School of Mathematics and Statistics

Undergraduate Student Handbook

2024-25

Rochester Institute of Technology
College of Science
School of Mathematical Sciences
85 Lomb Memorial Drive
Rochester, NY 14623-5602
Tel: 585-475-2498
Fax: 585-475-6627
http://www.rit.edu/science/sms

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Dear SMS Students,

Welcome to the 2024-2025 academic year at Rochester Institute of Technology! The School of Mathematics and Statistics is pleased to have you as a student. We hope you will enjoy your time here, learn a great deal, and professionally benefit from your studies with us. Make sure to meet your fellow students, and take advantage of opportunities like PiRIT, the student math club. The friendships and connections you make here can last a lifetime!

As you become familiar with the SMS, you will find that we put our student's educational needs first. Our faculty truly enjoy developing relationships with you. Feel free to stop by their offices, or drop them an email and ask for a meeting. They will be delighted to talk with you.
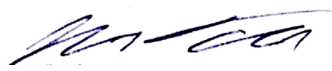
No, really, that last paragraph was not just boilerplate! Getting to know your faculty can be critical to success in college and afterwards. If you stop by their office and ask "What do you do for research?", be prepared to have them describe it at great length, to the point where we'd recommend you don't have another meeting scheduled soon afterwards. Undergraduate student research has always been an incredibly important part of the SMS experience, and we hope you get to take advantage.

We are proud of our computer laboratories and look forward to you getting experience with them. Our computer facilities include the statistics lab, located on the second floor opposite the School Administrative Office, as well as teaching and walk-in labs, located on the first floor.

This handbook has been prepared to give you current information about the School of Mathematics and Statistics. We have included information about our programs, requirements, co-op opportunities, our faculty, and other related matters. Through constant feedback from business and industry, we continually update our programs, and we work diligently to develop new and exciting co-op and permanent employment opportunities.

Please feel free to make any comments or suggestions you may have. We have always benefited greatly from student input, and we look forward to getting to know you during your time at RIT. You have our best wishes for a successful year.

Sincerely,

Josh Faber
Professor & Head, SMS

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1. INTRODUCTION

1.1. THE LEADERSHIP AND STAFF OF THE SMS

SMS Leadership			
Name	Title	Email	Office
Josh Faber	Head	jafsma	GOS-2334
Basca Jadamba	Associate Head, Math	bxjsma	GOS-2312
Bernard Brooks	Associate Head, Math	bpbsma	GOS-2350
Mihail Barbosu	Associate Head, Statistics	mxbsma	HLC-2215
Nathan Cahill	Director, Mathematical Modeling PhD Program	ndcsma	GOS-2358
Kara Maki	Director, Applied & Computational Math MS Program	klmsma	GOS-2348
Tamas Wiandt (Fall 2024) Teresa Gibson (Spring 2025)	Director, Applied Statistics MS and Advanced Certificate Programs	tiwsma tbgsma	GOS-2354 HLC-2505

SMS Undergraduate Program Coordinators			
Name	Title	Email	Office
Tamas Wiandt (Fall 2024) Carly Metcalfe (Spring 2025)	APPSTAT-BS	tiwsma cmsma	GOS-2354 HLC-2515
Nathaniel Barlow	APPMTH-BS, CMTH-BS	nsbsma	GOS-2344

SMS Administrative and Student Services Staff			
Name	Title	Email	Office
Colleen Graham	Academic Advisor (APPMTH-BS, CMTH-BS)	cagiao	GOS-1278
Tess Armstrong	Academic Advisor (APPSTAT-BS)	tdtsse	GOS-1296
Shawna Hayes	Senior Staff Assistant	shawna.hayes	HLC-2219
Kate Koch	Student and Admin Support Specialist	kate.koch	GOS-2330
Susan Powell	Senior Staff Assistant	suegla	GOS-2340
Alisa Hall	Senior Staff Assistant	adhsma	GOS-2338

1.2. AN OVERVIEW OF THE UNDERGRADUATE PROGRAMS

RIT offers three programs within the School of Mathematics and Statistics: *Applied Mathematics, Applied Statistics and Data Analytics,* and *Computational Mathematics*. Each leads to a Bachelor of Science degree. Graduates from all three programs are successful, whether they choose to take employment upon graduation or go directly to graduate school in pursuit of advanced degrees.

Applied Mathematics
The *Applied Mathematics* program focuses upon the study and solution of problems which can be effectively analyzed through the use of mathematics. Business and industry have a great need for students with this type of training. Students declare an applications interest, called a "program concentration." By choosing a sequence of courses from one of more than twenty applications areas, students gain the knowledge and skills necessary to collaborate on complex problems with scientists, engineers, computer specialists, business analysts, imaging specialists or other analysts.

Applied Statistics and Data Analytics

The *Applied Statistics and Data Analytics* program provides students with a solid foundation in statistical and mathematical principles, experience in the applications of statistics, knowledge of statistical software, and the necessary skills to communicate the results of a statistical analysis. The demand for graduates with this type of preparation is high. Business, industry and government recognize that a large number of problems can be effectively analyzed and solved through use of statistical methodology. Graduates from our program collaborate with specialists in scientific and technical areas in statistical and mathematical analyses of problems.

Computational Mathematics

The *Computational Mathematics* program prepares students for careers in applied mathematics and mathematical computing. It has been specially designed to incorporate a heavy concentration of computer science. Students are prepared to become mathematical analysts, systems analysts, scientific programmers, and software engineers. In this program, much emphasis is given to using the computer as a tool to solve physical problems that have been mathematically formulated.

2. DEGREE REQUIREMENTS

The degree requirements usually are grouped into one of three categories: *general education*, *non-general education* and *program requirements*. Additionally, there is an Experiential Learning component (section 2.3) that is not necessarily tied to a specific course.

2.1. GENERAL EDUCATION

RIT's framework for general education (GE) provides students with courses that meet specific university approved general education learning outcomes and New York State Education Department liberal arts and sciences requirements. The general education framework intentionally moves through three educational phases designed to give students a strong foundation, an introduction to fundamentals of liberal arts and sciences disciplines, and the opportunity for deeper study and integrative learning through immersion in a cluster of related courses.

The general education curriculum consists of the following requirements:

The Foundation Course of First Year Writing: A course in the first year that introduces students to the intellectual life of the university, and provides a focus on communication skills to prepare students for future coursework and life-long learning. (https://www.rit.edu/academicaffairs/generaleducation/general-education-framework/foundations)

Perspectives: Eight courses designed to introduce students to seven key areas of inquiry that develop ways of knowing the world. The perspective courses introduce students to fundamentals of a liberal arts and sciences discipline (methods, concepts, and theories) while addressing specific general education learning outcomes. (https://www.rit.edu/academicaffairs/generaleducation/general-education-framework/perspectives)
1. Ethical
2. Artistic
3. Global
4. Social
5. Natural Science Inquiry (See Science Sequence Requirement below)
6. Scientific Principles (See Science Sequence Requirement below)
7. Mathematical (2 courses) (fulfilled by first-year calculus courses for SMS students)

Immersion: A series of three related general education courses that further broadens a student's judgment and understanding within a specific area through deeper learning. (https://www.rit.edu/academicaffairs/generaleducation/general-education-framework/immersions-and-minors)

The Writing Intensive Course Requirement: Students must complete three writing intensive (WI) credit bearing courses:

1. One introductory WI course in the first year (ENGL 150, UWRT 150, or ISTE 110).
2. One course in the SMS program (MATH 421 or STAT 325).
3. A third course that can be a general education elective or a second WI course within the SMS program.

Science Sequence Requirement: All SMS students are required to complete one year of a lab science. This will fulfill the Natural Science Inquiry and Scientific Principles perspective requirements. The following sequences fulfill the Science requirement:

Biology	BIOL 101 & 103 General Biology I and lab (3+1 units)
	BIOL 102 & 104 General Biology II and lab (3+1 units)
OR	
Chemistry	CHMG 141 & 145 General & Analytic Chemistry I and lab (3+1 units)
	CHMG 142 & 146 General & Analytic Chemistry II, lab (3+1 units)
OR	
Physics	PHYS 211 University Physics I or PHYS 211A University Physics IA (4 units)
	PHYS 212 University Physics II (4 units)

Computer Science Sequence Requirement: All SMS students will complete one or two introductory computer science courses taken from the following three courses:
ISCH 110 Principles of Computing
GCIS 123 Software Development and Problem Solving I
GCIS 124 Software Development and Problem Solving II
CSCI 141 Computer Science I
CSCI 142 Computer Science II
See each individual program (sections 2.4, 2.5, or 2.6) for an explanation of the courses needed.

