals, learn about opportunities, and interview for co-ops, internships, research positions, and full-time employment.

Curriculum

Bioinformatics, MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
BIOL-625	Ethics in Bioinformatics	3
BIOL-630	Bioinformatics Algorithms	3
BIOL-635	Bioinformatics Seminar	3
BIOL-671	Database Management for the Sciences	3
BIOL-672	Computational Statistics and Data Science Methods	3
BIOL-694	Molecular Modeling and Proteomics	3
BIOL-790	Research and Thesis	2
	Graduate Electives*	6
Second Year		
BIOL-790	Research and Thesis	4
Total Semester Credit Hours		**30**

* Any graduate-level course deemed related to the field of Bioinformatics by the Program Director.

Admission requirements

To be considered for admission to the MS program in bioinformatics, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college in biology, biotechnology, biochemistry, chemistry, computer science, information technology, statistics, or a related discipline.
- Recommended minimum cumulative GPA of 3.2 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Environmental Science, MS

www.rit.edu/study/environmental-science-ms
Carmody McCalley, Assistant Professor
585-475-6258, ckmsbi@rit.edu

Program overview

Habitat loss, global climate change, water and air pollution, ozone depletion, species invasions, loss of biodiversity, and the accumulation of toxic wastes are among the many environmental dilemmas our society faces each day. These complex problems pit environmental limits against economic development, diverse cultures, ethics, values, and social stability, and therefore require an understanding of science, policy, society, history, and economics in order to address problems realistically and effectively. Environmental scientists must use integrated and holistic approaches to understand these issues in order to identify sustainable solutions to environmental challenges.

RIT's Environmental Science Master's Degree

RIT's environmental science master's degree provides you with a deep understanding of the science behind our environmental problems, the complex set of circumstances that impact environmental issues, and how environmental decisions and policies must attempt to find a balance between environmental conservation, human well-being, and economic development. You will amplify your hands-on classroom work with an in-depth thesis or project that provides you with an opportunity to work on real-world environmental problems under the guidance of skilled environmental scientists.

The practice of environmental science demands that you become a well-rounded specialists. To accomplish this, you will complete a concentration in one of the following areas:

- Chemistry
- Ecology and field biology
- Economics
- Environmental microbiology/molecular biology
- Geographic Information Systems (GIS)
- Organismal biology and evolution
- Public policy
- Remote sensing
- Statistics

You also may develop a self-designed concentration in an area of personal interest, subject to approval from an environmental science review committee.

Students in the environmental science master's degree are working on a variety of projects:

- Conducting research in aquatic ecology studying the effects of pollution (microplastics, pharmaceuticals) and exploring remediation possibilities
- Exploring methane production in wetlands as part of global warming issues and climate change
- Looking at various methods to treat industrial wastewater, such as food processing wastewater streams from eggs, yogurt, and cheese, to reduce potential pollution issues in the environment
- Examining microbial degradation of agricultural mulches and new food packaging
- Mapping carbon dioxide emissions from trucks carrying fracking water from Pennsylvania to NY Wastewater Treatment Plants

Our environmental science master's degree incorporates intensive fieldwork, policy implications, sustainable practices, and remote sensing into the curriculum. Students benefit from collaboration with experts from

RIT's College of Science, Chester F. Carlson Center for Imaging Science, and the Golisano Institute for Sustainability.

Careers in Environmental Science

Graduates of RIT's environmental science master's program are environmental consultants or field scientists for a range of companies such as Haley and Aldrich and La Bella Associates. Several of our graduates work for the U.S. Environmental Protection Agency. Still others pursue doctoral programs in environmental science. Students can also focus on policy issues if they are interested in becoming a spokesperson for the effects of climate change and pollution on the environment. Recent environmental science MS graduates have landed jobs at United Nations University, University of Rochester Medical Center, Microvi Biotechnologies Inc., The Nature Conservancy, General Dynamics, NYS Department of Environmental Conservation, United States Environmental Protection Agency, Haley and Aldrich, and LaBella Associates.

Experiential Learning

Cooperative Education

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

Cooperative education is optional for environmental science majors, however, it offers students a great way to get a head start on their career with paid, professional work experience. Students can participate in cooperative education as soon as the summer after their second year of study. Co-op placements are typically with local, state, or federal government agencies, nonprofit environmental organizations, and a host of environmental consulting firms.

National Labs Career Fair

Hosted by RIT's Office of Career Services and Cooperative Education, the National Labs Career Fair is an annual event that brings representatives to campus from the United States' federally funded research and development labs. These national labs focus on scientific discovery, clean energy development, national security, technology advancements, and more. Students are invited to attend the career fair to network with lab professionals, learn about opportunities, and interview for co-ops, internships, research positions, and full-time employment.

Curriculum

Environmental Science, MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
ENVS-601	Environmental Science Graduate Studies I	2
ENVS-602	Environmental Science Graduate Studies II	1
ENVS-795	Environmental Science Graduate Research	3
	Graduate GIS Elective	3
	Graduate Statistics Elective	3
	Graduate Public Policy/STS Elective	3
	Graduate Science Core Elective	3
	Professional Electives	6
Second Year		
Choose one of the following:		6
ENVS-780	Environmental Science Project	
ENVS-790	Environmental Science Thesis	
Total Semester Credit Hours		**30**

Electives

COURSE		SEMESTER CREDIT HOURS
Graduate Public Policy/STS Electives		
PUBL-610	Technological Innovation and Public Policy	3
PUBL-630	Energy Policy	3
PUBL-700	Readings in Public Policy	3
PUBL-701	Graduate Policy Analysis	3
PUBL-702	Graduate Decision Analysis	3
PUBL-703	Evaluation and Research Design	3
PUBL-810	Technology, Policy and Sustainability	3
STSO-621	Graduate Biodiversity and Society	3
STSO-710	Graduate Science and Technology Policy Seminar	3
STSO-750	Graduate Sustainable Communities	3
Graduate Science Core Electives and Professional Electives		
BIOL-655	Biogeography	3
BIOL-671	Database Management for the Sciences	3
BIOL-672	Computational Statistics and Data Science Methods	3
BIOL-673	Marine Biology	4
BIOL-675	Advanced Conservation Biology	3
ESHS-613	Solid and Hazardous Waste Management	3
ESHS-614	Industrial Wastewater	3
ESHS-615	Air Emissions Management	3
ESHS-755	Corporate Social Responsibility	3
ENVS-615	Aquatic Ecology Seminar	1
ENVS-631	Climate Change: Science Technology & Policy	3
ENVS-650	Hydrological Applications of Geographic Information Systems	4
ENVS-670	Advanced Concepts of Environmental Chemistry	3
IMGS-632	Advanced Environmental Applications of Remote Sensing	3
ISTE-742	Introduction To Geographic Information Systems	3
ISUS-704	Industrial Ecology	3
STAT-614	Applied Statistics	3
STAT-641	Applied Linear Models - Regression	3

Admission requirements

To be considered for admission to the MS program in environmental science, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college in environmental science, biological science, or a related discipline.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Three letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Students are strongly encouraged to contact program faculty before applying to discuss thesis topics and research projects. Students are matched with a potential thesis adviser at the time of admission.

School of Mathematical Sciences

Applied and Computational Mathematics, MS

www.rit.edu/study/applied-and-computational-mathematics-ms

Kara Maki, Associate Professor
585-475-2541, klmsma@rit.edu

Program overview

The applied and computational mathematics master's degree refines your capabilities in applying mathematical models and methods to study a range of problems, with an emphasis on developing and implementing computing solutions. Sophisticated mathematical tools are increasingly used to solve problems in management science, engineering, biology, financial portfolio planning, facilities planning, control of dynamic systems, and design of composite materials. The goal of RIT's master's in applied mathematics is to find computing solutions to real-world problems.

Applied and Computational Mathematics

The ideas of applied mathematics pervade several applications in a variety of businesses and industries as well as the government. The reasoning, deduction, and logic skills developed in this program will make you more competitive in a wide array of positions and industries.

Sophisticated mathematical tools are increasingly used to develop new models, modify existing ones, and analyze system performance. This includes applications of mathematics to problems in management science, biology, portfolio planning, facilities planning, control of dynamic systems, and design of composite materials. The goal of this mathematics master's degree is to find computable solutions to real-world problems arising from these types of situations.

RIT's Master's in Applied Mathematics

RIT's mathematics master's provides you with the capability to apply mathematical models and methods to study various problems that arise in industry and business, with an emphasis on developing computable solutions that can be implemented.

Tailor the applied and computational mathematics master's degree to fit your career goals. Electives may be selected from the graduate course offerings in the School of Mathematical Sciences or from other RIT graduate programs, with approval from the graduate program director. You also have the option to complete a thesis, which includes the presentation of original ideas and solutions to a specific mathematical problem. The proposal for the thesis work and the results must be presented and defended before the advisory committee.

Applied Mathematics Careers

Graduates of the masters in applied mathematics are uniquely qualified to address the full breadth of mathematical challenges and have developed a depth of knowledge in their chosen specializations.

The Department of Defense accounts for about 81 percent of the mathematicians employed by the federal government. In the private sector, mathematicians are employed by scientific research and development services, software publishers, insurance companies, and in aerospace or pharmaceutical manufacturing.

Recent graduates are employed as engineers, economists, analysts (e.g. operations research), physicists, cryptanalysts (codes), actuaries, teachers, market researchers, and financial advisors. Apple, BAE Systems, Ernst & Young, IBM, and Microsoft are just a few of the employers who have hired graduates of the applied and computational mathematics program.

Experiential Learning

Cooperative Education

What makes an RIT science and math education exceptional? It's the ability to complete science and math co-ops and gain real-world experience that sets you apart. Co-ops in the College of Science include cooperative education and internship experiences in industry and health care settings, as well as research in an academic, industry, or national lab. These are not only possible at RIT, but are passionately encouraged.

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

National Labs Career Fair

Hosted by RIT's Office of Career Services and Cooperative Education, the National Labs Career Fair is an annual event that brings representatives to campus from the United States' federally funded research and development labs. These national labs focus on scientific discovery, clean energy development, national security, technology advancements, and more. Students are invited to attend the career fair to network with lab professionals, learn about opportunities, and interview for co-ops, internships, research positions, and full-time employment.

Curriculum

Applied and Computational Mathematics (thesis option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
Choose three of the following core courses:		9
MATH-601	Methods of Applied Mathematics	
MATH-602	Numerical Analysis I	
MATH-605	Stochastic Processes	
MATH-622	Mathematical Modeling I	
MATH-645	Graph Theory	
MATH-722	Mathematical Modeling II	
MATH-606	Graduate Seminar I	1
MATH-607	Graduate Seminar II	1
	MATH Graduate Electives	9
Second Year		
MATH-790	Research & Thesis	7
	MATH Graduate Elective	3
Total Semester Credit Hours		**30**

Applied and Computational Mathematics (project option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
Choose three of the following core courses:		9
MATH-601	Methods of Applied Mathematics	
MATH-602	Numerical Analysis I	
MATH-605	Stochastic Processes	
MATH-622	Mathematical Modeling I	
MATH-645	Graph Theory	
MATH-722	Mathematical Modeling II	
MATH-606	Graduate Seminar I	1
MATH-607	Graduate Seminar II	1
	MATH Graduate Electives	9
Second Year		
MATH-790	Research & Thesis	4
	MATH Graduate Electives	6
Total Semester Credit Hours		**30**

Admission requirements

To be considered for admission to the MS program in applied and computational mathematics, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college in mathematics or a related field.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- Have college level credit or practical experience in programming language.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Although Graduate Record Examination (GRE) scores are not required, submitting them may enhance a candidate's acceptance into the program.

A student may also be granted conditional admission and be required to complete bridge courses selected from among RIT's existing undergraduate courses, as prescribed by the student's advisor. Until these requirements are met, the candidate is considered a nonmatriculated student. The graduate program director evaluates the student's qualifications to determine eligibility for conditional and provisional admission.

Nonmatriculated students

A student with a bachelor's degree from an approved undergraduate institution, and with the background necessary for specific courses, may take graduate courses as a nonmatriculated student with the permission of the graduate program director and the course instructor. Courses taken for credit may be applied toward the master's degree if the student is formally admitted to the program at a later date. However, the number of credit hours that may be transferred into the program from courses taken at RIT is limited for nonmatriculated students.

Applied Statistics, MS

www.rit.edu/study/applied-statistics-ms
Robert Parody, Associate Professor
585-475-5288, rjpeqa@rit.edu

Program overview

The master's in applied statistics focuses on data mining, design of experiments, health care applications, and the application of statistics to imaging and industrial environments. You'll integrate knowledge learned through engaging courses to solve more complex problems for a wide range of organizations, including industrial, marketing, education, insurance, credit, government, and health care.

RIT's Statistics Master's Degree

RIT's master's in applied statistics is available to both full- and part-time students with courses offered both on-campus and online. The program is intended for students who do not wish to pursue a degree beyond the MS. However, a number of students have attained doctorate degrees at other universities. The statistics master's program includes core courses, electives, and a capstone project or thesis.

Electives and Areas of Concentration

- Clinical Trails
- Data Mining/Machine Learning
- Industrial Statistics
- Informatics

Electives
Choose your elective courses with the guidance of an advisor. These courses are usually department courses but may include up to 6 credit hours from other departments (or may be transferred from other universities) that are consistent with your professional objectives.

Capstone Thesis/Project
Practice integrating your knowledge from courses to solve more complex problems by completing a capstone project. This project is taken near the end of your course of study.

Students, with advisor approval, may write a thesis as their capstone. A thesis maybe 3 or 6 credit hours. If a student writes a 6 credit hour thesis, they would be required to complete four elective courses instead of five.

Experiential Learning

Cooperative Education and Internships

What makes an RIT science and math education exceptional? It's the ability to complete science and math co-ops and gain real-world experience that sets you apart. Co-ops in the College of Science include cooperative education and internship experiences in industry and health care settings, as well as research in an academic, industry, or national lab. These are not only possible at RIT, but are passionately encouraged.

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

National Labs Career Fair

Hosted by RIT's Office of Career Services and Cooperative Education, the National Labs Career Fair is an annual event that brings representatives to campus from the United States' federally funded research and development labs. These national labs focus on scientific discovery, clean energy development, national security, technology advancements, and more. Students are invited to attend the career fair to network with lab professionals, learn about opportunities, and interview for co-ops, internships, research positions, and full-time employment.

Curriculum

Applied Statistics (project option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
STAT-631	Foundations of Statistics	3
STAT-641	Applied Linear Models - Regression	3
STAT-642	Applied Linear Models - ANOVA	3
	Electives	9
Second Year		
	Electives	9
STAT-790	Capstone Thesis/Project	3
Total Semester Credit Hours		**30**

Applied Statistics (thesis option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
STAT-631	Foundations of Statistics	3
STAT-641	Applied Linear Models - Regression	3
STAT-642	Applied Linear Models - ANOVA	3
	Electives	9
Second Year		
	Electives	6
STAT-790	Capstone Thesis/Project	6
Total Semester Credit Hours		**30**

Admission requirements

To be considered for admission to the MS program in applied statistics, candidates should fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- Have college level credit or practical experience in mathematics (two course sequence in calculus) and one course in applied statistics.
- Have college level credit or practical experience in programming language.

- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Applied Statistics, Adv. Cert.

www.rit.edu/study/applied-statistics-adv-cert
Robert Parody, Associate Professor
585-475-5288, rjpeqa@rit.edu

Program overview

The advanced certificate in applied statistics is designed for engineers, scientists, analysts, and other professionals who want a solid education in the statistical methods that are most closely related to their work. Courses are available both on-campus and online to accommodate diverse schedules. The program requires two core courses and two elective courses.

What is a Graduate Certificate?

A graduate certificate, also called an advanced certificate, is a selection of up to five graduate level courses in a particular area of study. It can serve as a stand-alone credential that provides expertise in a specific topic that enhances your professional knowledge base, or it can serve as the entry point to a master's degree. Some students complete an advanced certificate and apply those credit hours later toward a master's degree.

Curriculum

Applied Statistics, advanced certificate, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
STAT-641	Applied Linear Models - Regression	3
STAT-642	Applied Linear Models - ANOVA	3
	Electives	6
Total Semester Credit Hours		**12**

Electives

COURSE	
ISEE-682	Lean Six Sigma Fundamentals
STAT-621	Statistical Quality Control
STAT-670	Design of Experiments
STAT-745	Predictive Analytics
STAT-747	Principles of Statistical Data Mining
STAT-753	Nonparametric Statistics and Bootstrapping
STAT-756	Multivariate Analysis
STAT-773	Times Series Analysis and Forecasting
STAT-775	Design and Analysis of Clinical Trials
STAT-784	Categorical Data Analysis

Admission requirements

To be considered for admission to the advanced certificate in applied statistics, candidates should fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.

- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- Have college level credit or practical experience in mathematics and statistics (two courses in probability and statistics).
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Mathematical Modeling, Ph.D.

www.rit.edu/study/mathematical-modeling-phd
Nathan Cahill, Associate Professor
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Program overview

Mathematical modeling is the process of developing mathematical descriptions, or models, of real-world systems. These models can be linear or nonlinear, discrete or continuous, deterministic or stochastic, and static or dynamic, and they enable investigating, analyzing, and predicting the behavior of systems in a wide variety of fields. Through extensive study and research, graduates of the mathematical modeling Ph.D. will have the expertise not only to use the tools of mathematical modeling in various application settings, but also to contribute in creative and innovative ways to the solution of complex interdisciplinary problems and to communicate effectively with domain experts in various fields.

