Course Syllabus

Course Title: Programming for Information Security
Course Number: CSEC-201

Class Time and Location:	Section 01: Tuesday, Thursday TuTh 3:30PM - 4:45PM Golisano Hall (GOL)-2740
Course Mode:	In-person (See Course Modality)
Prerequisite(s):	1. CSEC-101, CSEC-102, CSEC-140, or equivalent course 2. CSEC-124, SWEN-124, GCIS-124, CSCI-142, CSCI-140, CSCI-242, or equivalent course
Online Course Material/Course Webpage:	RIT myCourses will be used to access course content, conduct quizzes and exams, and view grades. RIT myCourses is accessible at https://mycourses.rit.edu.

Instructor Information

Instructor:	Ahmed M. Hamza
Contact Information:	Office Location: GOL-1789 (Main Office) Phone: 54601 Email: amhics@rit.edu
Office Hours:	Tu Thu 2-3:30 Office hours will be conducted in person, unless an appointment is made for Zoom.

Course Information

Catalog Description

This course builds upon basic programming skills to give students the programming knowledge necessary to study computing security. Students will be introduced to network programming, memory management, and operating system calls along with associated security concepts. Specific focus will be placed on understanding the compilation process and on the relation between high-level programming concepts and low-level programming concepts, culminating in identifying and exploiting memory corruption vulnerabilities.

Course Objectives

The primary goal of this course is to provide students with an introduction to core application security concepts while, at the same time, teaching students the programming skills they will need in the information security profession. The secondary goal of this course is to provide

students with a broad exposure to relevant high and low-level programming languages used in information security.

Learning Outcomes

Learning Outcome	Assessment Method
1. Students will be able to program using sockets in multiple languages.	Multiple programming assignments
2. Students will understand how memory can and should be managed programmatically.	Programming assignment
3. Students will understand the compilation process and how high-level code is translated into low-level code.	Programming assignment
4. Students will be able to write basic programs in a low-level programming language, such as x86 assembly.	Programming assignment
5. Students will have an understanding of how memory corruption vulnerabilities can be exploited and be able to write basic memory corruption exploits.	Programming assignment

Course Components

This course consists of lectures, in-class activities, quizzes, exams, and out of class assignments. The out of class assignments, quizzes, and exams will be completed individually.

Course Modality

I expect all students will attend all lectures. However, because of the need to be flexible to accommodate student illness and other potential contingencies, all lectures will be streamed via Zoom and automatically posted to MyCourses.

Course Topics

- C Introduction
- C Pointers and Memory Management
- C Data Structures
- System Programming
- C Sockets
- C Threads
- Windows API
- Debugging
- x86 Assembly
- Fuzzing and Exploit Development
- Preventing Memory Corruption Vulnerabilities

Course Materials

Required Texts and Resources	None
Recommended Supplemental Texts	● Hacking: The Art of Exploitation, Jon Erickson, No Starch Press, 2008 ● Black Hat Python: Python Programming for Hackers and Pentesters, Justin Seitz, No Starch Press, 2014 ● Grey Hat Python: Python Programming for Hackers and Reverse Engineers, Justin Seitz, No Starch Press, 2009 ● Shellcoder's Handbook: Discovering and Exploiting Security Holes, Anley; Heasman; Leindner; Richarte, Wiley, 2007 ● The Linux Programming Interface, Michael Kerrisk, No Starch Press, 2010
Other Recommended Resources	Resources will be provided on myCourses.

Grading/Evaluation

Components

Your course grade/evaluation is based on attendance, in-class activities, assignments, and exams (i.e., midterm and final).

Quizzes	35%
Midterm	10%
Final Exam	10%
Practical Final Exam	10%
Assignments	35%
Total	**100%**

Grade Scale

Based on the 100% total listed above, letter grades will be assigned as follows:

A : 94 – 100	**A-** : 90 – 93	**B+** : 88 – 89	**B** : 82 – 87	**B-** : 80 – 81
C+ : 78 – 79	**C** : 72 – 77	**C-** : 70 – 71	**D** : 60 – 69	**F** : Below 60

Early Submissions

You will receive 1 bonus point per day that an assignment is submitted in advance of the due date.