GE Electives and the Total Number of GE Credits: Each student must earn at least 60 general education credits. That is typically not done with only the requirements above. Each program must therefore take additional general education electives in order to bring this total to at least 60. See each program for the specific number of general education electives needed.

2.2. NON-GENERAL EDUCATION

Wellness Requirement: All students must take at least two _distinct_ wellness activity courses before graduation. More information can be found at http://www.rit.edu/programs/undergraduate-graduation-requirements#wellness.

RIT 365 Requirement: All first-year students at RIT take YOPS-010 RIT 365: RIT Connections, the year one requirement course. It is a zero credit course. More information on this course can be found at https://www.rit.edu/studentlife/year-one-programs.

Open Electives: Depending on the program, three or more open electives (a.k.a. *free electives*) are available for the student. See each program (sections 2.4, 2.5, and 2.6) for the number available. These courses can be used to fulfill a minor (section 3.1), double major (section 3.2), and can be any credit bearing course at RIT.

2.3. EXPERIENTIAL LEARNING

All students in the College of Science are required to complete Experiential Learning (EL) before they graduate. The experiential learning requirement can be fulfilled through a variety of methods including co-op, undergraduate research, summer research experiences, designated EL courses, etc. These experiences all emphasize learning through doing or performing actions that promote the skills of critical thinking in iterative cycles of both reflection and active experimentation.

In the SMS, each student must participate in one of the following activities:
- Undergraduate research (at least one semester, usually more).

- Co-op or internship (as deemed appropriate).
- Successful completion of any course designated by the SMS as an EL course.

2.4. THE APPLIED MATHEMATICS PROGRAM – Plan code: <u>APPMTH-BS</u>

The *Applied Mathematics* program focuses upon the application of mathematics to problems arising in the sciences, engineering or business environments. The computer is used as a tool in the analysis of such problems. Business and industry have a great need for students with this type of education. Therefore, this program requires a program concentration in one of a variety of fields of application chosen by the student.

The minimum number of credit hours needed for certification of the degree is 121, although typically a student will earn more than the minimum number.

General Education

	CH
GE: First-Year Writing (WI)	3
Perspectives	
Artistic Perspective	3
Ethical Perspective	3
Global Perspective	3
Social Perspective	3
General Education Lab Science	
Natural Science Inquiry	4
Scientific Principles	4
General Education Mathematics	
MATH 181: Calculus I	4
MATH 182: Calculus II	4

	CH
Designated MATH GE Course	
MATH 221: Multivariable/Vector Calculus	4
General Education Immersion	
Immersion 1	3
Immersion 2	3
Immersion 3	3
General Education Computer Science	
ISCH 110: Principles of Computing	3
GCIS 123: Software Dev./Prob. Solv. I	4
General Education Electives	
GE Elective 1	3
GE Elective 2	3
GE Elective 3	3

Notes for General Education

- The total number of GE credits must total at least 60. The total listed here is 60. Nearly all GE courses are worth 3 credits.
- The lab science courses must be one of the biology lab sequence (BIOL 101-103, 102-104), chemistry lab sequence (CHMG 141-145, 142-146), or physics lab sequence (PHYS 211, 212).
- The SMS does recommend for students with the necessary background to start in GCIS 123 Software Development and Problem Solving I (or CSCI 141 Computer Science I) and take the follow-up course GCIS 124 (or CSCI 142) (also worth 4 credit hours).

Non-General Education

	CH
RIT 365	0
Wellness Education	
Activity 1	0
Activity 2	0

	CH
Open Electives	
Open Elective 1	3
Open Elective 2	3
Open Elective 3	3
Open Elective 4	3

Program Requirements

	CH
Mathematics and Statistics Core	

	CH
MATH 199: Math/Stat Seminar	1
MATH 200: Discrete Math and Intro to Proof	3

MATH 231: Differential Equations	3		Program Elective 1	3
MATH 241: Linear Algebra	3		Program Elective 2	3
MATH 251: Probability and Statistics	3		Program Elective 3	3
STAT 257: Statistical Inference	3		Program Elective 4	3
MATH 399: Math Sciences Job Seminar	0			
MATH 411: Numerical Analysis	3		***SMS Concentration***	
MATH 421: Mathematical Modeling (WI)	3		Program Concentration 1	3
MATH 431: Real Variables I	3		Program Concentration 2	3
MATH 441: Abstract Algebra I	3		Program Concentration 3	3
EL (MATH 499, 500 or 501)	*			
	CH			
SMS Program Electives				

Notes and Additional Requirements:

- These add up to 61 credit hours.
- Most every undergraduate MATH or STAT course of level 200 to 599 can be a program elective. There are a few exceptions.
- *First-Year Seminar:* The MATH 199 course introduces students to the programs within SMS, math and statistics software, and technical writing. As part of this course students write a paper, often related to the history of mathematics/statistics.
  - The MATH 199 course is designed for an incoming first year student and is usually substituted if a student changes programs into Applied Mathematics or is a transfer student from another college/university. The extra credit hour is also substituted as a program elective, but you must still achieve the minimum number of credit hours for certification (121).
- MATH 399 is a zero credit online course.
- *Mathematical Modeling:* The MATH 421 course explores problem solving through mathematical models. In this writing-intensive course, students learn about mathematical writing and are required to write a paper on a mathematical modeling topic.
- *Program Concentration Courses:* This group of three courses can be taken within the SMS, but may also be in a STEM-related program, economics, or philosophy (STEM is an acronym that stands for "science, technology, engineering, mathematics"). In general, the courses eligible for inclusion in the Program Concentration are those you would take in pursuit of a minor, and must be in a discipline distinct from your GE Immersion. See your academic advisor for the details.
- *Depth Requirement:* Students in APPMTH-BS are required to complete one of the following: MATH 411 & 412, MATH 431 & 432, MATH 441 & 442, STAT 405 & 406, or another sequence of upper division courses approved by the SMS.
- *Experiential Learning Courses:* See section 2.3. If not completing MATH 499, students must enroll in one of the two courses:
  - MATH 500 Senior Capstone in Mathematics (3 credit hours). This course is taken in the final year if undergraduate research or a co-op has not been completed. In this case, it would satisfy the EL requirement and count as a program elective.
  - MATH 501 Experiential Learning Requirement in Mathematics (0 credit hours). This course satisfies the EL requirement, but enrollment requires special permission.

Program Electives: The requirement for the program electives is to complete 15 credit hours in the list of the courses below. More information about these courses can be found in section 2.7. Some graduate courses may count as a program elective, but special permission must be given from both the instructor and your academic advisor.

Courses offered	Courses offered
MATH 255 Actuarial Mathematics	MATH 495 Undergraduate Research
MATH 261 Topics in the Mathematics of Finance	MATH 498 Independent Study
MATH 295 Topics in Mathematical Problem Solving	MATH 500 Senior Capstone in Mathematics
MATH 301 Mathematics of Simulation and Randomness	MATH 505 Stochastic Processes
MATH 305 Intro to Mathematical Computing	STAT 305 Regression Analysis
MATH 311 Linear Optimization	STAT 325 Design of Experiments
MATH 312 Nonlinear Optimization	STAT 335 Introduction to Time Series

MATH 321 Classical Game Theory	STAT 345 Nonparametric Statistics
MATH 322 Combinatorial Game Theory	STAT 405 Mathematical Statistics I
MATH 326 Boundary Value Problems	STAT 406 Mathematical Statistics II
MATH 331 Dynamical Systems	STAT 415 Statistical Sampling
MATH 341 Advanced Linear Algebra	STAT 435 Statistical Linear Models
MATH 351 Graph Theory	STAT 511 Statistical Software
MATH 361 Combinatorics	STAT 521 Statistical Quality Control
MATH 367 Codes and Ciphers	STAT 547 Data Mining
MATH 371 Number Theory	STAT 572 Survey Design and Analysis
MATH 381 Complex Variables	STAT 584 Categorical Data Analysis
MATH 412 Numerical Linear Algebra	
MATH 432 Real Variables II	
MATH 442 Abstract Algebra II	

2.5. THE APPLIED STATISTICS AND DATA ANALYTICS PROGRAM - Plan code: APPSTAT-BS

The *Applied Statistics and Data Analytics Program* has been designed to prepare students as applied statisticians for positions in business, industry, governmental agencies and hospitals. More specifically, students in this program will be involved in the application of statistics to problems in data analysis, quality control, reliability analysis, and statistical forecasting. The first two years of the program focus on the development of a wide range of basic skills in statistics, mathematics, and computer science. The required coursework provides the necessary background for the advanced courses to follow. The remaining years offer the student the opportunity to advance in both depth and breadth into the field of statistics. Specifically, the course of study provides the student with:

- Prerequisite undergraduate mathematical preparation
- A foundation in statistical principles
- Experience in the application of statistics
- Knowledge of statistical software
- Skills necessary to communicate the results of a statistical analysis

Courses offered by the SMS can prepare students for the first exams of the Society of Actuaries. There is also RIT coursework for which students can earn credit with the Society of Actuaries through Validation by Educational Experience (VEE) in the areas of economics, finance, and applied statistics. Students planning on an actuarial career are recommended to earn minors in Actuarial Science, and/or Finance and/or Economics. The Society of Actuaries maintains the website http://www.beanactuary.org , with links to dates, sites, and deadlines for Exam P/FM and to how to apply for VEE credit. The up to date list of RIT courses that are approved for VEE credit may be accessed at http://www.soa.org/education/exam-req/edu-vee.aspx. The Society of Actuaries' main website is http://www.soa.org.