Plan of Study

The degree requires at least 60 credit hours of course work and research. The curriculum consists of three required core courses, three required concentration foundation courses, a course in scientific computing and high-performance computing (HPC), three elective courses focused on the student's chosen research concentration, and a doctoral dissertation. Elective courses are available from within the School of Mathematical Sciences as well as from other graduate programs at RIT, which can provide application-specific courses of interest for particular research projects. A minimum of 30 credits hours of course work is required. In addition to courses, at least 30 credit hours of research, including the Graduate Research Seminar, and an interdisciplinary internship outside of RIT are required.

Students develop a plan of study in consultation with an application domain advisory committee. This committee consists of the program director, one of the concentration leads, and an expert from an application domain related to the student's research interest. The committee ensures that all students have a roadmap for completing their degree based on their background and research interests. The plan of study may be revised as needed. Learn more about our mathematical modeling doctoral students and view a selection of mathematical modeling seminars hosted by the department.

Qualifying Examinations

All students must pass two qualifying examinations to determine whether they have sufficient knowledge of modeling principles, mathematics, and computational methods to conduct doctoral research. Students must pass the examinations in order to continue in the Ph.D. program.

The first exam is based on the Numerical Analysis I (MATH-602) and Mathematical Modeling I, II (MATH-622, 722). The second exam is based on the student's concentration foundation courses and additional material deemed appropriate by the committee and consists of a short research project.

Dissertation Research Advisor and Committee

A dissertation research advisor is selected from the program faculty based on the student's research interests, faculty research interest, and discussions with the program director. Once a student has chosen a dissertation advisor, the student, in consultation with the advisor, forms a dissertation committee consisting of at least four members, including the dissertation advisor. The committee includes the dissertation advisor, one other member of the mathematical modeling program faculty, and an external chair appointed by the dean of graduate education. The external chair must be a tenured member of the RIT faculty who is not a current

member of the mathematical modeling program faculty. The fourth committee member must not be a member of the RIT faculty and may be a professional affiliated with industry or with another institution; the program director must approve this committee member.

The main duties of the dissertation committee are administering both the candidacy exam and final dissertation defense. In addition, the dissertation committee assists students in planning and conducting their dissertation research and provides guidance during the writing of the dissertation.

Admission to Candidacy

When a student has developed an in-depth understanding of their dissertation research topic, the dissertation committee administers an examination to determine if the student will be admitted to candidacy for the doctoral degree. The purpose of the examination is to ensure that the student has the necessary background knowledge, command of the problem, and intellectual maturity to carry out the specific doctoral-level research project. The examination may include a review of the literature, preliminary research results, and proposed research directions for the completed dissertation. Requirements for the candidacy exam include both a written dissertation proposal and the presentation of an oral defense of the proposal. This examination must be completed at least one year before the student can graduate.

Dissertation Defense and Final Examination

The dissertation defense and final examination may be scheduled after the dissertation has been written and distributed to the dissertation committee and the committee has consented to administer the final examination. Copies of the dissertation must be distributed to all members of the dissertation committee at least four weeks prior to the final examination. The dissertation defense consists of an oral presentation of the dissertation research, which is open to the public. This public presentation must be scheduled and publicly advertised at least four weeks prior to the examination. After the presentation, questions will be fielded from the attending audience and the final examination, which consists of a private questioning of the candidate by the dissertation committee, will ensue. After the questioning, the dissertation committee immediately deliberates and thereafter notifies the candidate and the mathematical modeling graduate director of the result of the examination.

Residency

All students in the program must spend at least two consecutive semesters (summer excluded) as resident full-time students to be eligible to receive the doctoral degree.

Maximum Time Limitations

University policy requires that doctoral programs be completed within seven years of the date of the student passing the qualifying exam. All candidates must maintain continuous enrollment during the research phase of the program. Such enrollment is not limited by the maximum number of research credits that apply to the degree.

National Labs Career Fair

Hosted by RIT's Office of Career Services and Cooperative Education, the National Labs Career Fair is an annual event that brings representatives to campus from the United States' federally funded research and development labs. These national labs focus on scientific discovery, clean energy development, national security, technology advancements, and more. Students are invited to attend the career fair to network with lab professionals, learn about opportunities, and interview for co-ops, internships, research positions, and full-time employment.

Curriculum

Mathematical Modeling, Ph.D. degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
MATH-602	Numerical Analysis I	3
MATH-606	Graduate Seminar I	1
MATH-607	Graduate Seminar II	1
MATH-622	Mathematical Modeling I	3
MATH-722	Mathematical Modeling II	3
	MATH Concentration Courses	6
	MATH Elective	3
Second Year		
MATH-751	High-performance Computing For Mathematical Modeling	3
MATH-790	Research & Thesis	6
	MATH Concentration Course	3
	MATH Electives	6
Third Year		
MATH-790	Research & Thesis	10
Fourth Year		
MATH-790	Research & Thesis	6
Fifth Year		
MATH-790	Research & Thesis	6
Total Semester Credit Hours		**60**

Concentrations

Applied Inverse Problems

COURSE		SEMESTER CREDIT HOURS
MATH-625	Applied Inverse Problems	3
MATH-633	Measure Theory of Elements and Functional Analysis	3
MATH-741	Partial Differential Equations I	3

Biomedical Mathematics

COURSE		SEMESTER CREDIT HOURS
MATH-631	Dynamical Systems	3
MATH-702	Numerical Analysis II	3
MATH-761	Mathematical Biology	3

Discrete Mathematics

COURSE		SEMESTER CREDIT HOURS
CSCI-665	Foundations of Algorithms	3
MATH-645	Graph Theory	3
MATH-646	Combinatorics	3

Dynamical Systems and Fluid Dynamics

COURSE		SEMESTER CREDIT HOURS
MATH-631	Dynamical Systems	3
MATH-741	Partial Differential Equations I	3
MATH-831	Mathematical Fluid Dynamics	3

Geometry, Relativity and Gravitation

COURSE		SEMESTER CREDIT HOURS
ASTP-660	Introduction to Relativity and Gravitation	3
ASTP-861	Advanced Relativity and Gravitation	3
MATH-702	Numerical Analysis II	3

Admission requirements

To be considered for admission to the Ph.D. program in mathematical modeling, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Mathematical modeling encompasses a wide variety of scientific disciplines, and candidates from diverse backgrounds are encouraged to apply. If applicants have not taken expected foundational course work, the program director may require the student to successfully complete foundational courses prior to matriculating into the Ph.D. program. Typical foundation course work includes calculus through multivariable and vector calculus, differential equations, linear algebra, probability and statistics, one course in computer programming, and at least one course in real analysis, numerical analysis, or upper-level discrete mathematics.

Financial Aid, Scholarships, and Assistantships

Graduate assistantships and tuition remission scholarships are available to qualified students. Applicants seeking financial assistance must submit all application documents to the Office of Graduate and Part-time Enrollment. Please contact the office for current application materials and deadlines. Students whose native language is not English are advised to obtain as high a TOEFL or IELTS score as possible if they wish to apply for a teaching or research assistantship. These candidates also are encouraged to take the Test of Spoken English in order to be considered for financial assistance.

School of Physics and Astronomy

Astrophysical Sciences and Technology, MS

www.rit.edu/study/astrophysical-sciences-and-technology-ms

Andrew Robinson, Professor
585-475-2726, axrsps@rit.edu

Program overview

The degree in astrophysics focuses on the underlying physics of phenomena beyond the Earth, and on the development of the technologies, instruments, data analysis, and modeling techniques that will enable the next major strides in the field.

There has never been a more exciting time to obtain an astronomy degree and study the universe beyond the confines of the Earth. A new generation of advanced ground-based and space-borne telescopes and enormous increases in computing power are enabling a golden age of astrophysics. RIT's astronomy degree has a multidisciplinary emphasis that sets it apart from conventional astrophysics graduate programs at traditional research universities.

RIT's Master's in Astrophysics

RIT's master's in astrophysics offers students a wide range of frontier research topics in areas including multi-wavelength astrophysics, instrumentation and detector technology, computational astrophysics and gravitational wave astronomy and numerical relativity. Our guiding principle is to provide an intellectually demanding program within an informal, student-centered and supportive environment.

At RIT, you have the flexibility to tailor your plan of study to emphasize astrophysics (including observational and theoretical astrophysics),computational and gravitational astrophysics (including numerical relativity, gravitational wave astronomy), or astronomical technology (including detector and instrumentation research and development).

Pursure research interests in a wide range of topics, including design and development of novel detectors, multiwavelength studies of proto-stars, active galactic nuclei and galaxy clusters, gravitational wave data analysis, and theoretical and computational modeling of astrophysical systems including galaxies and compact objects such as binary black holes.

RIT's astrophysics research areas include:

- Computational general relativity
- Gravitational wave astronomy
- Multi-messenger astrophysics
- Time domain astrophysics
- Experimental cosmology
- Supermassive black holes
- Active galaxie, galaxy evolution and galaxy clusters
- Proto-stars and proto-planetary disks
- Planetary nebulae
- Binary stars
- Stellar evolution
- Sub-orbital Astrophysics
- Next generation infrared detectors
- Zero read-noise detectors

Depending on research interests, you may participate in one of three research centers at RIT: the Center for Computational Relativity and Gravitation(Video), the Center for Detectors or the Laboratory for Multi-wavelength Astrophysics.

Master's in Astrophysics Degree: What You'll Study

A degree in astrophysics at RIT consists of four core courses, two to four elective courses, two semesters of graduate seminar, and a research project culminating in a thesis.

During the first year, you will begin a research project under the guidance of a faculty research advisor. Focus on the project becomes more significant during the second year after the core courses have been completed. A thesis committee is appointed by the program director and oversees the final defense of the thesis, which consists of a public oral presentation by the student, followed by a closed-door examination by the committee.

Careers for Master's in Astrophysics

Alumni of our programs most often work in research positions or education programs ranging from K-12 to higher education. Alumni also are successful in computing, information technology, federal government, and imaging technology.

As a standalone research degree, the MS is a qualification for positions in data analysis or an entry into numerous other careers ranging from education to federal government. The MS also provides a stepping stone to a Ph.D.

MS to Ph.D. Transfer

For those who want to pursue a career in research, the Ph.D. provides an essential qualification. It opens the door to positions such as a university professor or staff scientist in institutions such as NASA, and to many other careers in STEM requiring analytical capabilities.

Students in the MS degree program who have excelled in their course work and research project may be permitted, by program approval, to transition into the doctoral degree in astrophysical sciences and technology, with the MS thesis defense serving as the Ph.D. qualifying examination. Such a transition from MS to Ph.D. is contingent on the availability of an advisor and research funding.

Experiential Learning

Cooperative Education

What makes an RIT science and math education exceptional? It's the ability to complete science and math co-ops and gain real-world experience that sets you apart. Co-ops in the College of Science include cooperative education and internship experiences in industry and health care settings, as well as research in an academic, industry, or national lab. These are not only possible at RIT, but are passionately encouraged.

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

National Labs Career Fair

Hosted by RIT's Office of Career Services and Cooperative Education, the National Labs Career Fair is an annual event that brings representatives to campus from the United States' federally funded research and development labs. These national labs focus on scientific discovery, clean energy development, national security, technology advancements, and more. Students are invited to attend the career fair to network with lab professionals, learn about opportunities, and interview for co-ops, internships, research positions, and full-time employment.

Curriculum

Astrophysical Sciences and Technology, MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
ASTP-601	Graduate Seminar I	1
ASTP-602	Graduate Seminar II	1
ASTP-608	Fundamental Astrophysics I	3
ASTP-609	Fundamental Astrophysics II	3
ASTP-790	Research & Thesis	4
	Approved Graduate Electives	6
Second Year		
	Approved Graduate Electives	6
ASTP-790	Research & Thesis	2
Choose one of the following:		4
	Approved Graduate Electives	
ASTP-790	Research & Thesis	
Total Semester Credit Hours		**30**

Electives

COURSE	
ASTP-612	Mathematical and Statistical Methods for Astrophysics
ASTP-613	Astronomical Observational Techniques and Instrumentation
ASTP-618	Fundamentals of Theoretical Astrophysics I
ASTP-619	Fundamentals of Theoretical Astrophysics II
ASTP-660	Introduction to Relativity and Gravitation
ASTP-711	Advanced Statistical Methods for Astrophysics
ASTP-720	Computational Methods for Astrophysics
ASTP-730	Stellar Atmospheres & Evolution
ASTP-740	Galactic Astrophysics
ASTP-750	Extragalactic Astrophysics
ASTP-835	High-Energy Astrophysics
ASTP-841	The Interstellar Medium
ASTP-851	Cosmology
ASTP-861	Advanced Relativity and Gravitation
EEEE-610	Analog Electronics Design
IMGS-628	Design and Fabrication of Solid State Cameras
IMGS-639	Principles of Solid State Imaging Arrays
IMGS-642	Testing of Focal Plane Arrays
MATH-602	Numerical Analysis
MATH-751	High Performance Computing
PHYS-611	Classical Electrodynamics I
PHYS-612	Classical Electrodynamics II
PHYS-616	Data Analysis for the Physical Sciences
IMGS-616	Fourier Methods for Imaging

Admission requirements

To be considered for admission to the MS program in astrophysical sciences and technology, a candidate must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college in the physical sciences, mathematics, computer science, or engineering.
- Recommended minimum cumulative GPA of 3.2 (or equivalent) in course work in mathematical, science, engineering, and computing subject areas.
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Astrophysical Sciences and Technology, Ph.D.

www.rit.edu/study/astrophysical-sciences-and-technology-phd
Andrew Robinson, Professor
585-475-2726, axrsps@rit.edu

Program overview

There has never been a more exciting time to study the universe beyond the confines of the Earth. A new generation of advanced ground-based and space-borne telescopes and enormous increases in computing power are enabling a golden age of astrophysics. The doctoral program in astrophysical sciences and technology focuses on the underlying physics of phenomena beyond the Earth and on the development of the technologies, instruments, data analysis, and modeling techniques that will enable the next major strides in the field. The program's multidisciplinary emphasis sets it apart from conventional astrophysics graduate programs at traditional research universities.

The program offers tracks in astrophysics (including observational and theoretical astrophysics), computational and gravitational astrophysics (including numerical relativity, gravitational wave astronomy), and astronomical technology (including detector and instrumentation research and development). Students can pursue research interests in a wide range of topics, including design and development of novel detectors, multiwavelength studies of proto-stars, active galactic nuclei and galaxy clusters, gravitational wave data analysis, and theoretical and computational modeling of astrophysical systems including galaxies and compact objects such as binary black holes. Depending on research interests, students may participate in one of three research centers: the Center for Computational Relativity and Gravitation(Video), the Center for Detectors, or the Laboratory for Multi-wavelength Astrophysics.

Plan of Study

In the astrophysics Ph.D., students complete a minimum of 60 credit hours of study, consisting of at least 24 credit hours of course work and at least 24 credit hours of research. Students may choose to follow one of three tracks: astrophysics, astroinformatics and computational astrophysics (with the option of a concentration in general relativity), or astronomical instrumentation. All students must complete four core courses with grades of B or better, as well as two semesters of a graduate seminar. Core course grades below B must be remediated by taking and passing a comprehensive exam on the core course subject matter prior to receiving the doctoral degree. The remaining course credits are made up from specialty track courses and electives. Students must pass a qualifying examination, which consists of completing and defending a master's-level research project, prior to embarking on the dissertation research project.

Electives
Electives include additional courses in astrophysics and a wide selection of courses offered in other RIT graduate programs (e.g., imaging science, computer science, engineering), including detector development, digital image processing, computational techniques, optics, and entrepreneurship, among others.

Ph.D. qualification requirements: Master's-level research project
During the first year of the program, most doctoral candidates begin a master's-level research project under the guidance of a faculty member. The project gains momentum during the second year after the core courses have been completed. The master's-level research topic may be different from the eventual doctoral dissertation topic, and the supervising faculty member will not necessarily serve as the dissertation research advisor.

The doctoral qualification requirements consist of a combination of a publication-quality master's-level project report, which may be in the form of a thesis (if the student so chooses) and an oral presentation and defense of the master's-level project. This qualification process, which must be completed by the beginning of the third year of full-time study or its equivalent, is designed to ensure the student has the necessary background knowledge and intellectual skills to carry out doctoral-level research in the subject areas of astrophysical sciences and technology. A director-approved committee consisting of the student's master's-level project research advisor and two additional faculty members will assess the student's project report and defense.

Dissertation research advisor
After passing the qualifying examination, students are guided by a dissertation research advisor who is approved by the program director. The choice of advisor is based on the student's research interests, faculty research interests, and available research funding.

Research committee
After passing the qualifying examination, a dissertation committee is appointed for the duration of the student's tenure in the program. The committee chair is appointed by the dean of graduate education and must be a faculty member in a program other than astrophysical sciences and technology. The committee chair acts as the institutional representative in the final dissertation examination. The committee comprises at least four members and in addition to the chair, must also include the student's dissertation research advisor and at least one other member of the program's faculty. The fourth member may be an RIT faculty member, a professional affiliated in industry, or a representative from another institution. The program director must approve committee members who are not RIT faculty.

