

# COMPUTING SECURITY

Golisano College of Computing and Information Sciences



**Bachelor of Science in  
Computing Security**

2018-2019 STUDENT HANDBOOK

## **Academic Advisor Contact Information**

### *Bachelor of Science in Computing Security*

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## **Appointment Information**

Email works best for brief questions. Prospective students and families requiring more in-depth information can schedule face-to-face or phone appointments with an advisor or the department chair. Appointments can be made between the hours of 8:30 AM and 4:30 PM, Monday thru Friday. Students can make an appointment by calling (585) 475-2963 or by visiting our Student Services & Academic Advising Center located in building GOL, room 2120. Additionally, for current students, appointments can be schedule online via Starfish.

There is currently no ABET accreditation standards for degrees in computing security disciplines however RIT and the Computing Security BS degree has been designated an Academic Center of Excellence for Information Assurance Education. To earn this designation our degree is reviewed by the National Security Agency and the Department of Homeland Security under the National Centers of Academic Excellence in Information Assurance Education Program. You can read more about this designation at the following website:

[http://www.nsa.gov/ia/academic\\_outreach/nat\\_cae/index.shtml](http://www.nsa.gov/ia/academic_outreach/nat_cae/index.shtml).

### **For more information contact:**

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# 01. The Curriculum

## Understanding Graduation Requirements

### Major Requirements (59 Credit Hours)

#### Core (41 credit hours)

The core courses provide the foundation of your major. Included in the core are one-year of the Computer Science programming sequence; C programming; the fundamentals of computing security, computer systems, networking (the fundamentals and Routing & Switching), Network Services, and System Administration; as well as course work in databases, cryptography, security policies, authentication and security models, and a capstone project course.

#### Advanced Electives (18 credit hours)

A matriculated student in the B.S. in Computing Security needs to take 6 elective courses. It is required to take 3 courses from one of the clusters below, and 3 courses from the approved Advanced Electives. If the course has \* next to it, that course is required if it is in your chosen cluster.

Students can create customized clusters for their special interests provided compositions of clusters are vested by one faculty, one student academic advisor, and approved by the department chair. Courses in a customized cluster should be on the list of approved advanced elective courses of Computing Security. To be counted as a cluster course, a GCCIS course not on the list of advanced elective courses of Computing Security needs to be approved by the undergraduate director on a case by case basis, or simply such a course can be counted as a free elective for students.

#### ***Network and System Security:***

- \*CSEC 461 Computer System Security
- \*CSEC 462 Network Security and Forensics
- CSEC 465 Network & System Security Audit
- CSEC 469 Wireless Security
- CSEC 471 Penetration Testing Frameworks & Methodologies
- CSEC 473 Cyber Defense Techniques

#### ***Forensics & Malware:***

- \*CSEC 464 Computer Systems Forensics
- \*CSEC 466 Introduction to Malware
- CSEC 476 Malware Reverse Engineering
- CSEC 462 Network Security and Forensics
- CSEC 465 Network & System Security Audit
- CSEC 467 Mobile Device Security and Forensics
- CSEC 470 Covert Communications

### ***Software Security:***

- \*SWEN 261 Introduction to Software Engineering
- \*SWEN 331 Engineering Secure Software
- CSEC 467 Mobile Device Security and Forensics
- CSEC 468 Risk Management for Information Security
- CSEC 731 Web Server and Application Security Audits (Graduate course)
- CSCI 622 Data Security and Privacy (Graduate course)
- CSCI 642 Secure Coding (Graduate course)
- SWEN 567 Hardware Software Co-Design for Cryptographic Applications

### ***Security Management and Evaluation:***

- \*CSEC 468 Risk Management for Information Security
- \*CSEC 477 Disaster Recovery Planning and Business Continuity
- CSEC 465 Network & System Security Audit
- CSEC 471 Penetration Testing Frameworks & Methodologies
- CSCI 531 Introduction to Security Measurement
- CSCI 532 Introduction to Intelligent Security Systems