The minimum number of credit hours needed for certification of the degree is 120, although typically a student will earn more than the minimum number.

General Education

	CH
Designated MATH GE Course	
MATH 221: Multivariable &Vector Calculus	4
General Education Immersion	
GE Immersion 1	3
GE Immersion 2	3
GE Immersion 3	3
General Education Computer Science	
ISCH 110: Principles of Computing	3
General Education Electives	
GE Elective 1	3
GE Elective 2	3
GE Elective 3	3

	CH
GE: First-Year Writing (WI)	3
Perspectives	
GE Artistic Perspective	3
GE Ethical Perspective	3
GE Global Perspective	3
GE Social Perspective	3
General Education Lab Science	
GE Natural Science Inquiry	4
GE Scientific Principles	4
General Education Mathematics	
MATH 181: Calculus I	4
MATH 182: Calculus II	4

GE Elective 4	3
GE Elective 5	3

Notes for General Education

- The total number of GE credits must total at least 60. The total listed here is 62. Nearly all GE courses are worth 3 credits.
- The lab science courses must be one of the biology lab sequence (BIOL 101-103, 102-104), chemistry lab sequence (CHMG 141-145, 142-146), or physics lab sequence (PHYS 211, 212).
- Students with the necessary background may take GCIS 123 Software Development and Problem Solving I (or CSCI 141 Computer Science I).

Non-General Education

	CH
YOPS 010: RIT 365	0
Wellness Education	
Activity 1	0
Activity 2	0

	CH
Open Electives	
Open Elective 1	3
Open Elective 2	3
Open Elective 3	3
Open Elective 4	3

Program Requirements

	CH
Mathematics and Statistics Core	
MATH 199: Math/Stat Seminar	1
MATH 200: Discrete Math w/ Intro to Proof	3
MATH 241: Linear Algebra	3
MATH 251: Probability and Statistics	3
STAT 257: Statistical Inference	3

MATH 399: Math/Stat Job Seminar	0
STAT 305: Regression Analysis	3
STAT 325: Design of Experiments (WI)	3
STAT 405: Mathematical Statistics I	3
STAT 406: Mathematical Statistics II	3
STAT 500 Senior Capstone in Statistics (WI)	3

Notes:
- These add up to 58 credit hours.
- ***First-Year Seminar:*** The MATH 199 course introduces students to the programs within SMS, math and statistics software, and technical writing.
  - The MATH 199 course is designed for an incoming first year student and is usually substituted if a student changes programs into Applied Statistics and Data Analytics or is a transfer student from another college/university. The extra credit hour is also substituted as a program elective, but you must still achieve the minimum number of credit hours for certification (120).
- MATH 399 is a zero credit online course.
- ***Design of Experiments:*** The STAT 325 course is a study of the design and analysis of experiments, with extensive use of statistical software. As a writing-intensive course, students learn about statistical writing and are required to write a paper on an experiment of their own design.

- ***Experiential Learning Course:*** See section 2.3. The writing-intensive course STAT 500 is a designated Experiential Learning course. Since it is a core course, this requirement is satisfied by taking the course.

Program Electives: The requirement for the program electives is to complete 18 credit hours in the list of the courses below. More information about these courses can be found in section 2.7. Some graduate courses may count as a program elective, but special permission must be given from both the instructor and your faculty advisor.

Courses offered		
Choose at least three from		
MATH 255 Actuarial Mathematics	MATH 261 Topics in the Math of Finance	
STAT 335 Introduction to Time Series	STAT 547 Data Mining	
STAT 345 Nonparametric Statistics	STAT 572 Survey Design and Analysis	
STAT 511 Statistical Software - R	STAT 584 Categorical Data Analysis	
STAT 521 Statistical Quality Control	MATH 505 Stochastic Processes	
Remaining courses may be selected from		
MATH 231 Differential Equations		
MATH 295 Topics in Problem Solving	MATH 367 Codes and Ciphers	
MATH 301 Math of Simulation/Randomness	MATH 371 Number Theory	
MATH 305 Intro to Mathematical Computing	MATH 381 Complex Variables	
MATH 311 Linear Optimization	MATH 411 Numerical Analysis	
MATH 312 Nonlinear Optimization	MATH 412 Numerical Linear Algebra	
MATH 321 Classical Game Theory	MATH 421 Mathematical Modeling	
MATH 322 Combinatorial Game Theory	MATH 431 Real Analysis I	
MATH 326 Boundary Value Problems	MATH 432 Real Variables II	
MATH 331 Dynamical Systems	MATH 441 Abstract Algebra I	
MATH 341 Advanced Linear Algebra	MATH 442 Abstract Algebra II	
MATH 351 Graph Theory	MATH 495 Undergraduate Research	
MATH 361 Combinatorics	MATH 498 Independent Study	
Up to two courses may be selected from	MATH 500 Senior Capstone in Mathematics	
ACCT 110 Financial Accounting	MATH 500 Senior Capstone in Mathematics	
BANA 255 Data Literacy, Analytics & DM		FINC 220 Financial Management
BIOL 470 Statistical Analysis for Bioinfo	FINC 580 Financial Analytics	
DECS 310 Operations Management	ISEE 582 Lean Six Sigma Fundamentals	
ECON 403 Econometrics I	MKTG 365 Marketing Analytics	

2.6. THE COMPUTATIONAL MATHEMATICS PROGRAM - Plan code: CMTH-BS

This program has been designed to incorporate a heavy concentration of computer science courses within an applied mathematics curriculum so that students can effectively use computers in their work. Job opportunities are abundant in this field.

In order to graduate from the *Computational Mathematics Program*, the student must successfully complete certain courses in mathematics and computer science, as well as some courses in non-mathematics areas.

The minimum number of credit hours needed for certification of the degree is 122, although typically a student will earn more than the minimum number.

General Education

	CH		
GE: First-Year Writing (WI)	3	*Perspectives*	

			MATH 221: Multivariable/Vector Calculus	4
Artistic Perspective	3			
Ethical Perspective	3		***General Education Immersion***	
Global Perspective	3		Immersion 1	3
Social Perspective	3		Immersion 2	3
			Immersion 3	3
General Education Lab Science				
Natural Science Inquiry	4		***General Education Computer Science***	
Scientific Principles	4		CSCI 141: Computer Science I (or GCIS 123)	4
			CSCI 142: Computer Science II (or GCIS 124)	4
General Education Mathematics				
MATH 181: Calculus I	4		***General Education Electives***	
MATH 182: Calculus II	4		GE Elective 1	3
			GE Elective 2	3
	CH		GE Elective 3	3
Designated MATH GE Course				

Notes for General Education
- The total number of GE credits must total at least 60. The total listed here is 61. Nearly all GE courses are worth 3 credits.
- The lab science courses must be one of the biology lab sequence (BIOL 101-103, 102-104), chemistry lab sequence (CHMG 141-145, 142-146), or physics lab sequence (PHYS 211, 212).

Non-General Education

	CH			**CH**
RIT 365	0		***Open Electives***	
			Open Elective 1	3
Wellness Education			Open Elective 2	3
Activity 1	0		Open Elective 3	3
Activity 2	0		Open Elective 4	3

Program Requirements

	CH			**CH**
Mathematics and Statistics Core			***Choose one of the following (Program Elective 1)***	
MATH 199: Math/Stat Seminar	1		MATH 351: Graph Theory	3
MATH 200: Discrete Math w/ Intro to Proof	3		MATH 412: Numerical Linear Algebra	3
MATH 231: Differential Equations	3			
MATH 241: Linear Algebra	3		***Computer Science Core***	
MATH 251: Probability and Statistics	3		CSCI 243: Mechanics of Programming	3
MATH 399: Math/Stat Job Seminar	0		CSCI 262: Intro to Computer Science Theory	3
MATH 411: Numerical Analysis	3			
MATH 421: Mathematical Modeling (WI)	3		***SMS/CS Program Electives***	
MATH 431: Real Variables I	3		Program Elective 2 (MATH/STAT)	3
MATH 441: Abstract Algebra I	3		Program Elective 3 (MATH/STAT)	3
EL course (MATH 499, 500 or 501)	*		Program Elective 4 (CSCI)	3
			Program Elective 5 (CSCI or from list below)	3
			Program Elective 6 or Senior Capstone *	3

Notes and Additional Requirements:
- These add up to 61 credit hours.
- Most every undergraduate MATH or STAT course of level 200 to 599 can be a program elective. There are a few exceptions.
- ***(First-Year) Mathematics and Statistics Seminar :*** MATH-199 introduces students to the programs within SMS, math and statistics software, and technical writing. As part of this course students write a paper related to the history of mathematics and statistics.
  - The MATH 199 course is designed for an incoming first year student and is usually substituted if a student changes programs into Computational Mathematics or is a transfer student from another

college/university. The extra credit hour is also substituted as a program elective, but you must still achieve the minimum number of credit hours for certification (122).