Ph.D. proposal review (candidacy exam)
Within six months of the appointment of the dissertation committee, students must prepare a Ph.D. research project proposal and present it to the committee for review. The student provides a written research proposal and gives an oral presentation to the committee, who provides constructive feedback on the project plan. The review must take place at least six months prior to the dissertation defense.

Annual review
Each fall, students provide an annual report in the form of an oral presentation, which summarizes progress made during the preceding year. The program director also monitors student's progress toward meeting the requirements for either the qualifying examination (during the first two years), or the Ph.D. (after passing the qualifying examination). Students may be interviewed, as necessary, to explore any concerns that emerge during the review and to discuss remedial actions.

Final examination of the dissertation
Once the dissertation is written, distributed to the dissertation committee, and the committee agrees to administer the final examination, the doctoral candidate may schedule the final examination. The candidate must distribute a copy of the dissertation to the committee and make the dissertation available to interested faculty at least four weeks prior to the dissertation defense.

The final examination of the dissertation is open to the public and is primarily a defense of the dissertation research. The examination consists of an oral presentation by the student, followed by questions from the audience. The dissertation committee privately questions the candidate following the presentation. The dissertation committee caucuses immediately following the examination and thereafter notifies the candidate and the program director of the results.

Residency
All students in the program must spend at least one year (summer term excluded) in residence as full-time students to be eligible to receive the doctorate degree.

Time Limitations
All doctoral candidates must maintain continuous enrollment during the research phase of the program. Normally, full-time students complete the course of study in approximately four to five years. A total of seven years is allowed to complete the requirements after first attempting the qualifying examination.

Experiential Learning

National Labs Career Fair

Hosted by RIT's Office of Career Services and Cooperative Education, the National Labs Career Fair is an annual event that brings representatives to campus from the United States' federally funded research and development labs. These national labs focus on scientific discovery, clean energy development, national security, technology advancements, and more. Students are invited to attend the career fair to network with lab professionals, learn about opportunities, and interview for co-ops, internships, research positions, and full-time employment.

Curriculum

Astrophysical Sciences and Technology, Ph.D. degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
ASTP-601	Graduate Seminar I	1
ASTP-602	Graduate Seminar II	1
ASTP-608	Fundamental Astrophysics I	3
ASTP-609	Fundamental Astrophysics II	3
ASTP-790	Research & Thesis	4
	Specialty Track Courses	6
Second Year		
Choose from the following:		6
	Specialty Track Courses	
	Electives	
	Specialty Track Courses	6
ASTP-790	Research & Thesis	6
Third Year		
ASTP-890	Research & Thesis	8
Fourth Year		
ASTP-890	Research & Thesis	8
Fifth Year		
ASTP-890	Research & Thesis	8
Total Semester Credit Hours		**60**

Specialty Tracks

Astroinformatics

COURSE		SEMESTER CREDIT HOURS
ASTP-612	Mathematical and Statistical Methods for Astrophysics	3
ASTP-711	Advanced Statistical Methods for Astrophysics	3
PHYS-616	Data Analysis for the Physical Sciences	3
Choose one of the following:		3
ASTP-720	Computational Methods for Astrophysics	
MATH-751	High Performance Computing for Mathematical Modeling	
	Electives	9

Gravitational Wave Astronomy

COURSE		SEMESTER CREDIT HOURS
ASTP-612	Mathematical and Statistical Methods for Astrophysics	3
ASTP-613	Astronomical Observational Techniques and Instrumentation	3
ASTP-660	Introduction to Relativity and Gravitation	3
ASTP-730	Stellar Atmospheres & Evolution	3
ASTP-740	Galactic Astrophysics	3
	Elective	3

Instrumentation

COURSE		SEMESTER CREDIT HOURS
ASTP-613	Astronomical Observational Techniques and Instrumentation	3
PHYS-616	Data Analysis for the Physical Sciences	3
IMGS-616	Fourier Methods for Imaging	3
	Electives	9

Numerical Relativity

COURSE		SEMESTER CREDIT HOURS
ASTP-612	Mathematical and Statistical Methods for Astrophysics	3
ASTP-618	Fundamentals of Theoretical Astrophysics I	3
ASTP-619	Fundamentals of Theoretical Astrophysics II	3
ASTP-660	Introduction to Relativity and Gravitation	3
ASTP-861	Advanced Relativity and Gravitation	3
Choose one of the following:		3
ASTP-720	Computational Methods for Astrophysics	
MATH-751	High Performance Computing for Mathematical Modeling	
	Optional Electives	3

Observational Astrophysics

COURSE		SEMESTER CREDIT HOURS
ASTP-613	Astronomical Observational Techniques and Instrumentation	3
ASTP-730	Stellar Atmospheres & Evolution	3
ASTP-740	Galactic Astrophysics	3
ASTP-750	Extragalactic Astrophysics	3
	Electives	6

Theoretical Astrophysics

COURSE		SEMESTER CREDIT HOURS
ASTP-612	Mathematical and Statistical Methods for Astrophysics	3
ASTP-618	Fundamentals of Theoretical Astrophysics I	3
ASTP-619	Fundamentals of Theoretical Astrophysics II	3
ASTP-851	Cosmology	3
	Electives	6

Electives

COURSE		SEMESTER CREDIT HOURS
ASTP-612	Mathematical and Statistical Methods for Astrophysics	3
ASTP-613	Astronomical Observational Techniques and Instrumentation	3
ASTP-618	Fundamentals of Theoretical Astrophysics I	3
ASTP-619	Fundamentals of Theoretical Astrophysics II	3
ASTP-660	Introduction to Relativity and Gravitation	3
ASTP-711	Advanced Statistical Methods for Astrophysics	3
ASTP-720	Computational Methods for Astrophysics	3
ASTP-730	Stellar Atmospheres & Evolution	3
ASTP-740	Galactic Astrophysics	3
ASTP-750	Extragalactic Astrophysics	3
ASTP-835	High-Energy Astrophysics	3
ASTP-841	The Interstellar Medium	3
ASTP-851	Cosmology	3
ASTP-861	Advanced Relativity and Gravitation	3
EEEE-610	Analog Electronics Design	3
IMGS-628	Design and Fabrication of Solid State Cameras	3
IMGS-639	Principles of Solid State Imaging Arrays	3
IMGS-642	Testing of Focal Plane Arrays	3
MATH-602	Numerical Analysis I	3
MATH-751	High-performance Computing for Mathematical Modeling	3
PHYS-611	Classical Electrodynamics I	3
PHYS-612	Classical Electrodynamics II	3

Admission requirements

To be considered for admission to the Ph.D. program in astrophysical sciences and technology, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college in the physical sciences, mathematics, computer science, or engineering.
- Recommended minimum cumulative GPA of 3.2 (or equivalent) in course work in mathematical, science, engineering, and computing subject areas.
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Physics, MS

www.rit.edu/study/physics-ms
George Thurston, Professor
585-475-4549, gmtsps@rit.edu

Program overview

RIT's Physics MS: Explore Advanced Physics Your Way

A physics master's prepares you for a variety of professional opportunities. Whether your interests are in quantum mechanics or studying the entire universe with general relativity, you can gain the research and technical skills needed to achieve your career goals.

Students in RIT's physics MS program are trained in the core areas of physics and can choose sub-areas of physics that align with their interests and career aspirations. Sub-areas may include: atomic, molecular, and optical physics; computational physics; lasers; modern and quantum optics; nanoscale physics; physics education research; radiation, scattering, and spectroscopy; relativity and gravitation; solid-state, materials, and device physics; and soft matter and biological physics.

At RIT you don't just study these areas, you work directly with faculty conducting research. The School of Physics and Astronomy conducts millions of dollars in research annually in experimental, theoretical, applied, and computational physics. Gain hands-on experience and put your knowledge into practice with access to our labs and equipment and as part of our strategic research centers.

You will also develop professional skills in organization and leadership, managing research teams, promoting innovation or sustainable technologies, entrepreneurship and intellectual property, finance and accounting, data science, scientific visualization, electronics, STEM pedagogy and education research, public policy, and communication. The RIT physics master's program offers robust, advanced training in a flexible format that allows you to meet your personal career goals.

Research Centers

Students and faculty researchers collaborate in our strategic research centers:

- Center for Computational Relativity and Gravitation
- Center for Detectors
- Future Photon Initiative
- Laboratory for Multiwavelength Astrophysics

Labs and Equipment

Students in the physics MS have access to an extensive range of equipment and labs:

- Atomic-Scale Microscopy Laboratory
- Granular Materials Laboratory
- Iontronics and Nanoelectronics Laboratory
- Laboratory for Complex and Biological
- Fluid Studies
- Laboratory for Experimental Cosmology
- Laser Light Scattering Equipment
- Materials Laboratory
- Nanopower Research Laboratories
- Quantum Optics/Imaging Laboratory
- RIT Observatory
- Supercomputer Clusters
- X-Ray and Surface Science Laboratory

Careers in Physics

Nationally, graduates of the program are in demand across all economic sectors, spanning a wide variety of exciting opportunities within the private sector (especially in engineering and computer/information technology), in government labs and agencies, and in education at both the university and secondary levels.

Experiential Learning

Cooperative Education

What makes an RIT science and math education exceptional? It's the ability to complete science and math co-ops and gain real-world experience that sets you apart. Co-ops in the College of Science include cooperative education and internship experiences in industry and health care settings, as well as research in an academic, industry, or national lab. These are not only possible at RIT, but are passionately encouraged.

What makes an RIT education exceptional? It's the ability to complete relevant, hands-on career experience. At the graduate level, and paired with an advanced degree, cooperative education and internships give you the unparalleled credentials that truly set you apart. Learn more about graduate co-op and how it provides you with the career experience employers look for in their next top hires.

National Labs Career Fair

Hosted by RIT's Office of Career Services and Cooperative Education, the National Labs Career Fair is an annual event that brings representatives to campus from the United States' federally funded research and development labs. These national labs focus on scientific discovery, clean energy development, national security, technology advancements, and more. Students are invited to attend the career fair to network with lab professionals, learn about opportunities, and interview for co-ops, internships, research positions, and full-time employment.

Curriculum

Physics (research option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
PHYS-601	Graduate Physics Seminar I	1
PHYS-602	Graduate Physics Seminar II	1
Choose two of the following:		6
PHYS-610	Mathematical Methods for Physics	
PHYS-611	Classical Electrodynamics I	
PHYS-614	Quantum Theory	
Choose one of the following:		3
PHYS-630	Classical Mechanics	
PHYS-640	Statistical Physics	
Choose one of the following:		3
PHYS-790	Graduate Research & Thesis	
	Physics (or closely related) Elective	
	Physics (or closely related) Electives	6
Second Year		
Choose one of the following:		3
PHYS-610	Mathematical Methods for Physics	
PHYS-611	Classical Electrodynamics I	
PHYS-614	Quantum Theory	
PHYS-790	Graduate Research & Thesis	7
Total Semester Credit Hours		**30**

Physics (professional option), MS degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
PHYS-601	Graduate Physics Seminar I	1
PHYS-602	Graduate Physics Seminar II	1
Choose two of the following:		6
PHYS-610	Mathematical Methods for Physics	
PHYS-611	Classical Electrodynamics I	
PHYS-614	Quantum Theory	
Choose one of the following:		3
PHYS-630	Classical Mechanics	
PHYS-640	Statistical Physics	
	Physics (or closely related) Elective	3
	Professional Electives	6
Second Year		
PHYS-780	Graduate Physics Project	4
	Professional Elective	3
	Physics (or closely related) Elective	3
Total Semester Credit Hours		**30**

Electives

These lists are representative of the types of elective courses available to students in the physics program. Other RIT courses may be used as electives upon approval by the program director.

Physics (or closely related) electives

COURSE	
ASTP-660	Introduction to Relativity and Gravitation
ASTP-861	Advanced Relativity and Gravitation
CLRS-601	Principles of Color Science
CLRS-602	Color Physics and Applications
EEEE-605	Modern Optics for Engineers
EEEE-689	Fundamentals of MEMS
IMGS-616	Fourier Methods for Imaging
IMGS-619	Radiometry
IMGS-628	Design and Fabrication of Solid State Cameras
IMGS-633	Optics for Imaging
IMGS-639	Principles of Solid State Imaging Arrays
IMGS-642	Testing of Focal Plane Arrays
MATH-602	Numerical Analysis I
MATH-702	Numerical Analysis II
MATH-712	Numerical Methods for Partial Differential Equations
MATH-831	Mathematical Fluid Dynamics
MCEE-620	Photovoltaic Science and Engineering
MCEE-713	Quantum and Solid-State Physics for Nanostructures
MCSE-702	Introduction to Nanotechnology and Microsystems
MCSE-712	Nonlinear Optics
MCSE-713	Lasers
MCSE-731	Integrated Optical Devices & Systems
MCSE-771	Optoelectronics
MCSE-889	Special Topics
MTSE-601	Materials Science
MTSE-632	Solid State Science
PHYS-612	Classical Electrodynamics II
PHYS-616	Data Analysis for the Physical Sciences
PHYS-667	Quantum Optics
PHYS-670	Teaching and Learning Physics
PHYS-689	Graduate Special Topics
PHYS-715	Advanced Quantum Theory
PHYS-720	Computational Methods for Physics
PHYS-732	Advanced Solid State Physics
PHYS-751	Soft Matter Physics
PHYS-752	Biological Physics
PHYS-760	Radiation Interactions & Scattering Probes of Matter
PHYS-767	Optical Coherence and Light-Matter Interactions
PHYS-770	Advanced Methods in Physics Education Research
PHYS-799	Independent Study

Professional electives

COURSE	
ACCT-603	Accounting for Decision Makers
ACCT-794	Cost Management in Technical Organizations
BLEG-612	Legal and Accounting Issues for New Ventures
CSCI-603	Computational Problem Solving
CSCI-605	Advanced Object-Oriented Programming Concepts
CSCI-610	Foundations of Computer Graphics
CSCI-620	Introduction to Big Data
CSCI-714	Scientific Visualization
CSCI-720	Big Data Analytics
DECS-744	Project Management
EEEE-610	Analog Electronics Design
EEEE-620	Design of Digital Systems
ESCB-705	Economics and Decision Modeling
FINC-605	Financing New Ventures
FINC-721	Financial Analysis for Managers
ISUS-704	Industrial Ecology
ISUS-705	Technology, Policy, and Sustainability
ITDS-611	STEM Education: Concepts and Practice
ITDS-613	STEM Education: Research Methods and Theory
MGIS-650	Introduction to Data Analytics and Business Intelligence
MGMT-735	Management of Innovation in Products and Services
MGMT-740	Leading Teams in Organizations
MGMT-741	Managing Organizational Change
MGMT-755	Negotiations
PSYC-716	Graduate Social Psychology
PUBL-630	Energy Policy
PUBL-701	Graduate Policy Analysis

Admission requirements

To be considered for admission to the MS program in physics, applicants must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college in physics, applied physics, or a closely-related discipline within the physical/mathematical sciences or engineering fields.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Bridge Courses

If an applicant lacks any prerequisites, bridge courses may be recommended to provide students with the required knowledge and skills needed for the program. If any bridge courses are indicated in a student's plan of study, the student may be admitted to the program on the condition that they successfully complete the recommended bridge courses with a grade of B (3.0) or better (courses with lower grades must be repeated).

Faculty

Dean's Office

André Hudson, BS, Virginia Union University; Ph.D., Rutgers University—Interim Dean; Professor, Biology: amino acid metabolism, bacterial cell wall metabolism, plant-bacterial interactions

Bioinformatics

Gregory Babbitt, BA, Ohio Wesleyan University; MS, Ph.D., University of Florida—Associate Professor: evolution of the biophysical properties of whole genomes and their interactions with DNA binding proteins

Eli Borrego, BS, Ph.D., Texas A&M University—Assistant Professor: plant biochemistry and pathology

Larry Buckley, BA, University of Missouri; MS, Southern Illinois University at Edwardsville; Ph.D., Southern Illinois University at Carbondale—Senior Associate Dean for Academic Affairs; Associate Professor, Biology: herpetology, anatomy, evolution, biogeography, systematics

Feng Cui, MS, Truman State University; Ph.D., Iowa State University; MD, Hunan Medical University (China)—Graduate Program Director, Bioinformatics; Associate Professor, Bioinformatics: next-generation sequencing data analysis, chromatin organization, epigenomics, cancer genomics and p53-DNA interactions

André Hudson, BS, Virginia Union University; Ph.D., Rutgers University—Interim Dean, College of Science; Professor, Biology: amino acid metabolism, bacterial cell wall metabolism, plant- bacterial interactions

Michael V. Osier, BS, University of Vermont; Ph.D., Yale University—Associate Professor; Bioinformatics: high-throughput sequencing analysis, human genetics

Gary R. Skuse, BA, University of Rochester; Ph.D., Syracuse University—Professor, Bioinformatics: cancer genetics, RNA processing, natural language processing to mine the scientific and medical literature, computer networking, wired and wireless communications

Hyla C. Sweet, BS, Union College; Ph.D., University of Texas at Austin—Associate Professor, Biology: Genomics/transcriptomics of invertebrates

Julie A. Thomas, B.App.Sc., Ph.D., LaTrobe University, Bendingo (Australia)—Associate Professor, virology, phage genetics and genome structure, phage gene expression

Crista Wadsworth, BA, Smith College; Ph.D., Tuffs University—Assistant Professor, microbial evolution, populations dynamics and genomics.