### ***Electives:***

- CSCI 455 Principles of Computer Security
- CSCI 464 Xtreme Theory
- CSCI 531 Introduction to Security Measurement
- CSCI 532 Introduction to Intelligent Security Systems
- CSCI 622 Data Security and Privacy (Graduate course)
- CSCI 642 Secure Coding (Graduate course)
- CSCI 762 Advanced Cryptography (Graduate course)
- CSEC 461 Computer System Security
- CSEC 462 Network Security and Forensics
- CSEC 464 Computer Systems Forensics
- CSEC 465 Network & System Security Audit
- CSEC 466 Introduction to Malware
- CSEC 467 Mobile Device Security and Forensics
- CSEC 468 Risk Management for Information Security
- CSEC 469 Wireless Security
- CSEC 471 Penetration Testing Frameworks & Methodologies
- CSEC 473 Cyber Defense Techniques
- CSEC 470 Covert Communications
- CSEC 476 Malware Reverse Engineering
- CSEC 477 Disaster Recovery Planning and Business Continuity
- CSEC 731 Web Server and Application Security Audits (Graduate course)
- SWEN 261 Introduction to Software Engineering
- SWEN 331 Engineering Secure Software
- SWEN 567 Hardware Software Co-Design for Cryptographic Applications

## **Math and Science Requirements (25 credits)**

### Math

MATH-181 Project based Calculus I (4 credits)\* (Math sequence is based on their MPE score, please refer to the Math Departments website: <http://www.rit.edu/science/sms/mpe> or contact your advisor with questions.)

MATH-182 Project based Calculus II (4 credits)

MATH-190 Discrete Mathematics for Computing (3 credits)

MATH-251 Probability and Statistics I (3 credits)

MATH-241 Linear Algebra (3 credits) or MATH-252 Probability and Statistics II (3 credits)

### Science (Choice of one of the following sequences):

BIOL-101/103 General Biology I or BIOG 101/102 Explorations in Cellular Biology and Evolution

BIOL-102/104 General Biology II or BIOG 102/104 Explorations in Animal and Plant Anatomy and Physiology

CHMG-141/145 General & Analytical Chemistry I

CHMG-142/146 General & Analytical Chemistry II

PHYS-211 University Physics I (4 credits)

PHYS-212 University Physics II (4 credits)

This block consists of courses to be taken through the College of Science. Students who have not had a pre-calculus course in high school will be required to do so prior to taking calculus. This will be documented as a free elective course for purposes of degree certification.

## **Liberal Arts Requirements (27 credits)**

This block of courses is the standard Liberal Arts curriculum for almost all Bachelor of Science degrees at RIT. The College of Liberal Arts sets this curriculum and they maintain their own advising center on the second floor of the Liberal Arts Building across from the Wallace Library. If you have any questions about liberal arts transfer credits, course substitutions, or anything else in this block of courses you need to discuss this with the Liberal Arts advisors.

Briefly, this block consists of the following requirements from the College of Liberal Arts:

- First Year Writing (3 credits)
- PUBL-363 Cyber Policy & Law (3 credits)
- Ethical Perspective (3 credits)
- Global Perspective (3 credits)
- Artistic Perspective (3 credits)
- Social Perspective (3 credits)
- A three-course advanced immersion (9 credits)

### Liberal Arts Immersion & Liberal Arts Minors

The College of Liberal Arts offers students two options for completing upper-level liberal arts requirements. They must complete a liberal arts immersion or they may enhance it by completing a liberal arts minor. It is important to note that the perspective liberal arts requirements (core requirements) remain the same regardless of whether a student elects to complete an immersion or a minor.

A liberal arts immersion is a cohesive set of three upper-level courses (9 credits) meeting RIT's general education requirements. Immersions may be disciplinary or interdisciplinary, and some may require prerequisite course work. Students who prefer greater depth in the humanities and social sciences may elect to complete a liberal arts minor. Minors require the completion of 5 upper-level courses (15 credits) in a designated liberal arts area. Liberal arts minors may be disciplinary or inter-disciplinary; some may require prerequisite courses.