- MATH 399 is a zero credit online course.
- *Mathematical Modeling:* The MATH 421 course explores problem solving through mathematical models. In this writing-intensive course, students learn about mathematical writing and are required to write a paper on a mathematical modeling topic.
- *Experiential Learning Courses:* See section 2.3. If not completing MATH 499, students must enroll in one of the two courses:
  o MATH 500 Senior Capstone in Mathematics (3 credit hours). This course is taken in the final year if undergraduate research or a co-op has not been completed. In this case, it would satisfy the EL requirement and count as one of the program electives for mathematics.
  o MATH 501 Experiential Learning Requirement in Mathematics (0 credit hours). This course satisfies the EL requirement, but enrollment requires special permission.

Program Electives: The requirement for the program electives is to complete 18 credit hours in the list of the courses below, with the following rules: three of the program electives must be MATH or STAT courses with course numbers of at least 250 and either MATH-351 Graph Theory or MATH-412 Numerical Linear Algebra must be one of these three courses. Also, three of the program elective courses must be chosen from SWEN-261, MATH-305, ISTE-470, CMPE-570, EEEE-346, EEEE-547, (ISEE 301 or MATH 301), BIOL-235, BIOl-470, PHYS-377, ENGL-581, IGME-386, and CSCI courses numbered at least 250. At least two of the courses must be courses from computer science. Those courses must be chosen from those computer science courses that are used to satisfy the minor in computer science. Below are the mathematics and statistics courses that can be used as program electives (note that both 351 and 412 can be taken – one course would be used for the required portion and the other can be used as a program elective). More information about the mathematics and statistics courses can be found in section 2.7. Some graduate courses may count as a program elective, but special permission must be given from both the instructor and your academic advisor.

Courses offered	Courses offered
MATH 255 Actuarial Mathematics	MATH 495 Undergraduate Research
MATH 261 Topics in the Mathematics of Finance	MATH 498 Independent Study
MATH 295 Topics in Mathematical Problem Solving	MATH 500 Senior Capstone in Mathematics
MATH 301 Mathematics of Simulation and Randomness	MATH 505 Stochastic Processes
MATH 305 Intro to Mathematical Computing	STAT 257 Statistical Inference
MATH 311 Linear Optimization	STAT 305 Regression Analysis
MATH 312 Nonlinear Optimization	STAT 325 Design of Experiments
MATH 321 Classical Game Theory	STAT 335 Introduction to Time Series
MATH 322 Combinatorial Game Theory	STAT 345 Nonparametric Statistics
MATH 326 Boundary Value Problems	STAT 405 Mathematical Statistics I
MATH 331 Dynamical Systems	STAT 406 Mathematical Statistics II
MATH 341 Advanced Linear Algebra	STAT 415 Statistical Sampling
MATH 351 Graph Theory	STAT 435 Statistical Linear Models
MATH 361 Combinatorics	STAT 511 Statistical Software
MATH 367 Codes and Ciphers	STAT 521 Statistical Quality Control
MATH 371 Number Theory	STAT 547 Data Mining
MATH 381 Complex Variables	STAT 572 Survey Design and Analysis
MATH 412 Numerical Linear Algebra	STAT 584 Categorical Data Analysis
MATH 432 Real Variables II	
MATH 442 Abstract Algebra II	

2.7. SMS Courses for majors

Note that courses running are dependent on sufficient enrollment. The school reserves the right to cancel any course if the resources are not available to do so. The following table contains all the undergraduate courses 200 or higher including the terms (Fall, Spring, or Summer) and an indication if the course is only offered every other year (OY).

Course	Name	Prerequisite(s)	Fall	Spr	Su	OY
MATH 200	Discrete Math and Intro to Proof	MATH 182	X	X		
MATH 219	Multivariable Calculus	MATH 182	X	X	X	
MATH 220	Vector Calculus	MATH 219		X		
MATH 221	Multivariable and Vector Calculus	MATH 182	X	X	X	
MATH 221H	Honors Multivariable and Vector Calculus	MATH 182	X			
MATH 231	Differential Equations	MATH 182	X	X	X	
MATH 241	Linear Algebra	MATH 219	X	X	X	
MATH 241H	Honors Linear Algebra	MATH 219		X		
MATH 251	Probability and Statistics	MATH 182	X	X	X	
STAT 257	Statistical Inference	MATH 251	X	X		
MATH 255	Actuarial Mathematics	MATH 251		X		
MATH 261	Topics in the Mathematics of Finance	MATH 219, 251		X		
MATH 295	Topics in Math. Problem Solving	MATH 182	X			
MATH 301	Mathematics of Simulation and Randomness	MATH 200, 251, GCIS 123				X
MATH 305	Intro to Mathematical Computing	MATH 219, 241, GCIS 123				X
MATH 311	Linear Optimization	MATH 241				X
MATH 312	Nonlinear Optimization	MATH 219, 311				X
MATH 321	Classical Game Theory	MATH 241				X
MATH 322	Combinatorial Game Theory	MATH 200				X
MATH 326	Boundary Value Problems	MATH 219, 231	X	X	X	
MATH 331	Dynamical Systems	MATH 231, 241				X
MATH 341	Advanced Linear Algebra	MATH 241	X	X	X	
MATH 351	Graph Theory	MATH 200	X		X	
MATH 361	Combinatorics	MATH 200		X		
MATH 367	Codes and Ciphers	MATH 200		X		
MATH 371	Number Theory	MATH 200		X		
MATH 381	Complex Variables	MATH 219	X	X	X	
MATH 411	Numerical Analysis	MATH 231, 241	X			
MATH 412	Numerical Linear Algebra	MATH 221, 231, 341		X		
MATH 421	Mathematical Modeling	MATH 200, 221, 231, 241	X			
MATH 431	Real Variables I	MATH 200, 221	X	X		
MATH 432	Real Variables II	MATH 431				X
MATH 441	Abstract Algebra I	MATH 200, 241	X	X		
MATH 442	Abstract Algebra II	MATH 441				X
MATH 495	Undergraduate Research	Special permission				
MATH 498	Independent Study	Special permission				
MATH 500	Senior Capstone in Mathematics	MATH 411, 421, and 431 or 441		X		
MATH 505	Stochastic Processes	MATH 241, 251		X		
STAT 305	Regression Analysis	MATH 241, STAT 257		X		
STAT 325	Design of Experiments	STAT 257	X			
STAT 335	Introduction to Time Series	STAT 257				X
STAT 345	Nonparametric Statistics	STAT 257	X			
STAT 405	Mathematical Statistics I	STAT 257	X			
STAT 406	Mathematical Statistics II	STAT 405		X		
STAT 415	Statistical Sampling	STAT 257		X		
STAT 435	Statistical Linear Models	STAT 305		X		
STAT 500	Senior Capstone in Statistics	STAT 305, 325		X		
STAT 511	Statistical Software		X	X		
STAT 521	Statistical Quality Control	MATH 252				X
STAT 547	Data Mining	STAT 305		X		
STAT 572	Survey Design and Analysis	STAT 257	X			

STAT 584	Categorical Data Analysis	STAT 305		X		

Course Restrictions: There are certain courses offered by the School of Mathematics and Statistics which students majoring in Applied Mathematics, Applied Statistics and Data Analytics, and Computational Mathematics <u>may not</u> take for credit that can be applied to the program.

MATH	STAT
090 Algebra 101 College Algebra 104 Contemporary Mathematics 108 The Art of Geometry 111 Precalculus 131 Discrete Mathematics 161 Applied Calculus 185 Mathematics of Graphical Simulation I 186 Mathematics of Graphical Simulation II 211 Elements of Multivariable Calculus and Differential Equations 233 Linear Systems and Differential Equations	Any course with a number less than STAT-295 may not be used as a program elective.