Environmental Science

Eli Borrego, BS, Texas A&M University, Ph.D., Texas A&M University—Assistant Professor, Biology: plant biochemistry and pathology

Larry Buckley, BA, University of Missouri; MS, Southern Illinois University at Edwardsville; Ph.D., Southern Illinois University at Carbondale—Senior Associate Dean for Academic Affairs; Associate Professor, Biology: herpetology, anatomy, evolution, biogeography, and systematics

Sandra Connelly, BS, Juniata College; MS, University at Buffalo; Ph.D., Miami University of Ohio—Principal Lecturer, Biology: ecotoxicology, freshwater ecosystems, anthropogenic stresses, UV-radiation, evolution

Elizabeth N. Hane, BA, Rice University; MA, University of Kansas; Ph.D., Brown University—Associate Professor, Biology: plant community ecology, ecosystem biology, conservation biology

M. Ann Howard, BS, Cornell University; J.D., Rutgers University School of Law—Professor, College of Liberal Arts, Science, Technology and Society/Public Policy: relationship between environmental decision-making and the role of citizen involvement, sustainable community development

André Hudson, BS, Virginia Union University; Ph.D., Rutgers University—Interim Dean, College of Science; Professor, Biology: amino acid metabolism, bacterial cell wall metabolism, plant-bacterial interactions

Christine Keiner, BA, McDaniel College; Ph.D., Johns Hopkins University—Associate Professor, College of Liberal Arts, Science, Technology and Society/Public Policy: history of ecology and biology, U.S. environmental politics, and relations between science and politics

Karl F. Korfmacher, BA, Carleton College; MS, Ph.D., Duke University—Professor, Environmental Science: GIS-based habitat suitability, transportation, hydrologic, and pollution modelling, green infrastructure land cover analysis, soil science

Carmody K. McCalley, BA, Middlebury College; Ph.D., Cornell University—Graduate Program Director, Environmental Science; Associate Professor, Environmental Science: biogeochemistry, global change biology, terrestrial and wetland ecosystem ecology

Susan Smith Pagano, BS, State University College at Oswego; MS, State University College at Brockport; Ph.D., University of Rhode Island—Associate Professor, Biology: avian nutritional ecology and migration physiology

Todd Pagano, BA, State University College at Oswego; MS, Ph.D., Tufts University—Professor, Chemistry/Laboratory Science Technology: aquatic chemistry, environmental chemistry, sensor/instrument design, environmental monitoring

Paul Shipman, BSE, MS, Emporia State University; Ph.D., Oklahoma State University—Associate Professor, Biology: ecological informatics, conservation of amphibians and reptiles, behavioral and evolutionary ecology

Kaitlin Stack-Whitney, BS, Cornell University; Ph.D., University of Wisconsin-Madison—Assistant Professor, Biology: insects, ecology, novel ecosystems, environmental policy, critical open studies, animal studies, and pollinators

Anna Christina Tyler, BS, Cornell University; MS, Ph.D., University of Virginia—Professor, Environmental Science and Biology: aquatic ecology, biogeochemistry, invasive species, ecosystem restoration

Jan van Aardt, BSc, University of Stellenbosch (South Africa); MS, Ph.D., Virginia Polytechnic Institute and State University—Professor, Imaging Science: remote sensing of natural resources, application of hyperspectral, light detection and ranging for spectral- structural characterization of natural systems, integrated modeling approaches, scaling of natural resources remote sensing solutions through sensor interoperability

Jeffrey Wagner, AB, University of Missouri at Columbia; MS, Ph.D., University of Illinois-Urbana—Professor, College of Liberal Arts, Economics: sustainable waste management, green consumption, economics of active transportation, economics of endangered species recovery

Applied and Computational Mathematics, Applied Statistics

Anurag Agarwal, MS, Indian Institute of Technology (India); Ph.D., State University of New York at Buffalo—Associate Professor, number theory, cryptography, algebra, graph theory

Ephraim Agyingi, BS, MS, University of Ilorin (Nigeria); Ph.D., University of Manchester (United Kingdom)—Associate Professor, numerical analysis

Olalekan Babaniyi, BS, MS, Ph.D., Boston University—Assistant Professor, inverse problems, computational mechanics, biomechanical imaging, uncertainty quantification

Peter Bajorski, MS, University of Wroclaw (Poland); Ph.D., Technical University of Wroclaw (Poland)—Professor, regression models, multivariate analysis, nonparametrics, statistical approaches to spectral image processing

Mihail Barbosu, BS, Ph.D., Babes-Bolyai University (Romania); MS, Ph.D., Paris VI University (France)—Professor, mathematical modeling, dynamical systems, celestial mechanics and space dynamics, symbolic computation systems, data analytics, management science

Nathaniel Barlow, BS, Ph.D., Clarkson University—Associate Professor, stability and propagation of waves in fluids, asymptotic methods

David S. Barth-Hart, BS, Syracuse University; MA, University of Rochester—Associate Professor, algebra, number theory

Maurino P. Bautista, BS, Ateneo de Manila University (Philippines); MS, Ph.D., Purdue University—Professor, numerical analysis, applied mathematics

Bernard Brooks, BS, University of Toronto (Canada); MBA, Rochester Institute of Technology; MS, Ph.D., University of Guelph (Canada)—Professor, mathematical modeling, dynamical systems, financial mathematics

Nathan Cahill, BS, MS, Rochester Institute of Technology; D.Phil., University of Oxford (United Kingdom)—Graduate Program Director, Mathematical Modeling; Associate Professor, Mathematics: scientific computing, biomedical image analysis, computer vision, advanced mathematical approaches to image processing

Manuela Campanelli, Laureate in Mathematics, University of Perugia (Italy); Ph.D., University of Bern (Switzerland)—Director, Center for Computational Relativity and Gravitation; Professor, Mathematics: numerical relativity, gravitational physics, computational astrophysics, black holes, gravitational waves

Lucia Carichino, BS, MS, Politecnico di Milano (Italy); Ph.D., Purdue University—Assistant Professor, mathematical modeling, scientific computing

Linlin Chen, BS, Beijing University (China); MCS, Rice University; MA, Ph.D., University of Rochester—Associate Professor, statistics, biostatistics, statistical consulting, genetics, bioinformatics and computational biology

Matthew Coppenbarger, BS, University of Arizona; MA, Ph.D., University of Rochester—Associate Professor, mathematical physics, spectral theory

Michael Cromer, BS, York College of Pennsylvania; MS, Ph.D., University of Delaware—Associate Professor, mathematical modeling of complex fluids, asymptotics and perturbation methods, simulation

Blessing Emerenini, BTech, Federal University of Technology (Nigeria); M.Sc., Technical University Eindhoven (Netherlands); M.Eng., Johannes Kepler University (Austria); Ph.D., University of Guelph (Canada)—Assistant Professor, mathematical modeling, mathematical biology

Joshua Faber, BS, State University of New York at Stony Brook; Ph.D., Massachusetts Institute of Technology—Head, School of Mathematical Sciences; Professor, numerical relativity, computational astrophysics, dynamics

Raluca Felea, BS, University of Iasi (Romania); Ph.D., University of Rochester—Professor, microlocal analysis

Ernest Fokoue, Maitrise B.Sc., University of Yaounde (Cameroon); M.Sc., Aston University (United Kingdom); Ph.D., University of Glasgow (United Kingdom)—Professor, statistical machine learning and data mining

Teresa Gibson, BS, Carnegie-Mellon University; MS, MA, Ph.D., University of Michigan – Professor of Practice, advanced analytic methods, machine learning

Anthony A. Harkin, BS, State University College at Brockport; MS, Massachusetts Institute of Technology; Ph.D., Boston University—Associate Professor, applied and computational mathematics, partial differential equations

Matthew J. Hoffman, BA, Williams College; MS, Ph.D., University of Maryland—Associate Professor, data assimilation, applied mathematics, ocean and atmospheric forecasting, remote sensing; hyperspectral vehicle tracking

Jay Alan Jackson, BS, MS, Ph.D., Florida State University—Associate Professor, mathematical modeling, innovative and interdisciplinary math and science education

Jobby Jacob, BS, Bharata Mata College (India); MS, Indian Institute of Technology (India); MS, Ph.D., Clemson University—Associate Head, Applied and Computational Mathematics; Associate Professor, graph theory

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Akhtar Khan, MS, Technical University Kaiserslautern (Germany); Ph.D., Michigan Technological University—Professor, applied math, optimization, inverse problems, variational inequalities, elasticity imaging

Seshavadhani Kumar, BS, MS, University of Madras (India); Ph.D., University of Delaware—Professor, operations research, simulation

Manuel Lopez, AB, Princeton University; Ph.D., Wesleyan University—Associate Professor, homological algebra

Carlos Lousto, MS, Universidad Nacional De La Plata (Argentina); Ph.D., Universidad De Buenos Aires (Argentina)—Professor, numerical relativity

Carl V. Lutzer, BS, Michigan State University; MA, Ph.D., University of Kentucky—Director, Honors Program; Professor, mathematical physics

Kara L. Maki, BS, University of New Hampshire; MS, Ph.D., University of Delaware— Graduate Program Director, Applied and Computational Mathematics; Associate Professor, mathematical modeling, scientific computing

Nishant Malik, BS, MS, University of Delhi (India), Ph.D., University of Potsdam (Germany)—Assistant Professor, network science, nonlinear dynamics, stochastic processes

Carol E. Marchetti, BS, Case Institute of Technology; MS, Weatherhead School of Management; MA, Ph.D., University of Rochester—Professor, statistics

James E. Marengo, BA, MS, California State University; Ph.D., Colorado State University—Professor, statistics, probability

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Darren A. Narayan, BS, State University of New York at Binghamton; MS, Ph.D., Lehigh University—Professor, graph theory, discrete math

Shahla Nasserasr, Honours B.Sc., Tabriz University (Iran); M.Sc., Shahid Beheshti University (Iran); M.Sc., University of Victoria (Canada); Ph.D., College of William and Mary—Assistant Professor, discrete mathematics, graph theory

Richard O'Shaughnessy, BA, Cornell University; Ph.D., California Institute of Technology—Associate Professor, gravitational wave astrophysics

Niels F. Otani, BA, University of Chicago; Ph.D., University of

California at Berkeley—Associate Professor, mathematical biology

Robert J. Parody, BS, Clarkson University; MS, Rochester Institute of Technology; Ph.D., University of South Carolina— Graduate Program Director, Applied Statistics; Associate Professor, experimental design, response surface methods, quality control and improvement

Michael Radin, BA, Rowan University; MS, Ph.D., University of Rhode Island—Associate Professor, differential equations

Mary Lynn Reed, BS, Georgia Institute of Technology; MFA, University of Maryland; Ph.D., University of Illinois—Professor, abstract algebra, network science, cybersecurity, statistical modeling

Brendan Rooney, BSc, Simon Fraser University (Canada); MS, Ph.D., University of Waterloo (Canada)—Assistant Professor, graph theory, combinatorics

Hossein Shahmohamad, BS, MA, California State University at Long Beach; Ph.D., University of Pittsburgh—Professor, graph theory

Nourridine Siewe, Honours BS, MS, University of Buea (Cameroon); Howard University—Assistant Professor, mathematical modeling, mathematical epidemiology

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John T. Whelan, BA, Cornell University; Ph.D., University of California at Santa Barbara—Professor, computational relativity and gravitation, gravitational wave data analysis

Tamas Wiandt, BS, Jozsef Attila University (Hungary); Ph.D., University of Minnesota—Professor, dynamical systems

Anthony E. Wong, BA, Ohio Wesleyan University; MS, Ph.D., University of Colorado, Boulder—Assistant Professor, data assimilation, model calibration, geophysical models

Elmer L. Young, BA, Amherst College; MS, Ph.D., The Ohio State University—Associate Professor, topology and analysis

Yosef Zlochower, BS, Ph.D., University of Pittsburgh—Professor, numerical relativity, relativistic astrophysics, black hole physics

Chemistry

Emiliano Brini, BS, MS, Bologna University (Italy); Ph.D., TU Darmstadt (Germany)—Assistant Professor, Physical Chemistry and Biochemistry: molecular dynamics simulations, protein to protein interactions, free energy calculations

Jeremy Cody, BS, Indiana University of Pennsylvania; Ph.D., University of Rochester—Associate Professor, Organic Chemistry: synthetic organic chemistry

Christina Goudreau Collison, BA, Colby College; Ph.D., University of Rochester—Professor, Organic Chemistry: synthetic organic chemistry, chemical education

Christopher Collison, BSc, Ph.D., Imperial College of London (United Kingdom)—Professor, Physical Chemistry: photovoltaic chemistry

Michael G. Coleman, BS, Ph.D., University of Buffalo—Associate Professor, Organic Chemistry: synthetic organometallic methodologies towards medicinally relevant targets

Paul A. Craig, BS, Oral Roberts University; Ph.D., University of Michigan—Professor, Biochemistry: computational biochemistry, biochemistry education

Nathan Eddingsaas, BS, University of Wisconsin, Stevens Point; Ph.D., University of Illinois at Urbana-Champaign—Graduate Program Director, Chemistry; Associate Professor, Analytical Chemistry: atmospheric chemistry

Michael Gleghorn, BS, Clarion University of Pennsylvania; Ph.D., Pennsylvania State University—Assistant Professor, Biochemistry, gene regulation, nucleic acids, molecular cell biology

Michael D. Heagy, BA, Franklin and Marshall College; Ph.D., University of Southern California, Los Angeles—Head, School of Chemistry and Materials Science; Professor, Physical Organic Chemistry: fluorescent probes, solar fuels, photocatalysis

Joseph P. Hornak, BS, Utica College of Syracuse University; MS, Purdue University; Ph.D., University of Notre Dame—Professor, Joint Appointment with Imaging Science, Physical Chemistry: magnetic resonance spectroscopies and imaging

André O. Hudson, BS, Virginia Union University; Ph.D., Rutgers University—Interim Dean, College of Science; Professor, Affiliate member of Chemistry

Lea V. Michel, BA, Colgate University; Ph.D., University of Rochester—Associate Professor, Biochemistry: structural biology, biophysics, vaccine development

Massoud J. Miri, BS, MS, Ph.D., University of Hamburg (Germany)—Associate Professor, Polymer Chemistry: polymerization mechanisms, polymer properties, catalysis

Suzanne O'Handley, BS, Rutgers University; MS, Ph.D., University of Rochester—Associate Professor, Biochemistry: cloning characteristics of nudix hydrolases, novel phosphatase families, novel antibiotic targets, enzyme-substrate specificity

K. S. V. Santhanam, BSc, MA, Ph.D., Sri Venkateswara University (India)—Professor Emerita, Analytical Chemistry and Materials Science: organic conducting polymers, electrochemistry, sensors and carbon nanotubes

Hans Schmitthenner, BS, Massachusetts Institute of Technology; Ph.D., Pennsylvania State University—Research Professor, Analytical and Organic Chemistry: imaging agent synthesis and analysis.

Gerald A. Takacs, BSc, University of Alberta (Canada); Ph.D., University of Wisconsin—Professor, Physical Chemistry: chemical kinetics, atmospheric chemistry, plasma chemistry, and photochemistry

Scott Williams, BS, Purdue University; Ph.D., Montana State University—Graduate Program Director, Materials Science and Engineering; Professor, Inorganic Chemistry: pharmaceutical quality assurance through application of point-of-care assays

Materials Science and Engineering

Jairo Diaz Amya, B.Sc., National University of Colombia, Bogota; Ph.D., Purdue University—Assistant Professor, Chemical Engineering: soft matter, biological systems, structural biology, controlling self-assembly of chiral cellulose nanocrystals

Mishkat Bhattacharya, B.Tech., Indian Institute of Technology (India); MA, Ph.D., University of Rochester—Professor, Physics: quantum optics, nanoscience, superconductivity

David A. Borkholder, BS, Rochester Institute of Technology; MS, Ph.D., Stanford University—Bausch and Lomb Professor of Microsystems Engineering

Christopher Collison, BS, Ph.D., Imperial College of London (United Kingdom)—Associate Professor, Physical Chemistry: polymer chemistry, organic photovoltaics

Denis Cormier, BS, University of Pennsylvania; MS, State University of New York at Buffalo; Ph.D., North Carolina State University—Earl W. Brinkman Professor: additive manufacturing, rapid prototyping

Michael Cromer, BS, York College of Pennsylvania; MS, Ph.D., University of Delaware—Associate Professor, mathematical modeling of complex fluids, asymptotics and perturbation methods, simulation

Pratik P. Dholabhai, BS, MS, Maharaja Sayajirao University of Baroda (India); MS, Ph.D., University of Texas at Arlington—Assistant Professor, Physics: computational condensed matter physics and materials science, materials by design, nanostructured materials, materials for energy technologies

Moumita Das, BS, MS, Jadavpur University (India); Ph.D., Indian Institute of Science—Associate Professor, Physics: theoretical soft condensed matter, mechanical response of biological materials and living systems

Scott Franklin, BA, University of Chicago; Ph.D., University of Texas—Professor: granular materials.