For advising on liberal arts immersions and minors go to the Office of Student Services located in LBR-2210. Office hours are: Monday through Thursday, 8:30 am to 4:30 pm, and Friday 8:30 am to 4:30 pm. Phone: 585/475-2444. Immersion Courses are listed on the Liberal Arts website:

<https://www.rit.edu/cla/academics-programs/immersions>

### **Ethics Elective (3 credits)**

Ethics is a branch of philosophy dealing with what the proper course of action is to take in any given situation. Computing security students will gain knowledge during their course of study that gives them great technological power. Students with this knowledge base need to understand the ethical expectations that come with this technological power. Therefore, computing security students are required to choose one of the following courses as their ethics elective:

PHIL-102 Introduction to Moral Issues  
PHIL-202 Foundations of Moral Philosophy  
PHIL-306 Professional Ethics

### **Free Electives (12 credits)**

Students may choose 12 credits of electives from any program at RIT. The intent of these electives is to enable students to develop expertise in a domain where they wish to apply their skills in computing security. Ideally these selections will enable the student to gain insight into the culture, standards, and practices of their future career environment. The free electives can also be used to complete minors housed in or outside of the College of Liberal Arts such as Business or to explore other topics of interest to them. Students who want to gain greater depth in computing security may use some or all of these course slots to take additional advanced courses in computing security.

### **Wellness Activity Requirement (2 courses)**

Students are required to complete two *different* activity courses during their time at RIT. Credit is not given for these courses, but completion of these courses are required for graduation. Each course does have an activity fee that will vary depending on the course.

### **Co-op Requirement (2 blocks)**

Students are required to complete two 10-week co-op experiences. Co-op is short for *co-operative education*, and is an opportunity in which the student gains real-life work experience. Students will be paid for the job, but more importantly will gain on-the-job experience that is valuable when they graduate and begin to search for a full-time position. To help facilitate finding a co-op position the Co-op and Career Services Office at RIT maintains job listings from companies that are looking for co-op students to work for them. Students may find co-op employment anywhere in the US and International co-ops are also supported.

To be eligible for co-op, students must have completed their freshman and sophomore year course requirements, and must have completed CSEC-99 Co-op Seminar. Transfer students usually must complete one year of academic work at RIT before becoming eligible to go out on co-op. Exceptions will be considered on a case by case basis.

Co-op allows a student to gain work experience, apply concepts taught in class, and bring lessons learned from the workplace back into the classroom thereby enriching their educational experience. Therefore, you should complete both co-op blocks prior to entering your senior year. You must complete all of your co-op requirements *before* you finish your last term of classes. Another way of stating this is that you should not “end on a co-op.”

One final consideration: since most students are on co-op for the summer term, the summer course offerings are sparse, particularly in the advanced study courses. With that in mind you should ideally go out for your first co-op experience the summer after your second year and plan for the second block sometime during your junior year or the summer after your junior year.

## **Additional Options**

### Minors

Many students choose to “minor” in an academic area away from their major. This is particularly appropriate in for students in the Computing Security Department as their skills are in demand throughout all segments of society. Many students use a minor to gain more depth in a specific domain in which they intend to work. This domain knowledge can be very attractive to many employers and RIT transcripts record any completed minors along with the student’s major.

A minor is a collection of at least five courses (15 credits hours) taken in a specific area away from the major and defined by the sponsoring department. For example, the College of Liberal Arts has a vast selection of five-course minors available which use the three-course Liberal Arts immersion course slots and two Free Elective slots. Minors are emerging in areas other than Liberal Arts such as Business and Engineering. These minors may be pursued by using the four Free Elective course slots. For information on all minors currently available at RIT visit the following website: <https://www.rit.edu/programs/minors>. If you are interested in pursuing a minor, please meet with your academic advisor for assistance in laying out your plan.

### Dual Degrees and Double Majors

A dual degree is available to RIT students who are matriculated baccalaureate candidates who wish to complete two bachelor degrees concurrently. The second undergraduate degree must be in a different programmatic area and must require at least 30 semester credit hours beyond the first baccalaureate degree. (i.e., one BS degree and one BFA degree). The BS/MS degree is another form of a dual degree.

A double major is available to RIT students wishing complete two different majors, but receive only one baccalaureate degree. The double major must satisfy the graduation and accreditation requirements from both degrees, and be of the same degree type (i.e., both BS degrees).

Both of the options require the approval of the unit heads of both degree programs and require careful consideration and planning. This is accomplished by meeting with your academic advisor to develop your amended course of study prior to pursuing either option.



### *BS/MS in Computing Security*

The BS/MS in the Computing Security program is for undergraduate students who wish to earn both a BS and MS in Computing Security. A student accepted into this program will take up to three graduate courses in Computing Security and apply them to both the BS and MS degree requirements. These courses would take the place of three of the advanced security courses in the undergraduate degree and will be considered electives in the graduate degree. This three-course overlap will give students the opportunity to complete both degrees in five years given careful planning and execution.