3. PROGRAM ENHANCEMENTS/OPPORTUNITIES

3.1. MINORS

RIT encourages all students to pursue a minor to broaden their knowledge. A list of all minors with their requirements is available at https://www.rit.edu/study/minors-and-immersions. To declare a minor, a student must fill out the "Minor Authorization / Change" form available on the registrar's website: https://www.rit.edu/academicaffairs/registrar/forms.html.

In general, a student cannot declare a minor that is offered within their home department. However, the School of Mathematics and Statistics permits a student with a plan in Applied Mathematics or Computational Mathematics to have a minor in Statistics and/or a minor in Actuarial Science. Likewise, it is allowable for a student with a plan in Applied Statistics and Data Analytics to have a minor in Mathematics and/or Actuarial Science. If you are interested in a minor in mathematics, statistics, and actuarial science, contact smsminors@rit.edu.

Within the past few years, the most popular minors for SMS students have been Computer Science and Economics.

3.2. DOUBLE MAJOR OR DUAL DEGREE

Double Major

A double major is a program of study that meets the requirements of two distinct majors in a single Bachelor's degree. The program of study consists of courses required to meet the degree requirements for each of the two majors, together with the liberal arts and science courses needed to meet the general education requirements for the degree. The minimum number of credit hours required for a double major equals the total number of credit hours required for the major comprising the larger number of credit hours for the degree.

Students may apply the same coursework towards the fulfillment of requirements for both majors. Students who complete the requirements for a double major receive a single diploma that acknowledges both majors.

Some examples of double majors of SMS students:
    Applied Mathematics and Mechanical Engineering
    Applied Mathematics and Physics
    Applied Mathematics and Imaging Science
    Applied Statistics and Data Analytics and Economics
    Computational Mathematics and Computer Science

You can find the double major policy at https://www.rit.edu/academicaffairs/policiesmanual/d012.

Dual Degree

A dual degree program is one in which the student works towards satisfying the academic requirements for two distinct degree types in an integrated fashion. Currently at RIT at the undergraduate level, this option applies solely to those students who aspire to earning the Bachelor of Science (BS) and the Bachelor of Fine Arts (BFA) in a single program of study. Students may apply the same coursework towards the fulfillment of the requirements for both degrees. To achieve the academic depth and breadth implied by a program of study that results in the awarding of two undergraduate degrees, a dual degree program consists of *substantial additional coursework* as compared to that required for a double major; namely, a minimum of 30 additional semester hours beyond the credit hours required for the degree program comprised of the smaller number of credits. Students who successfully complete a dual degree program receive two diplomas, one for each degree earned.

You can find the dual degree policy at https://www.rit.edu/academicaffairs/policiesmanual/d013.

3.3. BS/MS DEGREE OPTIONS

MS in Applied and Computational Mathematics – Plan Code: <u>ACMTH-MS</u>

The Master of Science degree program in *Applied and Computational Mathematics* focuses on the applications of mathematics in the physical sciences, engineering, business, and other areas. This is both a full-time and part-time program with the goal of providing students with advanced mathematical concepts and their relevance to solving problems in business and industry. It is designed both for students whose undergraduate education is in mathematics and also for students with other backgrounds, such as engineering, business, computer science and the physical sciences. Students tailor their program to reflect their research or career interests by choosing one of four program concentrations.

MS in Applied Statistics – Plan Code: <u>APPSTAT-MS</u>

The Master of Science degree program in *Applied Statistics* focuses on data mining, design of experiments, health care applications, and the application of statistics to imaging and industrial environments. By integrating knowledge from engaging courses, students are prepared to solve complex problems for a wide range of organizations, including industrial, marketing, education, insurance, credit, government, and health care. 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. Students learn about both the foundation and tools of statistics in such areas as data mining, machine learning, design of experiments and modeling. The graduate program in Applied Statistics is flexible enough to allow students to take courses full-time on campus or part-time on line. Full-time, on campus students typically take two years to complete the program. The program consists of four core courses, five electives, and a Capstone course for a total of 30 semester credit hours.

Areas of Concentration
- Clinical Trials
- Data Mining/Machine Learning
- Industrial Statistics
- Informatics

Combined Undergraduate and Graduate Degrees

The School of Mathematics and Statistics offers several options for combining undergraduate and graduate degrees, enabling students to complete their bachelor's and master's degrees in one year of full-time study beyond the normal undergraduate requirements. Students may apply to the appropriate graduate program when they have attained third year status (this involves completing a Change of Program form and talking to both the SMS Associate Head and the Graduate Director of the particular MS program). Additionally, the student must complete all the admission requirements of the graduate program. The following options are available:

BS Program	MS Program
Applied Mathematics Applied Statistics and Data Analytics Computational Mathematics	Applied and Computational Mathematics
Computational Mathematics	Computer Science (in GCCIS)
Applied Statistics and Data Analytics	Applied Statistics

The Saunders College of Business also offers an Accelerated MBA for RIT undergraduates. This option fits in particularly well for Applied Mathematics and Applied Statistics students that choose the recommended foundation courses for their program electives. The MBA may be completed with an additional year of coursework. Details can be found at http://saunders.rit.edu/programs/graduate/mba_accelerated.php .

3.4. UNDERGRADUATE RESEARCH

RIT is emerging as a premier undergraduate research university. Many of our majors choose to pursue research paths, working collaboratively with faculty members on innovative and exciting research projects.

The SMS at RIT has a nationally recognized program of undergraduate research. At many large universities, faculty members work with PhD students on research ventures, but at RIT, undergraduates are our main focus. Many of our majors choose to pursue research paths, working collaboratively with faculty members on innovative and exciting research projects. Students can collaborate with faculty on a variety of research projects in combinatorics, differential equations, differential geometry, dynamical systems, graph theory, hyperspectral imaging, mathematical modeling, and statistics.

After signing up with a faculty mentor, students register for **MATH 495 Undergraduate Research**. Research projects can vary in length from one term to a year or more and can be in any number of mathematical subjects. Several of our majors have participated in National Science Foundation funded Research Experience for Undergraduates (REU) programs at various universities across the country, researching topics such as biostatistics, graph theory, and knot theory.

3.5. CO-OP

What Is a Co-op? Each of our programs features an optional cooperative education plan known as "co-op." Co-op experience not only provides the student with the opportunity to work in his/her chosen career field prior to graduation but also enables the student to earn attractive salaries that can substantially offset educational costs. The additional experience and expertise acquired by the student through co-op make permanent jobs significantly easier to obtain after graduation.

When Can I Co-op? We recommend you complete two years as a full-time student in the Applied Mathematics, Computational Mathematics or Applied Statistics and Data Analytics program (or the equivalent if you have transfer or advanced placement credit) before you co-op. Most students begin during the summer or fall after their second year.

How Do I Find a Co-op Job? The Office of Co-operative Education and Career Services offers a full range of services to help you locate a co-op job:
- Identification of employment opportunities
- Career fairs and on-campus co-op interviews
- Directories of technical companies to contact
- Individual assistance in writing your resume and cover letters
- Individual counseling for your co-op search
- Mock interviews and panel discussions

Please make an appointment with the co-op coordinator for the School of Mathematics and Statistics students, Kris Stehler, Career Services Coordinator (kwsoce@rit.edu, 475-5468), at least three to four months prior to the term in which you wish to co-op. Beginning in your second year, you will be able to enroll in **MATH 399 Mathematics and Statistics Job Search Seminar.** This course will acquaint you with the services and assistance available at RIT for finding your first co-op position or preparing you for the job search after graduation.

Why Should I Co-op? Although co-op is optional, the School of Mathematics and Statistics urges you to co-op in order to obtain valuable experience that will make school more relevant and give you a definite advantage in finding a job when you graduate. The mathematics and statistics graduates who participate in co-op have near 100% success in obtaining permanent employment. Also, in terms of financing an RIT education, with co-op you should be able to earn enough money to substantially help in meeting your college expenses.

More information about co-ops can be found at https://www.rit.edu/co-op.

3.6. STUDY ABROAD

Interested in taking a term to take courses at some overseas campus? Visit the RIT Global office and see the opportunities that are available. Their website is https://www.rit.edu/academicaffairs/global/about-overview .

3.7. INDEPENDENT STUDY

The purpose of an Independent Study course, like those courses that you take with other students in class, is to introduce you to new material that you did not have before. We approve and allow offering of Independent Studies for courses that we do not have in the books and are not offered on a regular basis.

If you are interested in taking an independent studies course, you need to find an instructor who is willing to offer this course. The instructor must then write up a contract with you that will include:
- The description of the course
- Units
- Meeting times
- Assessment of your success in the course (i.e. grading policy)

The contract must be signed by the instructor and the Head of the SMS. A grade will be assigned for the course to indicate quality and completion of the work.