Thomas R. Gaborski, BS, Cornell University; MS, Ph.D., University of Rochester—Associate Professor, nanomaterials, separations, cellular mechanics

Gabrielle Gaustad, BS, Alfred University; MS, Ph.D., Massachusetts Institute of Technology—Associate Professor: sustainability, materials recovery

Surendra K. Gupta, B.Tech., India Institute of Technology (India); MS, University of Notre Dame; Ph.D., University of Rochester—Professor, Mechanical Engineering: x-ray diffraction, atomic force microscopy, micromechanics modeling, digital image analysis

Richard K. Hailstone, BS, Northern Illinois University; MS, Indiana University—Associate Professor, Imaging Science: silver halide materials and processing, imaging materials

Joseph P. Hornak, BS, Utica College of Syracuse University; MS, Purdue University; Ph.D., University of Notre Dame—Professor, Chemistry, Physical Chemistry: magnetic resonance spectroscopy and imaging

Seth M. Hubbard, BS, Drexel University; MS, Case Western Reserve University; Ph.D., University of Michigan—Professor, Physics: epitaxial crystal growth, growth and characterization of nanomaterials, high-efficiency photovoltaic devices, semiconductor device design and fabrication, thin films

Patricia Iglesias Victoria, BS, Ph.D., Polytechnic University of Cartagena (Spain)—Assiociate Professor: ionic liquids, tribology

Michael A. Jackson, BS, MS, Ph.D., State University of New York at Buffalo—Associate Professor, Microelectronic Engineering: microelectronic device design, fabrication, and test; material characterization techniques, surface analytical instrumentation; vacuum processing, including CVD, plasma, and ion beam techniques, micromachining, ferroelectric thin films, amorphous silicon and polysilicon film deposition and characterization

Karuna Koppula, B.Tech., Andhra University (India); MS, University of New Hampshire; Ph.D., Michigan State University—Senior Lecturer, Chemical Engineering: turbulent flow modeling, multiphase flow in Pulse jet mixers

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Golisano Institute for Sustainability

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Programs of Study

Golisano Institute for Sustainability is a comprehensive academic, training, and technology-transfer center focusing on multidisciplinary studies in sustainable production systems and the built environment. The institute's research areas include sustainable products, sustainable mobility, alternative energy systems, Eco-IT, and pollution prevention.

Please visit the college's website for in depth information on academics, faculty, facilities, research initiatives, advising, and more.

Admission requirements

Each college makes all decisions regarding graduate admission. Please refer to the individual program descriptions for information regarding specific admission criteria. For general graduate admission information, please refer to the Admission section of this bulletin.

Financial aid and scholarships

Please refer to the Financial Aid and Scholarship section of this bulletin for information regarding financial aid, scholarships, grants, loans, and graduate assistantships.

Architecture, M.Arch.

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Program overview

Sustainability concerns are changing how we think about architecture. Buildings account for a large percentage of the world's energy expenditures and carbon emissions, which has driven demand for more sustainable architecture. In RIT's accredited master of architecture program, we're moving sustainability forward to elevate the value of architectural design. As a student here, you'll learn how to design with context and substance in areas such as positive energy, performance building, climate-responsive designs, passive resiliency, and more.

Our accredited architecture program offers an immersive program focused on investigating the complexity of designing buildings with people, space, and the environment in mind. Whether you have a background in the building design sector or are new to the field, the program will prepare you for a path to positively contribute to the design of tomorrow's buildings, neighborhoods, and communities.

Our program offers foundation courses as well as more in-depth classes exploring integrated building systems, urban planning, industrial ecology, and more. You'll also have the flexibility to choose electives in other subject areas based on your unique talents and career goals, such as business, engineering, energy, or additional design skills.

What Sets Us Apart

1. Design matters: As a program emphasizing design, the program's core education takes place in the studio. Our studio curriculum integrates construction technologies, material science, and mechanics into design.
2. Hands-on education: Expect a hands-on learning environment, working on real-world projects and utilizing our 75,000-square-foot, LEED Platinum-certified building to observe and test building efficiency. The City of Rochester and the western New York region also serve as an active learning environment for our students.
3. Work experience: A professional co-op will help you build your resume before you graduate. RIT's cooperative education program lets you work in the field with local architects and present neighborhood improvement ideas to planning boards.
4. Global experience: Our global experience requirement lets you experience new cultures, settings, and contexts to expand your understanding of diverse architectural interests and needs.
5. STEM-designated: Our program is STEM-designated, which increases scholarship and research opportunities for students, and offers up to two additional years of work/study for international students.
6. NAAB-accredited: We're one of the few master of architecture degree programs in the U.S. to be accredited by the National Architectural Accrediting Board (NAAB)—that means you're getting one of the best architecture educations in the country.
7. Thesis: Our thesis option allows you to integrate everything you learn into a comprehensive project. Past student theses include designs for an urban master plan for Rochester's downtown, a net-zero or positive energy building, and a turbine system to harvest rainwater for energy.
8. On-campus or online: Our program is offered in both a traditional on-campus experience and through a 100% online setting.

Plan of Study

The RIT master of architecture program is available in a traditional on-campus setting or through a fully online format. The program also provides advanced standing or standard admission pathways for both the on-campus and online settings. We work with each student individually to determine the best setting and pathways and can customize course requirements based on levels of prior experience.

Program Settings

9. On-campus: Designed as a full-time in-person program, courses are offered on campus in the fall and spring semesters, primarily during the day, and often include open periods between classes to allow time for students to gain work experience with an architectural firm while they complete their degree.
10. Online: Designed as a flexible and remote program, courses are offered through 100% online instruction during the fall, spring, and summer semesters using both synchronous and asynchronous instruction. This flexible format allows time for students to gain work experience with an architectural firm while they complete their degree from any location.

Program Pathways

11. Advanced Standing Pathway: For those with previous experience and an undergraduate degree in architecture, the Advanced Standing track provides a two- to two-and-a-half year (5 semester) path.
12. Standard Admission Pathway: For those with no prior experience or background in architecture, the Standard Admission track is available and provides a three and half year (7-semester) path.

Curriculum

- Sustainability: With a global need for a more sustainable world, including buildings and their impact on energy consumption and carbon footprints, the focus of many courses reflect the conditions of sustainable design and practice.
- Technology: Design exploration is enhanced through the understanding of the implication of technology on both design process and product. The program enables students to focus and collaborate in many specialized areas of technology, including engineering, computer science, imaging science, materials and construction, and products and remanufacturing.
- Urbanism: The complexity of the urban environment requires an interdisciplinary approach to architecture education—one that references economics, public policy, sociology, and regional culture. With this in mind, the program also focuses on the practices and principles of preservation and adaptive reuse.
- Integrated learning/practice: From the outset, students often approach design problems within teams, learning to value and leverage collective and collaborative participation. Through integrated learning and evidenced-based models, we prepare students for the increasingly integrated practice of architecture, where architects are orchestrating teams of professionals from a variety of fields, including engineering, management, science, and computer science.

Enhanced Career Opportunities

RIT's master of architecture program is proud of the 100 percent job placement rate among our graduates. Our alumni are employed in architectural firms around the world and are working in diverse fields, from community development to smart growth to green building materials. Within firms and elsewhere, they serve as architectural designers, research scientists, sustainability consultants, planning engineers, start-up entrepreneurs, and more. Plus, our professional co-ops are a compelling program requirement that often leads to employment offers from architects and other firms working in construction, urban design, and facilities management.

Innovation Through Diversity

Enhancing the value of design requires constructive collaboration and a breadth of skills and viewpoints, interwoven in a way that elevates and celebrates everyone's differences and strengths at RIT. Behind our focus on creativity and innovation is a dedication to diversity and inclusion that is fundamental to our mission. The master of architecture degree is suited for students with or without a background in the architecture or sustainability fields. Many of our students have been former art teachers, film students, engineers, interior designers, lawyers, and more before beginning their studies. They bring these backgrounds to the program in ways that enriched conversations and perspectives about design and human needs. Plus, approximately one-third of our students are international students, bringing cultural experiences and architectural design concepts from every continent.

Curriculum

Architecture, M.Arch. degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
ARCH-611	Architectural Representation I	3
ARCH-612	Architectural Representation II	3
ARCH-621	Architectural History I	3
ARCH-622	Architectural History II	3
ARCH-631	Architectural Design I	6
ARCH-632	Architectural Design II	6
ARCH-641	Fundamentals of Building Systems	3
ARCH-761	Understanding Sustainability	3
Second Year		
ARCH-699	Coop Architecture (summer)	0
ARCH-731	Architectural Studio I: Site	6
ARCH-734	Architectural Studio II: Urban	6
ARCH-741	Integrated Bldg Systems I	3
ARCH-742	Integrated Building Systems II	3
ARCH-751	Architectural Theory	3
ARCH-752	Urban and Regional Planning	3
ARCH-762	Industrial Ecology Fundm	3
ARCH-763	Sustainable Building Metrics	3
Third Year		
ARCH-698	Global Experience (summer)	0
ARCH-733	Architectural Studio III: Adaptive	6
ARCH-735	Architecture Studio IV: Integrative	6
ARCH-743	Integrated Building Systems III	3
ARCH-744	Integrated Building Systems IV	3
ARCH-753	Research Seminar/Thesis Prep	3
	Open Graduate Sustainability Elective	3
	Open Graduate Electives	6
Fourth Year (fall only)		
ARCH-771	Professional Practice	3
ARCH-790	Thesis	6
	Open Graduate Electives	6
Total Semester Credit Hours		**105**

Numerous courses in the architecture curriculum require students to purchase supplies for use in class. Please review the Supply List for required supplies prior to starting the Master of Architecture program. For additional information, visit our Accreditation and Support page.

Accreditation

The master of architecture program is accredited by the National Architectural Accrediting Board (NAAB). In addition, the program is now designated as a STEM program in Architectural and Building Sciences/Technology (CIP code 04.0902) making international graduates eligible to extend their F-1 visas for up to three years in order to work in the United States.

Learn more about our program advisory council.

See who has made our program possible.

Admission requirements

We encourage applicants to demonstrate creative curiosity along with an interest in collaboration and leadership. We value applicants who can show an eagerness to contribute to the built environment and a sustainable future. To be considered for admission to the M.Arch. program, candidates must:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a portfolio. Refer to Graduate Portfolio Requirements for more information.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

We encourage applicants to demonstrate creative curiosity along with an interest in collaboration and leadership. We value applicants who can show an eagerness to contribute to the built environment and a sustainable future.

Sustainability, Ph.D.

www.rit.edu/study/sustainability-phd

Eric Williams, Professor
585-475-7211, exwgis@rit.edu

Program overview

Our approach to sustainability means working in the broader context of environmental assessment, economics, and policy. Each faculty member in the Golisano Institute for Sustainability sponsors a select number of students for specific research projects, with the scope varying from fundamental science to applied engineering to corporate sustainability applications. On acceptance into a sponsored research project, you will receive a fully-funded education, a stipend to help with living expenses, your own office space, and the time to develop your technical expertise in sub-areas dependent on your research.

In the sustainability Ph.D. program, you'll have the opportunity to learn from areas across the entire university to develop your own innovative approach to the field, building off of methodologies such as life cycle assessment, environmental risk and impact assessment, design for the environment, pollution prevention, closed-loop supply chain management, and product life assessment. Moreover, you'll work side-by-side with our world-renowned faculty who are avid researchers in diverse areas including biofuels, transportation, energy policy, resource recovery, smart products and systems, and more.

The sustainability Ph.D. helps you think innovatively about how sustainability can positively impact systems all over the world through big-picture solutions, from training future business leaders to maximizing natural resources. You don't need a background in sustainability to apply to this program; you just need a desire to create positive change in the world. We bring in students of all ages, from all backgrounds—from biotechnology to business—and from all over the world. You'll also find a wide range of experience—many of the program's students have more than 10 years of career experience and/or education.

The faculty are well-known scholars and active researchers who not only bring their knowledge into the classroom but also directly involve students in their scholarship. This work includes a wealth of hands-on experience in our impressive research facilities, including a 75,000-sq.-ft., LEED Platinum certified research building with over nine labs and six technology testbeds. With this level of experience, you'll be prepared for diverse academic and industry jobs where you can make an impact on the way the world views and utilizes sustainable practices, from the macro to the micro.

RIT's Sustainability Ph.D.

With the sustainability Ph.D.'s integrative curriculum, you will develop a deep foundation in sustainability science, sustainable systems, risk analysis, and more. You can also choose several electives from across RIT's colleges—from Computational Modeling and Simulation to Principles of Statistical Data Mining—to tailor your degree and create interdisciplinary relationships throughout the university.

Through your sponsored research project, you'll have the opportunity to make novel and impactful contributions to the development and understanding of sustainable technologies. Recent dissertation examples include:

- Implications of Consumer Lifestyle Changes and Behavioral Heterogeneity on U.S. Energy Consumption and Policy
- Criticality of Byproduct Materials: Assessing Supply Risk, Environmental Impact, and Strategic Policy Response for Tellurium
- Development of an Integrated Reformer and Fuel Cell System for Portable Power Applications

Sustainability Research

Sustainable Energy

- Fuel cells
- Photovoltaics
- Energy supply/demand models
- Energy policy

Circular Economy

- Life cycle assessment
- Electronic waste and battery recycling
- Waste-to-energy processes
- Food waste management
- Remanufacturing

Sustainable Urban Systems

- Smart Cities
- Transportation systems analysis
- Food Waste Management
- Food-Energy-Water Nexus

Sustainability Resources: RIT Advances Global Sustainability

Partnering locally and internationally with the communities in which we are engaged, RIT is continuing to advance sustainability efforts and build resiliency at home and around the world. Rochester, NY, is a hub for sustainability professionals and home to rich natural resources, such as fertile farmland and the nearby Finger Lakes. Many of our students share their passion for sustainability with the local community by volunteering on projects connected to K-12 education, community gardens, farmer's markets, and more. In addition, you will connect with the global sustainability community by attending and presenting at professional conferences all over the world.

Curriculum

Sustainability, Ph.D. degree, typical course sequence

COURSE		SEMESTER CREDIT HOURS
First Year		
ISUS-702	Fundamentals of Sustainability Science	3
ISUS-704	Industrial Ecology	3
ISUS-706	Economics of Sustainable Systems	3
ISUS-806	Risk Analysis	3
ISUS-808	Multicriteria Sustainable Systems	3
	Elective	3
Second Year		
Complete 8 credits from the following:		8
ISUS-807	Research	
ISUS-890	Dissertation Research	
PUBL-810	Technology, Policy and Sustainability (or approved substitute)	3
	Electives	9
Third Year		
ISUS-890	Dissertation Research	8
	Electives	6
Fourth Year		
ISUS-890	Dissertation Research	8
Total Semester Credit Hours		**60**

Admission requirements

To be considered for admission to the Ph.D. program in sustainability, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a writing sample, of which you are the sole author, which should be a report or paper from previous academic or professional work that reflects your critical thinking and writing abilities.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- Have completed at least two science courses, one calculus course, and one statistics course.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.
- Contact the department with a few sentences detailing your work and/or research experience, especially as it relates to the area you're interested in, so we can identify a potential sponsored research project match for you.

Sustainable Systems, MS

www.rit.edu/study/sustainable-systems-ms
Eric Williams, Professor
585-475-7211, exwgis@rit.edu

Program overview

The sustainable systems MS degree accepts students from any academic background and encompasses a wide range of interdisciplinary studies in sustainability science. Here, you won't be restricted to one sustainability topic or methodology. You will comprehensively learn and experience the methods that lead to environmental, social, technological, and business success, working one-on-one with a faculty advisor to tailor the degree to your sustainability interests.

RIT's Sustainable Degree

In the sustainable systems MS, you will start with a broad foundation of knowledge in environmental life cycle assessment, sustainable decision making, economic and policy strategies, and more. Then, you will have the opportunity to customize your degree in areas that suit your interests and career goals—such as renewable energy or mobility—as well as get the hands-on experience that employers are seeking. In as little as one year of study, you will be prepared to make sustainability decisions that you can apply to any career.

Not only will you be able to focus on an area that interests you, but you will be able to get hands-on in your projects with the use of one of our many labs or through design modeling tools. This degree allows you the flexibility to adapt your career over time and in response to the ever-changing developments in sustainability. The Golisano Institute for Sustainability is dedicated to groundbreaking sustainability research and its business applications. Our research facilities are second to none, and include a number of green buildings including Sustainability Institute Hall, a 75,000-square-foot, LEED Platinum-certified research building and multiple state-of-the-art research centers.

You don't need a background in sustainability to apply to this program; just a desire to create positive change in the world. We accept applicants of all ages, from all backgrounds—from mechanical engineering to political science—and from all over the world. This ensures your learning experience comes from the classroom as well as from the perspectives of students with diverse experiences.

Sustainability Curriculum

Through a flexible and interdisciplinary curriculum, you'll begin your degree in sustainable systems with core courses in industrial ecology, risk assessment, the economics of sustainability, and more. Several electives from across the university–in areas as diverse as from sustainable craft brewing and distilling to corporate social responsibility–allow you to tailor your degree around your talents and career goals.

Your degree culminates with a research thesis or a capstone project. Recent thesis examples include:

- Techno-Environmental Analysis of Generating Animal Feed from Wasted Food Products
- Fabrication and life cycle assessment of organic photovoltaics
- Characterizing adaptive capacity to climate change in developing countries: a case study on Peru

Sustainability Topics/Tracks

Sustainable Energy

- Sustainable Energy Systems
- Food-Energy-Water Nexus
- Energy Policy

Example research project: Inspection of wind turbine blades with unmanned aerial vehicles (UAVs)

Circular Economy

- Introduction to Geographic Information Systems (GIS)
- Data Analysis for Sustainability
- Innovation Policy
- Corporate Social Responsibility (CSR)

Example research project: Assessing a baseline case for reaching carbon neutrality in Monroe County by 2027

Sustainable Urban Systems

- Sustainable Mobility Systems
- Graduate Sustainable Communities
- Sustainable Building Metrics

Example research project: Evaluating strategies for sustainable renovation of RIT campus buildings

Careers in Sustainability

Graduates of the sustainable systems MS have a 100 percent placement rate, in part because of RIT's dedication to career counseling and ongoing relationships with employers. This means that all of our graduates gain employment or choose to further their education shortly after graduating. And If you're interested in pursuing a career more focused on academia or research, the master's degree is also an excellent stepping stone to a doctoral program, such as RIT's Ph.D. in sustainability, if you take the route of completing a thesis while here.