To be considered for admission into this program, students will need:

1. Student must attend either an information session or meet with our BS/MS academic advisor one-on-one.
2. Students must have a minimum cumulative GPA of a 3.25.
3. Student must be at least third year standing.
4. Students must complete 20 semester credits of computing coursework before applying.
5. For students whose BS curriculum requires co-op, a minimum of 1 co-op must be completed before applying.
6. Students must complete a brief statement outlining why they are interested in the BS/MS program and what area of focus they think they are interested in pursuing.
7. Students must provide one letter of recommendation from a GCCIS Professor explaining your potential for the BS/MS program.

It should be noted that a student will not receive their Bachelor's degree until the requirements for both the BS and the MS degrees have been completed.

## **AP, IB, CLEP, and Transfer Credits**

### **Advanced Placement (AP):**

Rochester Institute of Technology accepts AP credit earned in high school depending on the score attained on the AP exam. An exam score of 3 is considered for credit from the RIT College of Liberal Arts. An exam score of 4 or better may be considered to receive credit for math, science, or Computer Science. Students are requested to contact the [College Board](#) and have their AP scores sent to the RIT Office of Undergraduate Admissions.

### **International Baccalaureate (IB)**

RIT recognizes IB level work. Credit may be awarded for higher level examinations completed with a grade of 5 or better. Credit is awarded on a course-by-course basis and in the context of the student's intended program at RIT. Each department will determine the specific amount of credit to be awarded. Students may forward IB transcripts to the Office of Admissions for evaluation.

### **College Level Examination Program (CLEP)**

CLEP is a nationwide system of credit by examination offered by The College Board. Any person entering college, presently attending college or out of college may take CLEP examinations and

seek credit by submitting the test results to RIT for evaluation. Credit recommendations for CLEP vary depending on the subject and examination results. Please consult with an advisor in the Office of Student Services for further information and to determine which examination will fulfill Liberal Arts course requirements.

## **Transfer Credit**

### **Incoming Students:**

RIT awards transfer credit for courses completed at other regionally accredited colleges and universities only. Transfer credit at the undergraduate level will be granted for course work completed with a grade of "C" or above. The College of Liberal Arts evaluates transfer credits for liberal arts courses for current and prospective students. The student's current or prospective academic department evaluates the remaining courses. Official transcripts from each college or university previously attended must be sent to the RIT Office of Undergraduate Admissions.

Rochester Institute of Technology  
Office of Undergraduate Admissions  
60 Lomb Memorial Drive  
Rochester, NY 14623

Prospective students can call the College of Liberal Arts Office of Student Services at (585) 475-2444 if they have questions about acceptable liberal arts courses for transfer to RIT.

### **Current Students:**

If you are a matriculated student at RIT and are considering taking courses at another college or university you should consult your academic advisor in the Computing Security office before registering for the course. Once you complete the course you must request to have an official transcript sent to the RIT Office of the Registrar.

Rochester Institute of Technology  
Office of the Registrar  
George Eastman Building  
27 Lomb Memorial Drive  
Rochester, NY 14623-5603

RIT's transfer credit policies:

<http://www.rit.edu/academicaffairs/registrar/transfer-credit>

## 02. Academic Resources and Activities

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### Academic Advising

Students matriculated in the undergraduate Computing Security degree program are assigned an academic advisor. The professional academic advisor guides students through the curriculum, helping them develop their academic plan by taking into consideration program requirements, pre-requisites, course sequences, and course availability. They also help students by interpreting institutional policies, referring students to other resources on campus, and discussing issues of concern regarding their academic progress. Students are expected to be responsible for making their own decisions based on the information and advice their advisor offers. All incoming students will have a mandatory meeting with their assigned advisor before they register for their second term courses.

Appointments can be made between the hours of 8:30am and 4:30pm, Monday - Friday. Students can make an appointment by calling (585) 475-2963, online via Starfish, or by visiting the Student Services Office located in building GOL, room 2120. The best way to get your quick questions answered is via email. You can generally expect a response in 1-2 business days.

### Computing Security Labs

The Computing Security Labs provide students with an environment to apply lecture material and re-enforce the full spectrum of computing security concepts on a practical level. We provide VMware, OS software, packet sniffer software, simulators, security tools, PCs, routers, switches, servers, wireless A – N, Voice over IP infrastructure and many other devices in a protected environment to allow students the opportunity to explore both independently and with professor led instruction.