Additionally, there are two restrictions:
- The maximum number of units for an Independent Study course is 3.
- No more than 12 units of independent study course work may count toward the degree.

3.8. PUTNAM EXAM

The William Lowell Putnam Mathematical Competition, often abbreviated to the Putnam Competition, is an annual mathematics competition (taking place the first weekend of December) for undergraduate college students enrolled at institutions of higher learning in the United States and Canada. It awards a scholarship and cash prizes ranging from $250 to $2,500 for the top students and $5,000 to $25,000 for the top schools, plus one of the top five individual scorers (designated as *Putnam Fellows*) gets graduate tuition waived at Harvard (Putnam Fellow Prize Fellowship), and the top 100 individual scorers have their names mentioned in the American Mathematical Monthly's October issue (alphabetically ordered within rank). It is widely considered to be the most prestigious university-level mathematics examination in the world, and its difficulty is such that the median score is often zero or one (out of 120) despite being attempted by students specializing in mathematics.

Contact Dr. James Marengo (jemsma@rit.edu) if you are interested.

3.9. THE MATHEMATICAL CONTEST IN MODELING

The Mathematical Contest in Modeling is a multi-day mathematics competition held annually during the first or second weekend in February, since 1985. It is sponsored by SIAM, the NSA, and INFORMS. It is distinguished from other major mathematical competitions such as Putnam by its strong focus on research, originality, teamwork, communication and justification of results.

If interested, visit http://www.comap.com/undergraduate/contests/. It will be necessary to recruit a faculty sponsor and enough students to constitute a team to participate in the contest. This will need to be done well before the contest is to take place to secure funding in order to register.

3.10. PROBLEM SOLVING

Why spend time solving tough problems out of mathematical journals? There are three reasons for doing so:
- Learn some new mathematics. Many times you will try a problem because it seems like a very interesting question, but find that you must teach yourself a math topic that you haven't had a class in yet. That will give you a head start for when you actually have to take that class.
- Get some experience with scientific writing. This is the part that students dread the most because you can't send your solution to the problem editors as if you would turn in as a homework assignment. You must write your solution in LaTeX and in a format that other mathematicians will understand how you solved the problem. Your solution must be concise, but as short as possible – otherwise the problem editors won't put your solution in their journal.

- Pad your resume. After you graduate, most of you will either get a job or go on to graduate school. In either case, your resume will be evaluated by a range of people who will try to decide who would best fit in the position or within the department. Having your name published in a scientific journal will put you one step ahead of other applicants that did not.

Some of the journals for which there are regularly published problems are the Pi Mu Epsilon Journal, the College Mathematics Journal, Mathematics Magazine, and the American Mathematical Monthly.

Some of the SMS faculty will conveniently post some of these problems in the hallway next to room GOS-2312.

3.11. ASA DATAFEST

Taken from https://ww2.amstat.org/education/datafest/.

The American Statistical Association (ASA) DataFest is a celebration of data in which teams of undergraduates work around the clock to find and share meaning in a large, rich, and complex data set.

A key feature of ASA DataFest is that it brings together the data science community. Undergraduate students do the work, but they are assisted by roving consultants who are graduate students, faculty, and industry professionals. Many professionals find ASA DataFest to be a great recruiting opportunity–they get to watch talented undergraduate students work under pressure in a team and examine their thinking processes.

After two days of intense data wrangling, analysis, and presentation design, each team is allowed a few minutes and no more than two slides to impress a panel of judges. Prizes are given for Best in Show, Best Visualization, and Best Use of External Data.

For more information, see the following articles about ASA DataFest:
- ASA DataFest 2020: A Virtual Experience
- ASA DataFest 2017
- ECOTS 2106 Presentation
- ASA DataFest Over the Years
- A Celebration of Data
- A Festival of Data: Student Perspectives
- Big Data Goes to College
- The Students Most Likely to Take Our Jobs

4. RECOGNITIONS AND SCHOLARSHIPS

4.1. DEAN'S LIST

By action of the College of Science, full-time degree-seeking undergraduate students will be placed on the Dean's List if their term GPA is greater than or equal to 3.40; they do not have any grades of "Incomplete", "D" or "F", (including wellness and any other non-credit but required courses); and they have registered for, and completed, at least 12 credit hours.

For more information, see https://www.rit.edu/academicaffairs/policiesmanual/d051.

4.2. INSTITUTE AND SMS SCHOLARSHIPS

For RIT Merit Scholarships, see https://www.rit.edu/admissions/aid/merit-based-scholarships.

For SMS and COS Scholarships, see https://www.rit.edu/science/scholarships-and-financial-awards.

4.3. THE SMS HONORS AND AWARDS CEREMONY

Each year in late April or early May, the SMS holds a ceremony where we congratulate those graduating and recognize the accomplishments of the students over the past year. A fun time is guaranteed for all.

4.4. SMS/COS RESEARCH SCHOLAR

The COS Research Scholar award recognizes truly exceptional undergraduate researchers. The key characteristics of a COS Research Scholar are involvement in a long-term mentored-research experience, excellence in that research project, evidence of meaningful peer review of the work, and at least one instance of dissemination of the research beyond the academic unit.

4.5. THE OUTSTANDING UNDERGRADUATE SCHOLAR

One of the traditional concerns of colleges and universities is with the definition and recognition of excellence. The Outstanding Undergraduate Scholar Award has been established to recognize excellence in academic achievement by students. Those selected to receive the award are designated RIT Scholars in perpetuity. The achievement is noted on the Scholar's transcript and recognized through a specially designed medallion symbolic of high academic achievement. The awards are presented at a special convocation held prior to the end of each academic year.

Recipients of the award must be at least third-year status and have a cumulative GPA of 3.85 or higher. The COS assigns a committee to designate all or select only a portion of the applicants based on their record of service, scholarship, and research while at RIT.

For more information, see https://www.rit.edu/academicaffairs/policiesmanual/d051.

4.6. GRADUATION WITH HONORS

Honors posted to the academic record will be based upon the student's cumulative grade point average upon completion of the degree requirements. The registrar will post honors to the student's academic record and they will be reflected on the official transcript. The numerical criteria for graduation with honors are as follows.
- summa cum laude - 3.80 cumulative GPA
- magna cum laude - 3.60 cumulative GPA
- cum laude - 3.40 cumulative GPA

For more information, see https://www.rit.edu/academicaffairs/policiesmanual/d051.

5. ACADEMIC POLICIES AND GUIDELINES

The following subsections are drawn from RIT, COS, and SMS policies.

5.1. PLACEMENT IN CALCULUS

One of the most important factors of student success in mathematics is correct placement, so calculus at RIT begins with the math placement exam. Please refer to the math placement exam website, www.rit.edu/science/sms/mpe, for more information on the exam and score placement.

5.2. NUMBER OF HOURS TO SPEND OUTSIDE OF CLASS

The general guideline is that for each hour you spend inside a class, you should spend two hours outside of class doing homework and studying.

This means that, if you are taking 15 credits this semester, you should invest 30 hours studying each week outside of class. That would give you a 45 hour work week – or the equivalent of a full-time job.

Some students that already know a portion of the material in the course may not need to invest that much time outside of class. And there will be courses more difficult than expected and will require you to spend more time. This will depend upon the student, the instructor, and the class.

As a warning, there is a correlation between lower grades and the amount of time studying outside of class. That is, nearly all students that fail or receive a 'D' in a course have invested very little time preparing outside of the class. The positive message to take out of this is that even if you are taking a tough class, don't mentally withdraw from it – keep up on the work, and the commitment will likely pay off with a passing grade in the end.

5.3. USE OF CALCULATORS/CRIB SHEETS

The use of calculators and/or crib sheets during exams is at the sole discretion of each faculty member. However, no electronic devices can be used during final exams of all first-year mathematics courses (which includes MATH-111, -171, -172, -173, -181A, -182A, -181, and -182).

5.4. ADD/DROP PERIOD

There is usually a six working day window from the first day of class to add or drop courses from your schedule.

In some cases, adding and dropping of courses can be done by the student on SIS. The form to add/drop is available on the Registrar's Office website: https://www.rit.edu/academicaffairs/registrar/forms.html.
If you are using this form, read the instructions at the top about when the form applies and who should sign it.

Instructors are aware to accommodate students that add into a class after the first day. Be sure to discuss with the instructor how this will be done and be sure to make up any work given to you.

5.5. ACADEMIC ALERTS

If you are struggling in a course, an academic alert is an email communication from the instructor to you and your academic advisor(s). This alert can occur and any time during the term, and may occur multiple times. The content of the alert is usually with regard to attendance, participation, assignment completion, and/or exam performance.