Sustainability Resources: RIT Advances Global Sustainability

Partnering locally and internationally with the communities in which we are engaged, RIT is continuing to advance sustainability efforts and build resiliency at home and around the world. Rochester, NY, is a hub for sustainability professionals and home to rich natural resources, such as fertile farmland and the nearby Finger Lakes. Many of our students share their passion for sustainability with the local community by volunteering on projects connected to K-12 education, community gardens, farmer's markets, and more. In addition, you will connect with the global sustainability community by attending and presenting at professional conferences all over the world.

Curriculum

Sustainable Systems (capstone option), MS degree, typical course sequence (semesters)

COURSE		SEMESTER CREDIT HOURS
First Year		
ISUS-702	Fundamentals of Sustainability Science	3
ISUS-704	Industrial Ecology	3
ISUS-706	Economics of Sustainable Systems	3
ISUS-780	Capstone	6
ISUS-806	Risk Analysis	3
ISUS-808	Multicriteria Sustainable Systems	3
PUBL-810	Technology, Policy and Sustainability (or approved substitute)	3
	Electives	6
Total Semester Credit Hours		**30**

Sustainable Systems (thesis option), MS degree, typical course sequence (semesters)

COURSE		SEMESTER CREDIT HOURS
First Year		
ISUS-702	Fundamentals of Sustainability Science	3
ISUS-704	Industrial Ecology	3
ISUS-706	Economics of Sustainable Systems	3
ISUS-806	Risk Analysis	3
ISUS-808	Multicriteria Sustainable Systems	3
	Elective	3
Second Year		
ISUS-790	Thesis	6
PUBL-810	Technology, Policy and Sustainability (or approved substitute)	3
	Elective	3
Total Semester Credit Hours		**30**

Admission requirements

To be considered for admission to the MS program in sustainable systems, candidates must fulfill the following requirements:

- Complete an online graduate application. Refer to Graduate Admission Deadlines and Requirements for information on application deadlines, entry terms, and more.
- Submit copies of official transcript(s) (in English) of all previously completed undergraduate and graduate course work, including any transfer credit earned.
- Hold a baccalaureate degree (or US equivalent) from an accredited university or college.
- Recommended minimum cumulative GPA of 3.0 (or equivalent).
- Submit a current resume or curriculum vitae.
- Two letters of recommendation are required. Refer to Application Instructions and Requirements for additional information.
- Not all programs require the submission of scores from entrance exams (GMAT or GRE). Please refer to the Graduate Admission Deadlines and Requirements page for more information.
- Submit a writing sample, of which you are the sole author, which should be a report or paper from previous academic or professional work that reflects your critical thinking and writing abilities.
- Submit a personal statement of educational objectives. Refer to Application Instructions and Requirements for additional information.
- Have completed at least two science courses, one calculus course, and one statistics course.
- International applicants whose native language is not English must submit official test scores from the TOEFL, IELTS, or PTE. Students below the minimum requirement may be considered for conditional admission. Refer to Graduate Admission Deadlines and Requirements for additional information on English language requirements. International applicants may be considered for an English test

requirement waiver. Refer to the English Language Test Scores section within Graduate Application Materials to review waiver eligibility.

Non-matriculated Students

An applicant with a bachelor's degree from an approved undergraduate institution and the appropriate background is permitted to take graduate courses as a non-matriculated student. If the student is subsequently admitted to the graduate program, a limited number of credit hours from courses taken at RIT as a non-matriculated student can be transferred to the degree program. Any applicant who wishes to register for a graduate course as a non-matriculated student must obtain permission from the chair of the graduate program and the course instructor.

Faculty

Nabil Nasr, BS, Helwan University (Egypt); M.Eng., Pennsylvania State University; MS, Ph.D., Rutgers University— Associate Provost and Director, Golisano Institute for Sustainability

Dennis A. Andrejko, B.Arch., Arizona State University; M.Arch., Massachusetts Institute of Technology—Head, Department of Architecture, Associate Professor

Callie W. Babbitt, BS, Georgia Institute of Technology; ME, Ph.D., University of Florida—Professor

Amitrajeet A. Batabyal, BS, Cornell University; MS, University of Minnesota; Ph.D., University of California at Berkeley—Interim Head, Department of Sustainability, Distinguished Professor, Arthur J. Gosnell Professor of Economics

Julius J. Chiavaroli, B.Arch., University of Notre Dame; MBA, Rochester Institute of Technology—Professor

Alissa D. DeWit-Paul, BS, Cornell University; M.Arch., State University of New York at Buffalo; Ph.D., Binghamton University—Assistant Professor

Seth H. Holmes, B.Arch., Roger Williams University; MDes, Harvard University—Associate Professor

Eric Williams, BA, Macalester College; Ph.D., State University of New York at Stony Brook—Professor

Nathaniel J. Williams, BS, Whitworth University; MSc, Nelson Mandela University (South Africa); Ph.D., Carnegie Mellon University—Assistant Professor

Graduate Admission

www.rit.edu/admissions/graduate

Admission decisions for graduate applicants are made by the department or college offering the program, and upon receipt of a completed application file from the Office of Graduate Enrollment Services. Correspondence between the student and the university is conducted through the Office of Graduate Enrollment Services, according to the following policies and procedures:

1. Inquiries regarding academic programs, as well as all applications for graduate study, are directed to the Office of Graduate Enrollment Services, Rochester Institute of Technology, Bausch & Lomb Center, 58 Lomb Memorial Drive, Rochester, NY 14623-5604. 585-475-2229, gradinfo@rit.edu.
2. The Office of Graduate Enrollment Services will acknowledge the inquiry or application, instructing the student as to the information required for admission by the school or department to which he or she is applying.
3. Once a student has submitted a formal application, the Office of Graduate Enrollment Services will prepare an applicant file. All correspondence and admission information is collected by the Office of Graduate Enrollment Services and placed in the applicant's file. The file will include an RIT application, previous college records (transcripts), applicable test scores, letters of recommendation, and other documents that may support admission of the candidate.
4. When all relevant admission data has been received, the applicant's file is sent to the appropriate school or department for review and an admission decision.
5. When the school or department has made a decision on the application, the decision form is returned to the Office of Graduate Enrollment Services.
6. The Office of Graduate Enrollment Services notifies candidates of admission decisions.
7. Academic units may informally advise non-degree students, but no formal program of study can be approved prior to admission.
8. The formal program is laid out by the dean's designee (department head, coordinator or program director, etc.) and is the one that must be followed by all students applying for admission or readmission in that program.
9. The basic entry requirements for graduate degree candidates include the completion of a baccalaureate degree and whatever other evidence of the applicant's potential to complete graduate studies may be required by the particular program. Rare exceptions to the baccalaureate requirement can be made in the case of candidates who have demonstrated unusual competence in their field of specialization. For these exceptions the recommendation of the department chairperson or director and the approval of the appropriate dean and the dean of graduate education are required.

The U.S. Government expects international students to prove competency in the English language prior to their acceptance to an American college or university. In keeping with this expectation, students whose native language is not English and whose secondary or higher education was completed in a non-native English speaking country must take a test of English language proficiency. Students must achieve the following minimum scores prior to consideration for admission into graduate studies: 550 (paper-based) or 79 (Internet-based) on the Test of English as a Foreign Language (TOEFL), 6.5 on the International English Language Testing System (IELTS), or 58 on the Pearson Test of English – Academic. Individual academic units may require higher standards or additional requirements.

Applicants whose test results fall below the minimum scores for admission but who otherwise meet academic requirements will be referred to the English Language Center. They will not be admitted to academic programs until they meet proficiency criteria established by the English Language Center.

In certain cases graduate students may be admitted prior to, but conditional upon completion of the baccalaureate degree. Applicants should not be considered for admission prior to the start of their final year of undergraduate study. The student must present a final transcript signifying successful completion of their baccalaureate degree by the end of the first term they are enrolled in the graduate program.

Graduate applicants who do not fully satisfy all admission criteria as to grades, test scores or other credentials, but do show sufficient promise to qualify for a trial period of graduate study may be admitted on probation to the university. Such students must achieve a 3.00 (B) program grade point average by the end of their first 9 credit hours of graduate study. Those students who do not meet this criterion will be suspended. Responsibility for specific requirements and maintenance of the student's appropriate status rests with the academic unit in consultation with the Office of Graduate Enrollment Services and the Office of the Registrar.

New York State immunization requirement

All students registered for four or more credits and born after January 1, 1957, must comply with New York state and RIT immunization requirements. New York State Law requires proof of immunity to measles, mumps, and rubella through either two MMR immunizations or positive blood titers for each disease. New York state also requires all students, regardless of age, to sign a meningococcal awareness form. RIT requires students age 26 and under to have the meningitis shot. Required immunizations should be obtained before arrival to avoid delay in registration or interruption of classes for which students have enrolled. Contact the Student Health Center (www.rit.edu/studentaffairs/studenthealth) with questions. Additional information and forms are available online.

Readmission

Students who leave a graduate program, or have a lapse in enrollment greater than or equal to three terms, including summer, and wish to return to that program must reapply through the Office of Graduate Enrollment Services. All student applications are subject to admissions standards at the time of reapplication. The program of study shall be subject to review and may be rewritten. Previous waiver and/or transfer credit may be lost, and program deficiencies may need to be made up.

Each college has the responsibility, upon a student's readmission, of determining which previous courses if any, are applicable toward the degree. Be aware that standards and degree requirements may have changed and previous waiver, transfer, or competency credit may be lost and program deficiencies may need to be made up. All readmission decisions are made by the academic unit. Readmission is not guaranteed.

Graduate students must complete the graduate program
within seven years of the date of matriculation into their program. This does not apply to prerequisites, bridge program courses or similar requirements.

Costs and Payment Procedures

Costs and Payment Procedures

The university reserves the right to change its tuition and fees without prior notice. Nonmatriculated students are charged graduate rates for graduate courses.

Graduate costs are listed in the table on this page. In addition, any graduate student carrying more than 18 credit hours of study will be charged the full-time tuition rate plus $1,628/credit hour for each hour of study exceeding 18.

Room and board for full-time students: A variety of housing options (residence halls and apartmentd) and meal plans are available to graduate students. Costs vary according to options selected. For information about housing and meal plan options, please visit Housing Operations at: www.rit.edu/fa/housing/.

The cost of books and supplies varies depending on the area of study and the number of courses taken by a student. The estimated cost for books and supplies ranges from $500 to $2,500 a year for full-time students and $300 to $700 a year for part-time students.

Charges for tuition, fees, and room and board are computed on a semester basis. University billing statements may be paid by cash, check, or electronic check (e-check). The university does not accept credit card payments for tuition, fees, and room and board that appear on the student billing statement. However, we have an arrangement for a third-party vendor to accept MasterCard, Visa, and Discover Card when payment is made online. The vendor does charge a percentage fee for each credit card transaction. Billing-related payments (check) may be mailed to: Rochester Institute of Technology, Student Financial Services, 25 Lomb Memorial Drive, Rochester, NY 14623. Payment also may be made in person at the Office of Student Financial Services on the first floor of the University Services Center. Credit card and e-check payment information can be found at www.rit.edu/fa/sfs/billing-dates-and-payment-options.

Due dates are clearly designated on the billing statement and our website. Failure to pay the amount due or arrange an optional payment by the due date will result in a late payment fee. Charges less anticipated financial aid and other credits reflected on billing statement will be divided into four installments. Payments due are:

- **Fall semester: August 15, 2021**
- **Spring semester: January 15, 2022**

Payment plan option information can be found at: www.rit.edu/fa/sfs/billing-dates-and-payment-options.

Graduate Costs

FALL 2021-2022	PER SEMESTER	PER YEAR
Tuition (12-18 credit hours)	$26,046	$52,092
Student Activity Fee	$158	$316
Student Health Services Fee	$205	$410
Estimated Living Expenses*	$5,812	$11,624
Estimated costs for books, supplies, transportation, and personal expenses†	$2,088	
TOTAL	**$34,309**	**$68,618**

IMPORTANT NOTE: RIT health insurance is required for all full-time graduate students. This fee is estimated to be $2,006 for two semesters.

* Estimates based on a the rent of a bedroom apartment on RIT's campus. Choice of housing will determine (and possibly increase) actual cost. If you live in RIT housing, your living expenses will vary depending on where you live and if you choose a meal plan. Additional information regarding on-campus housing options and costs can be reviewed online at Housing Operations, rit.edu/housing/incoming-graduate-transfer#rates.

† Photography and art students should estimate an additional $2,000 for materials and supplies per nine-month period of study.

Electronic Billing

The university has an electronic billing (E-Bill) program for students. Each semester, all students receive an e-mail notification to their official university e-mail account stating that their E-Bill is available. Students have the option of granting additional access to allow for a parent, guardian, sponsor, or other authorized user to receive E-Bill notifications (www.rit.edu/eservices).

Student Accident and Sickness Insurance

All registered students are required to maintain medical insurance while attending RIT. Insurance coverage can be through RIT, a family member's policy, or a personal policy.

A student accident and sickness insurance plan is available through RIT. There is a separate charge for this insurance. The plan provides coverage, within limits specified in the policy, for sickness and injury, outpatient services, emergency care, and prescriptions.

Enrollment in this plan is voluntary for all students except registered international undergraduate students (full- and part-time) on A, B, E, F, G, I, J, K, O, Q, R, and V visas. These students will be enrolled automatically in the basic accident and sickness policy on a semiannual basis.

There is no need to waive coverage if it is not desired. Students who want to enroll in this plan may enroll online or by mail. An open enrollment period is available at the beginning of each academic semester. Payment can be made by check, money order, or credit card, or the premium can be added to the student's account.

The open enrollment period ends 30 days after the start of the academic semester in which the student first registers.

For plan and enrollment information, visit the web at www.universityhealthplans.com or call 800-437-6448. Students are not required to obtain the student accident and sickness insurance plan to receive services at the Student Health Center.

Refund Policies

For information regarding refund policies for withdrawal during the semester, please contact the Student Financial Services Office or visit their website at www.rit.edu/fa/sfs/refund.

Partial refund schedule for room and board

To complete a withdrawal from RIT, a resident student must check out with RIT Housing. All students on a meal plan should check out with RIT Dining. Refunds, when granted, are from the date of official check out.

Any student who intentionally defrauds or attempts to defraud the university of tuition, fees, or other charges, or who gives false information in order to obtain financial aid, is subject to legal liability, prosecution, and university disciplinary action.

Financial Aid

www.rit.edu/admissions/aid

General Information

RIT offers a full range of financial aid programs to assist graduate students with their educational expenses. The information provided in this section is an overview of the sources of assistance available. Please consult the Office of Financial Aid and Scholarships' website for more detailed information.

Scholarships and assistantships are available in most graduate departments. In addition, some departments offer externally funded tuition remission and stipends from corporate or government sponsors. Please contact the appropriate graduate program director (www.rit.edu/graduate-program-contacts) or the Office of Graduate Admission for additional information.

Financial aid is offered only once a student is accepted. Aid is generally given to full-time students, but exceptions are made for qualified part-time students.

All federal student aid programs require submission of the Free Application for Federal Student Aid (FAFSA). The FAFSA may be completed online at www.studentaid.gov. Only US citizens or eligible non-citizens may use the FAFSA. Course work not applicable to the student's program of study cannot be counted toward enrollment status nor in the determination of federal financial aid eligibility.

International students (F-1 or J-1 visa holders) may generally work on campus for up to 20 hours per week. Special authorization from International Student Services and/or the USCIS is needed for all other employment, including co-ops and internships. Please consult International Student Services at (585) 475-6943 or www.rit.edu/studentaffairs/iss for employment or visa questions.

Federal Satisfactory Academic Progress Requirements

To be eligible for federal financial aid, students who are U.S. citizens or eligible non-citizens are required by the U.S. Department of Education (34 CFR 668.34) to maintain Satisfactory Academic Progress (SAP) toward their degree objectives. RIT has established this SAP policy to ensure student success and accountability and to promote timely advancement toward degree objectives.

All students receiving federal assistance (i.e. Direct Loans, Direct Graduate PLUS Loans, Federal Work-Study) must remain enrolled in a degree program. Regulations require a maximum time frame for degree completion, a quantitative measurement where a student must complete 67% of credit hours attempted, and a qualitative measurement where a student must have at least a 3.0 cumulative grade point average.

Credit hours attempted include withdrawals, repeated courses, grade exclusions, non-matriculated courses, and credit by exam. Transfer credit count toward both attempted and completed credit hours.

Students must also complete their program within 150 percent of the published program length of the degree. For example, a thirty (30) credit hour master's degree program would allow a student a maximum of forty-five (45) attempted credit hours to degree completion.