The labs supporting the computing security curriculum consist of physical labs focused on digital security, additional labs to support the instruction of foundation computing course, a remote learning environment (RLES) and an equipment cage to meet student needs. These labs and the course work they support include:

- AirGap Lab– security auditing, network security, server security, malware, cryptography
- Security Lab – forensic courses, ad-hoc network security

Additionally, Graduate and Teaching Assistants are available during non-course hours for students to receive assistance or additional help with any course related issues.

# Involvement Opportunities

In addition to your coursework, we strongly recommend getting involved in computing related activities. Here are some options for students looking for more than just the classroom experience:

## Guest Speakers

Throughout the academic year you will have the opportunity to go to many guest lectures or panel discussions. These come in a variety of forms including but not limited to the Dean's lecture Series, The Center for the Advancement of Research and Education in Information Assurance (CARE-IA) lecture series, Co-op and Career Services speakers, and guests brought in by your professors to speak specifically to your class.

## Women in Computing

Women in Computing (WiC) at RIT is comprised of a group of students, faculty, and staff who are committed to the success and advancement of women in computing. This spans all computing disciplines from traditional computer science, to the emerging disciplines of game design, information assurance and security. Our purpose is to support existing and new creative, academic, professional, and community-based micro-cultures for women in computing and to bring those communities together when opportunities arise. We also strive to increase awareness of our disciplines by promoting the field of computing to area school-age girls and boys. For more information about our organization please visit us at <http://women.rit.edu/>.

## <RITSEC>

RITSEC is a student-run organization dedicated to educating and preparing RIT students to compete in security-related competitions, as well as showcasing RIT student talent in the current world of security today.

Whether you're new to competitive cybersecurity or a veteran, RITSEC has a place for you.

We believe security is for anyone who wants to learn and center our activities around live individual and team-based security exercises covering a wide variety of areas in computing security, including: penetration testing, Windows and Linux server hardening, web security, network services and more!

Regularly scheduled meetings are held Fridays from 12-4 pm.

<https://rc3.club/>

## 03. The Campus, Things to Do

### Housing

There are a number of on-campus housing options for students, ranging from traditional residence halls to hotel-style accommodations to state-of-the-art living communities with educational and commercial opportunities just a short walk away. The types of students you'll find living on campus are as diverse and enriching as any college in the country, and RIT does a great job of accommodating the needs of all students, whether they are traditional-age freshmen, transfer students, international students, or families. You can find more detailed information on the student housing website: <http://finweb.rit.edu/housing/>. Listed below are the steps to take if you're interested in on-campus housing:

### Freshmen

Residence hall assignments are made on a first-come, first-served basis, depending upon the postmark date of your admission deposit and the submission date of your housing contract. Freshmen entering directly from high school are guaranteed housing; however, students who are the last to be admitted may be placed in temporary housing. To complete a freshman housing contract please go to <https://www.rit.edu/fa/housing/content/how-apply>.

### NTID Students

To secure housing, NTID students should complete a housing contract and return it to Housing Operations. Residence hall assignments are made on a first-come, first-served basis, based on the postmark date of your admissions deposit and your housing contract.

### Transfer Students

Transfer students are assigned RIT housing on a space-available basis following the postmark date of the admissions deposit and the submission date of the housing contract; housing is not guaranteed. Some transfer and graduate students will be placed in temporary housing. Some will be asked to find their own housing in the local area. Transfers assigned to temporary housing will be relocated to permanent RIT housing during the summer, fall, and winter semesters.

### Clubs and Activities

Studies have shown that students who are actively involved in extracurricular activities on campus are more likely to receive higher grades and report a higher level of satisfaction with their college experience. For this reason, RIT has put a great amount of effort in supporting students clubs and activities. Student Government Clubs and Organizations exist to bring students of similar interest together and provide them with opportunities to become effective leaders. These groups enhance the quality of student life by fostering social interaction, leadership development, school spirit and an affinity to RIT. Clubs and Organizations promote activities, diversity, service and learning outside of the classroom.

Currently there are approximately 320 active clubs, Student Organizations, Greek Organizations on campus. RIT welcomes and embraces all of its unique, student operated clubs and organizations. To find out more about what clubs and organizations are available on campus, go to <https://www.rit.edu/studentaffairs/campuslife/>