Academic alerts are used to foster student success. An academic alert is *one* option, however not the only option, that allows the course instructor to inform a student that they may be at-risk in specific areas within the course. Advisers assigned to the student also receive early alert notification(s) of the instructor's concern. Instructors and advisers can then take a coordinated approach to help students utilize campus resources and develop an action plan. If you receive an early alert(s), it is your responsibility to respond promptly to each early alert by discussing the reason for the early alert with your course faculty and academic adviser. It is your responsibility to be aware of your standing in class throughout the term.

Remember, if you experience any problems related to your course work, the best time to see your faculty and adviser is before problems get too big. This will allow you and your advising team to decide on a course of action while challenges are more easily manageable.

5.6. FIRST-YEAR/REGISTRATION HOLDS

There are a variety of holds in SIS that will prevent enrollment.

Incoming first-year students will have a hold put in place for enrollment into the Spring semester. This hold will require the student to set up an appointment with their academic advisor before they can self-enroll in courses. This hold is to ensure that the student will register for the proper courses that are necessary for the completion of the degree.

There are a number of other holds that can be applied by the Registrar's Office or other units at RIT. The most common is a financial hold if a bill is not paid. We recommend that you avoid all unnecessary holds to ensure you may enroll as soon as possible. Popular classes fill up quickly and a hold on your account would prevent you from getting the classes that you want.

5.7. GRADING

At the commencement of the course, and as appropriate throughout the course, it is the instructor's responsibility to: (1) Define criteria for evaluation. (2) State the process for converting the professor's evaluation criteria to the RIT grading system.

This information is usually provided to you through the syllabus.

For credit bearing courses, grades assigned at the end of the term are A, A-, B+, B, B-, C+, C, C-, D, and F. Each grade is assigned a quality point (from 4.00 for an A down to 0.00 for an F) and is used for calculating grade point averages.

5.8. C- OR BETTER POLICY

Both common sense and experience point to adequate preparation as an important element in student success. Particularly when courses are in sequence, demonstrated competence in one course provides the best foundation for success in the next. Students enrolled in the calculus sequences must have earned a grade of C- or better in the prerequisite course. There is also a C- or better required in MATH 182 or MATH 173 in order to enroll in MATH 221.

Because enrollment in courses for the subsequent term begins before the end of the current term, students are allowed to enroll in a course for which their current course is a prerequisite. But the student will be dropped if the grade earned in the course is anything other than a C- or better.

5.9. COURSE WITHDRAWAL

Students are strongly advised to consult with their academic advisor and instructor before they withdraw from any courses. A student may not use the drop with a grade of "W" option to avoid charges of academic dishonesty or after the instructor has officially submitted the final grade.

More information can be found at https://www.rit.edu/academicaffairs/policiesmanual/d050.

5.10. GRADE OF INCOMPLETE

COS Policy on Incomplete Grade for undergraduate and graduate students
https://www.rit.edu/science/documents/cos-policies-procedures-and-guidelines

"Incomplete" Grades: A grade of "I", will only be considered by COS faculty if a student has been attending classes and is passing coursework (homework, quizzes, tests). If the request for an Incomplete grade (I) is granted, all outstanding coursework must be submitted no later than the end of the following two terms; including summer session, or the "I" grade becomes an "F" grade. The general guideline is that an incomplete grade will not be granted to students that have fallen behind in their work without sufficient justification.

5.11. REPEATING A COURSE TO RAISE LOW GRADES

An undergraduate student may repeat a course to raise a grade. If a student repeats a course, the last grade will stand as final even if the last grade earned is lower than the grade previously earned.

Courses taken at other institutions cannot be considered as repeats. Credit earned by examination/experience cannot be used to repeat previous course work. This process only applies to coursework in undergraduate programs.

5.12. CHANGE OF PROGRAM

Students who wish to change their academic plan must complete a Change of Program and/or Plan Application form with their academic adviser. Permission to change is determined on a case-by-case basis by the program applied to and, *if granted, may require additional course work and extend the time it takes to earn a degree*.

5.13. ACADEMIC PROBATION AND SUSPENSION

An undergraduate student must maintain a cumulative GPA of 2.00 or above at RIT in order to remain in good academic standing. To help students maintain satisfactory academic performance, RIT has set academic standards that serve to identify, warn, and provide timely intervention to a student who is experiencing academic difficulty.

Probation refers to the academic action taken when a student is not in good academic standing. A student placed on probation is expected to sufficiently raise their GPA so as to return to good academic standing in the succeeding term. Students placed on probation will be required to complete an academic success plan. Without consultation with their advisor and written permission from the dean of the college, students on probation may enroll in no more than 16 credits.

Academic Suspension refers to the academic action taken when a student is not permitted to enroll in courses at RIT for minimum of one term. Students who qualify for academic suspension at the end of a spring term will be placed on academic suspension for the following summer and fall terms. An **appeal form** can be used by a student to appeal an academic suspension decision.

Deferred Suspension refers to the academic action taken when a student appeals academic suspension and the appeal is granted. Students placed on deferred suspension will have one term to return to good academic standing and will be required to complete an academic success plan with their home program. A student on deferred suspension, enrolled in summer term, and taking 12 or more credits will be subject to this academic action policy and subsequent academic success plan.

Academic Success Plan is an agreement between a student and the student's academic program designed to facilitate success in the program. Students should consult with their academic program to determine the appropriate number of credits per term.

More detailed information can be found at https://www.rit.edu/academicaffairs/policiesmanual/d051.

5.14. COLLEGE RESTORATION PROGRAM

The College Restoration Program is an intensive one-semester only, academic intervention program for students facing academic suspension or probation. Students in serious academic difficulty can dramatically improve their performance with appropriate training and support.

For more information, see http://www.rit.edu/studentaffairs/crp/.

5.15. ACADEMIC PROGRESS TOWARD DEGREE COMPLETION

Understanding program degree requirements, including, but not limited to: course selection, course prerequisites and appropriate course sequencing, co-op requirements, and evaluation will support timely progress towards degree completion.

It is the responsibility of all students to attend their scheduled classes regularly and punctually in order to promote their progress and to maintain conditions conducive to effective learning. See https://www.rit.edu/academicaffairs/policiesmanual/d040 for more information about this policy.

Federal regulations require financial aid recipients to maintain minimum standards of satisfactory academic progress (SAP) for continued receipt of federally sponsored aid. All students receiving federal assistance must remain admitted in a degree program. Regulations require a maximum time frame for degree completion. See https://www.rit.edu/emcs/financialaid/ugrad_progress.html for more information about this policy.

5.16. LEAVE OF ABSENCE

There are two types of student leave of absence: voluntary (planned and immediate) and involuntary.

A student on a leave of absence, whether voluntary or involuntary, will not attend classes, must vacate university owned housing as outlined in the Terms & Conditions of Housing, Debit, and Meal Plans, and may be entitled to whatever refunds of tuition, fees, and room and board charges as would be appropriate for the effective date of the leave of absence. A student on a leave of absence will not have access to the Student Life Center facilities or the ability to check out Wallace Center materials.

For more information, see https://www.rit.edu/academicaffairs/policiesmanual/d021.

5.17. CHANGING GRADES

Once a grade has been officially reported by an instructor, it is normally not the right of any person to change this grade unless an actual error has been made in computing or recording it. If an error has been made, the instructor must complete the Change of Grade/Extension or Incomplete Form and the completed form must be approved by the head of the department in which the instructor teaches. When approved by both of these individuals, the form is to be forwarded to the Registrar's Office. There is an appeal procedure for disputed grades - see Policy D17.0-Final Course Grade Disputes.

More information can be found at https://www.rit.edu/academicaffairs/policiesmanual/d050.

5.18. STUDENT ACADEMIC INTEGRITY

As members of an academic community, both students and faculty share responsibility for maintaining high standards of personal and professional integrity. If a student violates these standards, the Academic Integrity Process affords a fair resolution. The committee outlined in the policy may be called upon to hear cases where a breach of student academic integrity is alleged by instructor. In all cases, it is the responsibility of any university representatives to render fair and appropriate decisions reaffirming standards of integrity expected in the academic community.

A breach of student academic integrity falls into three basic areas:
  A. **Cheating:** Cheating is any form of fraudulent or deceptive academic act, including falsification of data, possessing, providing, or using unapproved materials, sources, or tools for a project, exam, or body of work submitted for faculty evaluation.
  B. **Duplicate Submission:** Duplicate submission is the submitting of the same or similar work for credit in more than one course without prior approval of the instructors for those same courses.
  C. **Plagiarism:** Plagiarism is the representation of others' ideas as one's own without giving proper attribution to the original author or authors. Plagiarism occurs when a student copies direct phrases from a text (e.g. books, journals, and internet) and does not provide quotation marks or paraphrases or summarizes those ideas without giving credit to the author or authors. In all cases, if such information is not properly and accurately documented with appropriate credit given, then the student has committed plagiarism.