Review of academic records occurs at the end of each semester, includng summer. Any student who has attempted or earned nine (9) or more credit hours but does not have a cumulative GPA of a 3.0 or higher will be considered not to be making SAP for federal financial aid programs (Direct Loans, Direct Graduate PLUS Loans). In addition, a student must have completed at least 67% of his total attempted credit hours. A student who does not meet this pace requirement will also not be making SAP. A student who does not appear to be able to meet degree completion within 150% of the program of study is not making SAP.

Students not making SAP may appeal their status by submitting a Request for Federal Financial Aid Probation form, available by contacting the Office of Financial Aid and Scholarships. In addition to this form, the student must provide a Federal SAP Action Plan developed by the student's primary academic unit that demonstrates what the student must accomplish in order to regain federal SAP. The Office of Financial Aid and Scholarships will notify the student of the results of the request for probation. If approved, a student may continue to receive federal financial aid, as long as the individual meets the goals outlined within the SAP Action Plan. The probation period may not exceed two semesters in length. A student is only eligible for one Federal Financial Aid Probation for their entire graduate career at RIT. As such, the student should only request Federal Financial Aid Probation if seeking federal financial aid.

Financial Aid Refund Policy

Return of federal funds

In accordance with federal regulations, the Office of Financial Aid and Scholarships recalculates federal aid eligibility for students who withdraw, drop out, are suspended, or take a leave of absence prior to completing more than 60 percent of a term. "Withdrawal date" is defined as the actual date the student initiated the withdrawal process, the student's last date of academic related activity or the midpoint of the term for a student who leaves without notifying the university. Recalculation is based on the percent of earned aid using the following formula: number of days completed up to the withdrawal date/total days in the term. Aid returned to federal programs is then equal to 100 percent minus the percentage earned multiplied by the amount of federal aid disbursed.

Funds are returned to the federal government in the following sequence: Federal Direct Unsubsidized Loans, Federal Direct PLUS Loans, and other federal aid.

State scholarships

Regulations vary. Any adjustments are done in accordance with the specific requirements of the sponsoring state.

Privately funded grants and scholarships

In the absence of specific instructions from the sponsor, 100 percent of the semester offer will be credited to the student's account.

RIT grants and scholarships

Institutional funding such as RIT grants and scholarships are prorated based on the tuition refund schedule for withdrawal during a semester. For more information, please contact the Office of Financial Aid and Scholarships or visit their website at rit.edu/admissions/aid.

Financial Aid Programs

GRANTS/SCHOLARSHIPS	ELIGIBILITY	AMOUNT	HOW TO APPLY
Graduate Assistantships	Graduate student matriculated into an RIT graduate degree program.	Amounts vary	Complete Graduate Admissions Application and check appropriate box to be considered for graduate assistantships.
Graduate Merit-based Scholarships	Graduate student matriculated into an RIT graduate degree program.	Amounts vary	Complete Graduate Admissions Application and check appropriate box to be considered for graduate scholarship.
Veterans Tuition Award Program	Eligible Veterans who are New York state residents.	Amounts vary.	File the Free Application for Federal Student Aid (FAFSA). Also file the Veterans Tuition Award Application at www.hesc.ny.gov.
Veterans Benefits	Eligible veterans and children of deceased veterans, or service-connected disabled veterans.	Amounts vary.	Contact: Office of Veterans Affairs at (888) 442-4551, or visit their website at www.va.gov.
Bureau of Indian Affairs Graduate Fellowship Grants	Enrolled full-time and recognized by Secretary of the Interior as a member of an Indian tribe and demonstrating financial need and academic achievement.	Amounts vary	Contact the Native Forward Scholars Fund, formerly known as the American Indian Graduate Center, at (800) 628-1920, or visit their website at www.nativeforward.org.

LOANS	ELIGIBILITY	AMOUNT	HOW TO APPLY
Federal Direct Loans	Matriculated students who are enrolled at least half-time and who are U.S. citizens or permanent residents.	Maximum amount: $20,500. The maximum amount cannot exceed the cost of attendance minus all other financial aid offered.	File the Free Application for Federal Student Aid (FAFSA) at www.studentaid.gov. Must be a U.S. citizen or eligible non-citizen.
Federal Direct PLUS Loans for Graduate Students	Matriculated students who are enrolled at least half-time and who are U.S. citizens or permanent residents.	The maximum amount cannot exceed the cost of education minus all financial aid awarded.	File the Free Application for Federal Student Aid (FAFSA) and complete a Federal Direct PLUS Loan application. Both can be completed at www.studentaid.gov.
Private Alternative Loans	Enrolled student who is credit-approved by lender.	Up to the cost of education minus all other financial aid awarded.	Consult the Office of Financial Aid and Scholarships website at https://www.rit.edu/admissions/aid/loans#alternative-educational-loans or contact the private lender directly.

EMPLOYMENT	ELIGIBILITY	AMOUNT	HOW TO APPLY
Federal Work Study Program	Students who are U.S. citizens or permanent residents with financial need: most jobs provided are on campus, and some community service positions are available.	Varies, depending on hours and wage rate (RIT wage rates start at $13.20 per hour).	File the Free Application for Federal Student Aid (FAFSA). Contact the RIT Student Employment Office at www.rit.edu/seo.
RIT Employment Program	No financial need requirement; may be on campus or off campus.	Varies, depending on hours and wage rate (RIT wage rates start at $13.20 per hour).	Contact the RIT Student Employment Office at www.rit.edu/seo.

This chart covers the most commonly awarded financial aid programs available to full-time graduate students at RIT. Information is correct as of August 2022. Most graduate programs require satisfactory progress toward degree completion to maintain eligibility. Filing the FAFSA by October 1 will ensure priority consideration for all programs. Applications filed after this date will receive consideration as long as funds remain available. Scholarships provided by RIT will be prorated for NTID-sponsored students to reflect lower NTID tuition rates.

University Policies and Procedures

www.rit.edu/academicaffairs

Academic Policies and Procedures

The complete library of student academic policies and procedures may be found online at: www.rit.edu/academicaffairs/policiesmanual/policies/student.

A graduate degree at RIT may be obtained in more than 70 programs ranging from business administration to imaging science. (Please refer to page 4 for a complete listing of graduate programs of study.)

Upon completion of the stipulated requirements, students are certified by their academic departments for their degrees. A statement verifying that a degree has been awarded will be posted to the transcript and diplomas are mailed to all graduates.

Enrollment

1. Student should complete the enrollment and payment process in accordance with university enrollment/billing procedures, as indicated in the current enrollment guide.
2. It is the responsibility of the student to update their address online through the Student Information System (SIS), or to advise the registrar of any change of address.
3. University ID cards are required for students to use many campus facilities and services (e.g., the library, Student Life Center, meal plans, check cashing). Identification cards are available at the Registrar's Office.
4. Students are expected to pursue their degree without a substantial break. Failure to enroll (register) for three successive academic terms, including summer but excluding Intersession, can result in the loss of active student status.
5. RIT considers graduate-level students to be "full time" in every academic term in which they are enrolled for at least 9 semester credit hours. With approval of the department chair and associate provost for academic programs, additional equivalent credit can be granted for such activities as thesis work, teaching assistantships, and internships.

Student Classification

Active graduate students are those who have applied to and been formally accepted into a graduate program through the Office of Graduate Enrollment Services. Such students may enroll for graduate-level courses (600 and above) that fit their home department-approved programs. When enrolling for graduate courses outside the home department, students may need to secure the approval of the department offering the course.

Non-degree-seeking students will be allowed to take graduate courses on a space-available basis with the department's approval, and with the knowledge that course work completed while a non-degree-seeking student will not necessarily apply to any given academic program.

Active and non-degree-seeking graduate students may enroll for undergraduate-level courses with the understanding that these courses will not apply to any RIT graduate program.

Degree Requirements

Credit Requirements

The minimum credit requirement for a master's degree is 30 semester credit hours. At least 80 percent of these credit hours must be earned at the graduate level and in residence at the university.

Transfer Credit

A maximum of 20 percent of the total required semester hours for the graduate degree may be awarded through any combination of transfer credit, waived credit, and credit by competency. Only a course with a grade of B (3.0) or better may be transferred.

Transfer credits are not calculated in the student's grade point average but will count toward overall credit requirements for the degree. Transfer credits do not count toward the satisfaction of residency requirements.

A graduate student who wishes to take courses at another institution and transfer them toward degree work at RIT must obtain prior permission from the appropriate departmental officer or dean.

Candidacy for an Advanced Degree

A graduate student must be a candidate for an advanced degree for at least one term prior to receipt of the degree. The position of the Graduate Council is that a student is a candidate for the master or doctoral degree when they are formally admitted to RIT as a graduate student.

Dissertation, Thesis, or Project Requirements

Included as part of the total credit-hour requirement may be a research, dissertation, thesis, or project requirement, as specified by each department. The amount of credit the student is to receive must be determined by the time of enrollment for that term. For the purpose of verifying credit, an end-of-term grade of R should be submitted for each enrollment of research and thesis/dissertation guidance by the student's faculty adviser. Before the degree can be awarded, the acceptance of the thesis/dissertation must be recorded on the student's permanent record. Students also should note the following continuation of thesis/dissertation policy. Students who submit a project recieve a letter grade upon completion.

Students who complete a thesis or dissertation are required to submit an electronic copy of the thesis or dissertation to ProQuest/UMI for publication.

Continuation of Thesis/Project/Dissertation

Once work has begun on a thesis, project or dissertation, it is seen as a continuous process until all requirements are completed. If a thesis, project, or dissertation is required, or such an option is elected, and if the student has completed all other requirements for the degree, the student must enroll for the Continuation of Thesis/Project/Dissertation course each term (including summer but excluding intersession). This course costs the equivalent of one-semester credit hour, although it earns no credit.

1. Enrollment for the Continuation of Thesis/Project/Dissertation course preserves student access to RIT services; e.g., Wallace Library, academic computing, and faculty and administrative support. With payment of appropriate user fees, access to the Student Life Center and Student Health Center also is preserved.
2. If circumstances beyond students' control preclude them from making satisfactory progress on their thesis/project/dissertation, they should consider taking a leave of absence and discuss such a leave in advance with their adviser/department head. The dean's signature of approval is required on the Leave of Absence or course, or take an approved leave of absence, their departments may elect to remove them from the program.
3. The length of time to complete a thesis/project/dissertation is at the discretion of the department. Be sure to read, however, the first point under "Summary of requirements for master's degree" on this page.

Note: The dissertation is required only of Ph.D. students.

Summary Experience

The Graduate Council regards some form of integrative experience as necessary for graduate students. Such requirements as the comprehensive examination, a project, the oral examination of the thesis, and a summary conference are appropriate examples, provided they are designed to help the student integrate the separate parts of their total educational experience. The nature of the experience will be determined by the individual college or department.

Overlapping Credit for Second Degree

At the discretion of the Graduate Committee in the specific degree area, a maximum of 20 percent of previous RIT master's degree earned hours can normally be applied toward satisfying requirements for a second master's degree. The use of a given course in two different programs can be allowed only if the course that was used for credit toward the first degree is a required course for the second degree. The course must be used in both programs within five years; i.e., no more than five years between the time used for the first degree and when applied again toward the second degree.

In no case shall fewer than the minimum 30 semester credit hours be required for the second degree. If duplication of courses causes a student to go below the 30-hour limit in the second degree program, he or she would be exempted from these courses but required to replace the credit hours with departmentally approved courses. An RIT student will not be admitted through the Graduate Enrollment Services Office to the second degree program until the first program has been completed.

Financial Standing

Tuition and fees paid to the university cover approximately 60 to 70 percent of the actual expense of a student's education. The rest of the cost is borne by the university through income on its endowment, gifts from alumni and friends, and grants from business and industry. Students, former students, and graduates are in good financial standing when their account is paid in full in the Student Financial Services Office. Any student whose account is not paid in full will not receive transcripts or degrees. The university reserves the right to change its tuition and fees without prior notice.

Summary of Requirements for Master's Degree

1. Successfully complete all required courses of the university and the college. These requirements should be met within seven years of the date of matriculation into the student's program. Extension of this rule may be granted through petition to the dean of graduate education.
2. Complete a minimum of 30 semester credit hours for the master's degree. At least 80 percent of graduate-level course work and research (courses numbered 600 and above) must be earned in residence at RIT.
3. Achieve a program cumulative grade point average of 3.0 (B) or better.
4. Complete a thesis/project or other appropriate research or comparable professional achievement, at the discretion of the degree-granting program.
5. Pay in full, or satisfactorily adjust, all financial obligations to the university.

Note: The dean and departmental faculty can be petitioned, in extraordinary circumstances, to review and judge the cases of individual students who believe the spirit of the above requirements have been met yet fall short of the particular requirement. If the petition is accepted and approved by the faculty and dean of graduate education, a signed copy will be sent to the registrar for inclusion in the student's permanent record.

Definition of Grades

Grades representing the students' progress in each of the courses for which they are enrolled are given on a grade report form at the end of each term of attendance. The letter grades are as follows:

GRADE	DESCRIPTION	QUALITY POINTS
A	Excellent	4.0
A-		3.67
B+		3.33
B	Above Average	3.0
B-		2.67
C+		2.33
C	Satisfactory	2.0
C-		1.67
D	Minimum Passing Grade	1.0
F	Failure	0.0

C- and below grades do not count toward the fulfillment of program requirements for a graduate degree. **The grades of all courses attempted by graduate students will count in the calculation of the cumulative grade point average.** The program cumulative grade point average shall average 3.0 (B) as a graduation requirement. The dean of the college or their designee must approve all applications for graduate courses a student wishes to repeat.

The GPA is computed by the following formula: GPA = total quality points earned divided by total credit hours attempted. There are other evaluations of course work that do not affect GPA calculations. Only I

and R (as described below) can be assigned by individual instructor at the end of a term.

Registered (R)—A permanent grade used in graduate coursework indicating that a student has registered for a given course but has yet to meet the total requirements for the course or has continuing requirements to be met. The grade is given in graduate thesis work. Completion of this work will be noted by having the approved/accepted thesis or dissertation title, as received by the registrar from the department, added to the student's permanent record. Full tuition is charged for these courses. "R" graded courses are allowed in the calculation of the residency requirement for graduate programs; however, they do not affect GPA calculations. A student may receive a grade of "U" or "I" in a given term of an "R" graded course. A "U" grade in this case carries no credit and the course must be repeated.

Withdrawn (W)—A grade that indicates an official course withdrawal has been processed. See policy D05.IV.

Satisfactory (S)—A satisfactory grade at the graduate level may only apply to seminar, cooperative work experience, study abroad affiliate programs, and internship courses where programs have determined that a traditional alpha system letter grade is inappropriate. An "S" grade at the graduate level carries no quality points and therefore does not enter into a GPA calculation. A student may receive a grade of "U" or "I" in an "S" graded course. In this case, a "U" grade carries no credit and the course must be repeated. No more than 15% of a program's degree credits may be "S" graded courses.

Incomplete (I)—When an instructor observes conditions beyond the control of a student such that the student is unable to complete course requirements in the given term or session, the instructor may assign an Incomplete notation ("I") to a student. The instructor determines and advises the student of the due date, not to exceed two terms including summer session but excluding intersession, by which the student must complete course requirements. If the registrar has not received a "Change of Grade" form from the professor after two terms including summer session but excluding intersession, then the Incomplete becomes an "F" grade or a "U" grade if the "I" was associated with an "R" or "S" graded graduate course. An extension of time may be granted at the discretion of the instructor. Credit hours are not earned and the GPA is not affected until a permanent grade is assigned.

Unsatisfactory (U)—A permanent grade used in certain graduate coursework indicating that a student made unsatisfactory progress towards completing the course requirements. No credit hours are earned for a "U" grade and the "U" grade does not affect the calculation of quality points or GPA. A "U" grade in an "R" or "S" graded course carries no credit and the course must be repeated.

If there are extenuating circumstances which render an instructor unable to assign a grade or evaluate a student's work and assign a grade to replace an "Incomplete" notation, the head of the academic unit in which the course was taught will select an instructor to act in the place of the original instructor. After appropriate evaluation of the student's work, that instructor will assign a grade in place of the "Incomplete" notation.

Waived Courses (WV)—Those courses eliminated from the list of requirements that a student must take to graduate. For undergraduate students, only physical education courses and cooperative work experience may be waived because of previously completed experience.

For graduate students, required courses may be waived because of previously completed academic work but in no case shall the resulting graduate program requirements be reduced below 30 semester credit hours. In addition, waiver credit for graduate courses can be applied only towards required courses and not towards elective courses. The process of waiving courses and thereby reducing graduate program requirements is not to be confused with the process of substituting specific courses for published requirements with an equal number of credit hours, thus retaining the total number of credit hours in the specified program. The total combined amount of credit applied through external (non-RIT) transfer credit, waived courses, and credit by competency may not exceed 20% of the total credits in the graduate program as noted in the graduate catalog.

X Grade (X)—Assigned for successful completion of various assessments as defined in Policy D.02.0 Admissions. "X" grade for graduate students indicates Credit by Competency (graduate) (See policy D02.I.2).

"X" graded courses do not count toward the residency requirement and do not affect GPA calculations. Credit hours are included as hours earned.

For graduate students, the total combined amount of credit applied through external (non-RIT) transfer credit, waived courses, and credit by competency may not exceed 20% of the total credits in the graduate program as noted in the graduate catalog. Exceptions to the maximum credit by exam for graduate programs can be granted by the Graduate Council in unusual circumstances upon appeal from the dean of the college involved. For programs housed outside the college structure, the approval of the director of the academic unit is required.

Audit (AU)—Indicates a student has officially registered for the course for no credit. Courses available for audit are at the discretion of the college or academic unit. With permission of the instructor, the student may elect to take examinations and do course assignments. Audited courses do not count toward the residency or other degree requirements. Credit hours are not earned and GPA calculations are not affected.

A student may register for audit any time during the official registration period for the term. However, a student may not change from audit to credit or credit to audit after the official add/drop period (first seven calendar days, excluding Sundays and holidays, of the full fall, and spring terms and summer session). See Policy D03.0 - Registration. Changes from audit to credit must be accompanied by full payment of tuition.

Excluding audit courses, degree-seeking undergraduate students enrolling for 12 or more credit hours or graduate students enrolling for 9 or more credit hours may take any additional hours for audit at no incremental charge provided the total hours do not exceed 18 credit hours.

Excluding audit courses, undergraduate students enrolled for less than 12 credit hours or graduate students enrolled for less than 9 credit hours may take any additional hours for audit at a charge of one-half the normally assessed tuition rate.

Changing Grades

Once a grade has been reported by an instructor, it is not within the right of any person to change this unless an actual error has been made in computing or recording it. If an error has been made, the instructor must complete the appropriate form. The completed form must be approved by the head of the department in which the instructor teaches. When approved, the form is then sent to the registrar. There is, however, an appeal procedure for disputed grades through the Academic Conduct Committee of the college in which the course is offered.

Academic Probation and Suspension

Any degree-seeking graduate students will be placed on probation or suspended from the university according to the criteria enumerated below. All actions are taken at the end of the term; however, a student may petition the dean of their home college for reconsideration of probation or suspension should the removal of an incomplete grade (I) raise the program grade point average above those stated below. For programs housed outside the college structure, the approval of the director of the academic program in which the enrollment is requested is required.

Each degree-seeking graduate student will generate two different grade point averages that appear on the transcript - cumulative and term averages. The university cumulative average reflects all course work completed at RIT at the graduate level. The term average reflects a single term of academic activity. In addition, each graduate student has a program average used for degree certification that is manually calculated by the academic unit and reflects course work completed at RIT applicable to graduation in a student's current academic program. The current academic program refers to the university and college degree course requirements specified by the degree granting college and noted in the graduate catalog.

In addition to the university requirements outlined below, individual colleges and/or programs may define more rigorous requirements for maintaining good academic standing. This information must be approved by the dean, clearly defined within published college policy, communicated in the university bulletin, and communicated to the Provost's Office. For programs housed outside the college structure, the approval of the director of the academic unit is required.

1. Any degree-seeking graduate student whose cumulative and/or program grade point average (see D5.0 - Grades, section VII) falls below a 3.00 after 9 credit hours (attempted or earned) subsequently will be placed on probation and counseled by the graduate program director (or his/her designee) concerning continuation in the graduate program.
2. Students on probation must raise their program cumulative and program grade point average to 3.00 within 9 credit hours (attempted or earned) or they will be suspended from the graduate program.
3. A graduate student suspended for academic reasons, must apply for readmission.
4. A suspended student cannot enroll in any credit or non-credit course at the university while on suspension.
5. A suspended student may appeal a suspension decision. Individual colleges and/or programs may set limitations on the number of appeals a student can submit.
6. A suspension may be waived upon written appeal to the student's home program. Final suspension waiver approval requires dean (or designee) approval. For programs housed outside the college structure, the approval of the director of the academic unit in which the enrollment is requested is required.
7. A suspended student may be required to satisfy specific academic conditions imposed in order to be considered for readmission to his/her program.
8. A suspended student may be admitted to another program if it is approved by the dean (or designee) of the college in which enrollment is requested. For programs housed outside the college structure, the approval of the director of the academic program in which the enrollment is requested is required

Non-Degree-Seeking Undergraduate and Graduate Policy

Any non-degree-seeking undergraduate student who has a cumulative GPA below 2.00 after 15 credit hours or non-degree-seeking graduate student who has a cumulative GPA below 3.00 after 9 credit hours (attempted or earned) may not register for credit or non-credit courses without the specific approval of the department head offering the course(s).

Student Conduct Policies and Procedures

Standards for Student Conduct

The RIT community intends that campus life will provide opportunities for students to exercise individual responsibility and places high priority on self-regulation by its members. All members of the community are responsible for encouraging positive behavior by others, as well as preventing or correcting conduct by others that is detrimental to RIT's educational mission and values.

As an educational community, RIT strives for a campus environment that is free from coercive or exploitative behavior by its members. Moreover, it sets high standards that challenge students to develop values

that enhance their lives professionally and will enable them to contribute constructively to society.

RIT enjoys a diversity of backgrounds, lifestyles, and personal value systems among those who compose the academic community. Students, however, are expected to observe and respect the policies and standards of the university and the right of individuals to hold values that differ from their own and those expressed by RIT. Students are encouraged to review the Student Rights and Responsibilities Handbook for information regarding campus policies and expectations of student conduct.

Students must recognize that they are members of the local, state, and federal communities, and that they are obliged to live in accord with the law without special privilege because of their status as students or temporary residents.

RIT offers a number of services for graduate students. Those described in the following pages are among the most frequently used.

RIT Honor Code

Integrity and strong moral character are valued and expected within and outside of the RIT community. As members of the RIT campus community, including students, trustees, faculty, staff, and administrators, we will:

- Demonstrate civility, respect, decency and sensitivity towards our fellow members of the RIT community, and recognize that all individuals at this university are part of the larger RIT family, and as such are entitled to that support and mutual respect which they deserve.
- Conduct ourselves with the highest standards of moral and ethical behavior. Such behavior includes taking responsibility for our own personal choices, decisions and academic and professional work.
- Affirm through the daily demonstration of these ideals that RIT is a university devoted to the pursuit of knowledge and a free exchange of ideas in an open and respectful climate.

Computer Security and Safeguards

RIT's Code of Conduct for Computer and Network Use guides campus-wide use of all computers and networks. This document, found online at www.rit.edu/computerconduct, outlines RIT's official policy related to ethical use of computing and network resources. ITS put into place multiple safeguards to protect RIT's network environment and the integrity of individual user accounts. Additionally, ITS provides all students, faculty, and staff with antivirus software free of charge.

Health Policies

Health/Medical Records

Medical records are confidential. Information will not be released without the written consent of the student. Exceptions to this rule are made only when required by the public health laws of New York state or a court-ordered subpoena or in a life-threatening situation.

New York State and RIT Immunization Requirements

New York state public law requires that all students enrolled for more than six credit hours in a term and born after January 1, 1957, must provide proof of having received the appropriate immunizations against measles, mumps, and rubella, and to sign a meningitis awareness form. The law applies to all full time and part time students including RIT employees. Immunization requirements include:

- Two MMR vaccinations at least one month apart and after the first birthday;
- A Meningitis Awareness Form, signed by all students regardless of age; and
- Immunization against meningitis, which is required by RIT for all students age 21 and under.

Failure to comply with the New York State immunization law may result in exclusion from classes and the campus, and a $200 fine.

Covid Vaccine Requirement

All RIT students are required to be fully vaccinated. Individuals are considered fully vaccinated 1) two weeks after their second dose in a 2-dose series (such as the Pfizer or Moderna vaccines); or 2) two weeks after a single-dose vaccine (such as Johnson & Johnson's Janssen vaccine). For more information on RIT's Covid vaccination policy, please visit rit.edu/ready/rit-safety-plan.

NOTE: An email notification is sent to students' RIT email account with directions to complete the necessary health information through the Student Health Center portal. Please note that the immunization form is to be completed by the student online and then downloaded and taken to the student's health provider or school official for verification. The form must then be forwarded to the Student Health Center for approval (fax: 585-475-7530).

Consumer Information

rit.edu/fa/compliance/student-right-know

In compliance with the federal Student-Right-to-Know and Campus Security Act, and regulations of the U.S. Department of Education, RIT provides the following information to current and prospective students:

Outcomes Rate

Each year RIT gathers information about the career plans of its graduates in accordance with national standards established for the National Association of Colleges and Employers (NACE). These outcome summaries are provided by the university overall at both the undergraduate and graduate levels and reflect the career activities of graduates within six months of degree certification. Outcomes rates describe the percentage of graduates who have entered the workforce, enrolled for further full-time study, or are pursuing alternative plans (e.g., military service, volunteer service, or those not seeking employment at this time). The outcomes rate for the class of 2021 was 94.4% based on a 85.4% knowledge rate (the percent of graduates that RIT had verifiable information on).

Student Persistence and Graduation

For Master's Degree Students—One year retention rate was 89.1% for the students starting in the 2020-21 academic year. The five year graduation rate was 90% for the students starting in the 2016-17 academic year.

For Doctoral Degree Students—One year retention rate was 87.8% for the students starting in the 2020-21 academic year. The seven year graduation rate was 90% for the students starting in the 2014-15 academic year

Public Safety

The Public Safety Department is open 24-hours-a-day and is located in Grace Watson Hall. The department encourages the RIT community to take responsibility for their safety by staying informed of these services and reporting suspicious activity. Although each individual is ultimately responsible for their own personal safety, learning and practicing basic safety precautions can enhance one's well being. RIT's Public Safety Report is available at: www.rit.edu/publicsafety/sites/rit.edu.publicsafety/files/2021AnnualSecurityReport.pdf. The department provides the following services:

- *Blue Light Call Boxes*—Identified by a blue light and located across campus, these call boxes provide a direct line to Public Safety 24-hours-a-day. The location of the call is automatically recorded at the Public Safety Communications Center, making it possible for hard-of-hearing individuals to also use the call boxes. The call boxes may be used to request an escort, assist a motorist, report suspicious individuals or activity, or request access to a locked building or room.
- *Mobile Escort Service*—Available seven-days-a-week, on a timed schedule between 11 p.m. and 3 a.m.
- *Lost and Found*—All lost and found items are stored by Public Safety. Report a lost item at rit.edu/publicsafety/safety/lostitems.html (requires RIT computer account).
- *Emergency Notification*—Family members may contact Public Safety at (585) 475-2853 or TEXT (585) 205-8333 to make an emergency notification to a student. Public Safety will locate the student and relay the message.
- *Awareness Programs*—Public safety hosts a variety of prevention awareness programs and services on topics including crime prevention, personal safety, and alcohol awareness. A monthly newsletter, RIT Ready, is distributed to students, faculty, and staff to bolster emergency preparedness on campus.
- *Annual Security and Fire Safety Report*—Public Safety's Annual Security and Fire Sadety Report is available online (www.rit.edu/fa/compliance/student-right-know) and offers a description of security practices and information on reported occurrences of crime.
- *Confidential Tip Line*—This service is to obtain information that is unattainable through conventional methods and to alert public safety to endangering behavior that might go otherwise unreported. Individuals who utilize the tip line are encouraged to leave their names and contact information; however, they will not be contacted. An online form is available at rit.edu/publicsafety/forms/tipline.
- *Crime Statistics*—The Advisory Committee on Public Safety provides, upon request, all campus crime statistics as reported to the Department of Education. RIT crime statistics can be found at the Department of Education website (ope.ed.gov/security) or by contacting Public Safety. A hard copy of reported crime statistics required to be ascertained under Title 20 of the U.S. Code Section 1092(f) will be mailed within 10 days of the request.
- *Sexual Assault Information and CARES*—Confidential counseling services are available to anyone in need by calling (585) 546-2777 (voice/TTY). RIT's Campus Advocacy Response and Support (CARES) provides confidential and crisis intervention and support services for relationship concerns. Contact (585) 295-3533 at any time for assistance.
- *Emergency Preparedness*—RIT regularly communicates, prepares, and practices emergency management with public safety personnel and campus managers from various departments. If necessary, we will provide updated information through broadcast email, mass notification system (RIT ALERT), voicemail, ALERTUS beacons, and the university's website at rit.edu.

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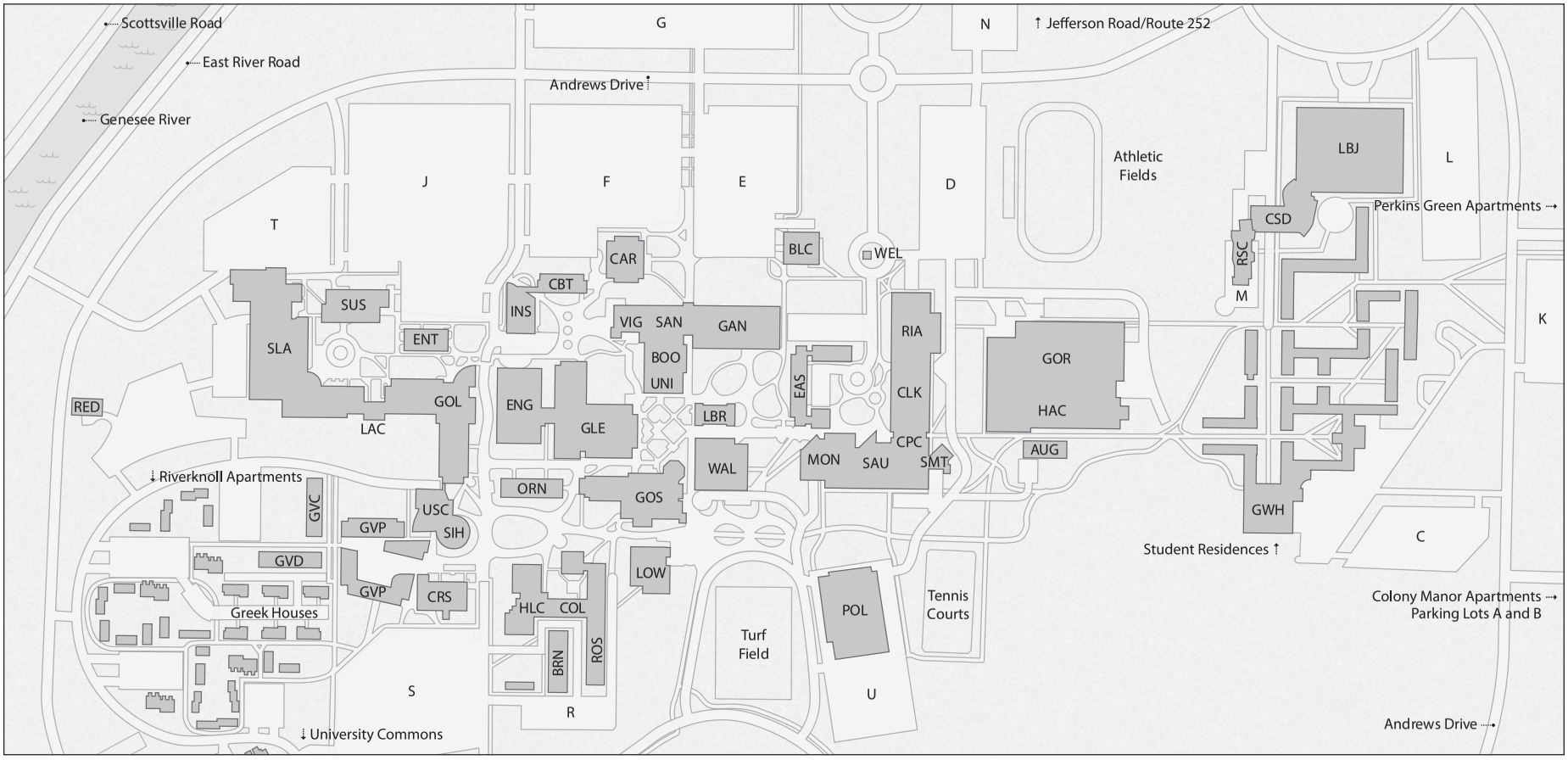

RIT CAMPUS MAP

AUG	August Center
BLC	Bausch & Lomb Center
BOO	James E. Booth Hall
BRN	Brown Hall
CAR	Chester F. Carlson Center for Imaging Science
CBT	Center for Bioscience Education & Technology
CLK	George H. Clark Gymnasium
COL	Color Science Hall
CPC	Campus Center
CRS	Crossroads
CSD	CSD Student Development Center
EAS	George Eastman Hall
ENG	Engineering Hall
ENT	Engineering Technology Hall
GAN	Frank E. Gannett Hall
GLE	James E. Gleason Hall
GOL	Golisano Hall
GOR	Gordon Field House and Activities Center
GOS	Thomas Gosnell Hall
GVC	Global Village Way C
GVD	Global Village Way D
GVP	Global Village Plaza
GWH	Grace Watson Hall
HAC	Hale-Andrews Student Life Center
HLC	Hugh L. Carey Hall
INS	Institute Hall
LAC	Laboratory for Applied Computing
LBJ	Lyndon Baines Johnson Hall
LBR	Liberal Arts Hall
LOW	Max Lowenthal Hall
MON	Monroe Hall
ORN	Orange Hall
POL	Gene Polisseni Arena
RED	Red Barn
RIA	Frank Ritter Ice Arena
ROS	Lewis P. Ross Hall
RSC	Rosica Hall
SAN	Sands Family Studios
SAU	Student Alumni Union
SIH	Student Innovation Hall
SLA	Louise Slaughter Hall
SMT	Schmitt Interfaith Center
SUS	Golisano Institute for Sustainability
UNI	University Gallery
USC	University Services Center
VIG	Vignelli Center for Design Studies
WAL	Wallace Library
WEL	Welcome Center