The important thing to remember is that violations of academic integrity can have serious consequences even for an apparently small or minor violation. Don't be tempted and you won't have to worry about facing the Academic Integrity Committee.

More information about the policy can be found at https://www.rit.edu/academicaffairs/policiesmanual/d080.

5.19. RIT NON DISCRIMINATION STATEMENT

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.

The Title IX Coordinator has overall responsibility for the university's institutional compliance with Title IX. Any person with a concern about the university's handling of a particular matter related to sex or gender-based discrimination or harassment should contact:
Stacy DeRooy
Director of Title IX and Clery Compliance
Title IX Coordinator
171 Lomb Memorial Drive
Rochester, NY 14623
585-475-7158
Stacy.DeRooy@rit.edu
www.rit.edu/titleix

Any person may report sex discrimination, including sexual harassment, in person, by mail, by telephone, or by electronic mail, using the contact information listed for the Title IX Coordinator, or by any other means that results in the Title IX Coordinator receiving the person's verbal or written report. Reports may be made regardless whether the person reporting is the alleged victim of any conduct that could constitute sex or gender-based discrimination or harassment. Reports may be made at any time (including during non-business hours) by calling the telephone number noted above, by electronic mail, by mail to the office address listed for the Title IX Coordinator, or by filing a report on line with RIT's Title IX Office.

The U.S. Department of Education, Office for Civil Rights (OCR) is a federal agency responsible for ensuring compliance with Title IX. OCR may be contacted at 400 Maryland Avenue, SW, Washington, DC 20202-1100, (800) 421-3481.

6. ASSISTANCE AND OPPORTUNITIES

6.1. ACADEMIC SUCCESS CENTER

The ASC works in a variety of ways to increase students' effectiveness as learners. Students learn how to develop basic skills, enhance advanced skills, or cope with the academic environment. The ASC offers workshops and instruction in study skills and alternative learning strategies as well as drop-in writing instruction in the Writing Center and mathematics/physics tutoring in the Bates Study Center and Sol Study Center. Other services such as Academic Assessment Program, Structured Monitoring, and Tutor Training are available.

ASC offices are located on the second floor of Monroe Hall, room 2080. There is no charge to students for these services (with the exception of the Structured Monitoring Program). For more information, visit the ASC website at https://www.rit.edu/academicsuccesscenter/.

6.2. MATHCRASH! STUDY SESSIONS

MathCrash! is a three-hour plus review session with pizza and soda that is held in the atrium of Gosnell Hall each semester term before final exams. Students work together, teaching and learning from each other, and faculty members from the School of Mathematics and Statistics are available to help students solidify concepts and polish techniques.

6.3. STUDENT EMPLOYMENT OPPORTUNITIES

There are several types of academically-related student employment opportunities on campus. These are excellent opportunities to earn experience and money while enrolled in classes. Some examples of such opportunities include grader, teaching assistant, tutor, and supplemental instructor. Many of these positions are posted through the Student Employment Office or on the School of Mathematics and Statistics website.

6.4. πRIT, THE SMS STUDENT CLUB

The School of Mathematics and Statistics Club, "PiRIT," is a student organization providing a variety of professional and social activities for students and faculty. Guest speakers provide interesting insights into special topics in mathematics and statistics. Social events are aimed at bringing students and faculty together in an informal atmosphere.

For more information, see https://www.facebook.com/Pi-RIT-122894584563648/ .

6.5 HELPFUL LINKS

The RIT website: http://www.rit.edu/
SMS Facebook Page: https://www.facebook.com/RITSMS/
MyCourses: https://mycourses.rit.edu/
SIS (Student Information System): https://sis.rit.edu/
College of Science Policies & Procedures Manual: https://www.rit.edu/science/forms-docs
RIT Policies & Procedures Manual: http://www.rit.edu/academicaffairs/policiesmanual/
Undergraduate Bulletin: http://www.rit.edu/upub/pdfs/Undergrad_Bulletin.pdf

7. SMS RESEARCH FACULTY

Rank	Name	Office No.	Phone No.	E-mail @rit.edu
Associate Professor	Dr. Anurag Agarwal	GOS-3216	5-7531	axasma
Professor	Dr. Ephraim Agyingi	GOS-2222	5-2513	eoasma
Assistant Professor	Dr. Olalekan Babaniyi	GOS-2206	5-4270	obsma
Professor	Dr. Peter Bajorski	HLC-2532	5-7889	pxbeqa
Professor	Dr. Mihail Barbosu	HLC-2235	5-2123	mxbsma
Associate Professor	Dr. Nathaniel Barlow	GOS-2344	5-4077	nsbsma
Professor	Dr. Mao Bautista	GOS-3354	5-6122	maurino.bautista
Professor	Dr. Bernard Brooks	GOS-2350	5-5138	bpbsma
Professor	Dr. Nathan Cahill	GOS-2358	5-5144	nathan.cahill
Professor	Dr. Manuela Campanelli	LAC-2054	5-7752	manuela@astro.rit.edu
Assistant Professor	Dr. Lucia Carichino	GOS-2278	5-2537	lcsma1
Associate Professor	Dr. Linlin Chen	HLC-2217	5-7619	lxcsma
Associate Professor	Dr. Matthew Coppenbarger	GOS-2306	5-5887	mecsma
Associate Professor	Dr. Michael Cromer	GOS-3308	5-4078	mec2sma
Assistant Professor	Dr. Blessing Emerenini	GOS-2266	5-2231	boesma
Professor, School Head	Dr. Joshua Faber	GOS-2334	5-5115	jafsma
Professor	Dr. Raluca Felea	GOS-2274	5-2524	rxfsma
Professor	Dr. Ernest Fokoue	HLC-2517	5-7525	epfeqa
Professor of Practice	Dr. Teresa Gibson	HLC-2505	5-5129	tbgsma
Associate Professor	Dr. Anthony Harkin	GOS-1344	5-2540	harkin
Professor	Dr. Matthew Hoffman	GOS-2302	5-4209	mjhsma
Associate Professor	Dr. Jobby Jacob	GOS-2272	5-5146	jxjsma
Professor	Dr. Baasansuren Jadamba	GOS-2312	5-3994	bxjsma
Professor	Dr. Akhtar Khan	GOS-2308	5-6367	aaksma
Professor	Dr. Seshavadhani Kumar	GOS-3304	5-2547	sxksma
Associate Professor	Dr. Manuel Lopez	GOS-2212	5-4382	malsma
Professor	Dr. Carlos Lousto	LAC-2069	5-2219	colsma
Professor	Dr. Carl Lutzer	GVP-2034	5-5133	cvlsma
Professor	Dr. Kara Maki	GOS-2348	5-2541	klmsma
Assistant Professor	Dr. Nishant Malik	GOS-3348	5-5439	nxmsma
Professor	Dr. Carol Marchetti	HLC-2221	5-2515	cemsma
Professor	Dr. James Marengo	GOS-3306	5-6872	jemsma
Assistant Professor	Dr. Nonhle "Channon" Mdziniso	HLC-2216	5-6240	ncmsma
Associate Professor	Dr. Laura Munoz	GOS-3340	5-2523	lmmsma
Professor	Dr. Darren Narayan	GOS-2228	5-2514	dansma
Assistant Professor	Dr. Shahla Nasserasr	GOS-3278	5-5150	shahla
Associate Professor	Dr. Richard O'Shaughnessy	LAC-2068	5-5965	rossma
Associate Professor	Dr. Niels Otani	GOS-3350	5-5140	nfosma
Associate Professor	Dr. Robert Parody	HLC-2215	5-5288	rjpeqa
Associate Professor	Dr. Michael Radin	ORN-1316	5-7681	marsma
Professor	Dr. Mary Lynn Reed	HLC-2530	5-2163	mlrsma
Assistant Professor	Dr. Brendan Rooney	GOS-2234	5-2519	brooney

Professor	Dr. Hossein Shahmohamad	GOS-2304	5-7564	hxssma
Assistant Professor	Dr. Nourridine Siewe	ORN-1330	5-5215	nxssma
Associate Professor	Dr. Wanda Szpunar-Lojasiewicz	GOS-2260	5-5134	wxlsma
Professor	Dr. John Whelan	LAC-2063	5-5083	jtwsma
Professor	Dr. Tamas Wiandt	GOS-2354	5-5767	tiwsma
Assistant Professor	Dr. Tony Wong	GOS-2232	5-7486	aewsma
Associate Professor	Dr. Elmer Young	GOS-2296	5-5137	elysma
Professor	Dr. Yosef Zlochower	LAC-2067	5-6103	yrzsma