Late Submissions/Due Date Extensions

Late submissions will not be accepted, and due dates will not be extended. All exams must be completed during the time period they are scheduled. All activities and assignments must be submitted by their due dates.

If you believe you will miss a due date, please contact me as soon as possible. If it is due to an excused absence, then arrangements may be made for late submission or due date extension on a case-by-case basis.

See below for information on RIT's policy on excused absences.

- RIT Policy D04.0 Attendance
- Provost Statement on RIT Attendance Policy

Emailed Submissions

Assignments (e.g., in-class activities, assignments, etc.) submitted via email to me or the Teaching Assistants will not be accepted.

Extra Credit

Extra credit assignments may be offered, in the form of additional/extra bonus sections on certain labs and activities.

Lab Assignments

Lab assignments will be available on Thursday. They are due by Thursday of the following week at 8:00 PM eastern, unless otherwise specified. Lab assignments will include a combination of code and documentation, often including screenshots of successful code execution. More information will be provided about specific deliverables in each assignment.

All student work must be pushed to GitHub or uploaded to MyCourses, as appropriate, by the deadline for the assignment. **Email submissions will not be accepted under any circumstances**.

Quizzes

Regular quizzes will be assigned via MyCourses. These quizzes will largely be intended to assess topics such as vocabulary and core concepts. Students will be permitted to take the quiz as many times as they would like within the assigned time frame. These quizzes will be automatically graded and students will be able to see their score on the quiz after each attempt. Detailed feedback about specific missed questions will not be provided after each attempt. Students should reach out to their instructor or teaching assistant regarding questions about specific missed points.

Midterm Exam

An online (i.e., myCourses), written midterm exam will be conducted.

Final Exam

The final exam will consist of two parts.

1. An online (i.e., myCourses) written exam.
2. A practical exercise involving a programming component

Expectations

Students

I expect the following from students.

- You will conduct yourself professionally in accordance with RIT policies and standards.
- You will act ethically in accordance with RIT policies and standards.
- You will use myCourses to obtain course content.
- You will use GitHub to submit assignments and class activities.
- You will arrive to lectures and labs prepared.
- You will attend and participate in lectures and labs.
- You will contact me if you need help with this course.
- You will attend office hours to seek detailed assistance on assignments
- You will contact me to schedule an alternative time if you are unable to attend my office hours

Instructor

Students can expect the following from me.

- I will provide course content prior to the class in which it is presented.
- I will provide grades for assignments in myCourses within two (2) weeks of submission.

- I will answer emails within 48 hours between Monday and Friday. Responses to emails received on Saturdays, Sundays, breaks, or holidays may be delayed. I will respond to those emails within 48 hours of the next academic day.
- I will hold regular office hours.

Course Policies

Communication

RIT email is the official communication mechanism. Email will be used to make official announcements. Students are to use email for notification of class absence, grades discussion, and requests. Students may also use email to discuss and ask questions about course topics and assignments. All academic-related communications must be sent from students' RIT email addresses.

RIT Slack will be used for more real-time communication between students and me. Students may only use Slack to discuss and ask questions about course topics and assignments. Slack is not to be used for notifying me of class absence, discussion of grades, or requests. Email must be used for these purposes.

Technology in the Classroom

During lectures and labs, place all electronics in silent mode to limit classroom disruptions.

Starfish

This course uses the RIT Starfish communication tool in order to promote student success.

Attendance

As stated in the RIT Attendance Policy (https://www.rit.edu/academicaffairs/policiesmanual/d040), "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. Absences, for whatever reason, do not relieve students of their responsibility for fulfilling normal requirements in any course. In particular, it is the student's responsibility to make individual arrangements in advance of missing class due to personal obligations such as religious holidays, job interviews, athletic contests, etc., in order that [they] may meet [their] obligations without penalty for missing class."

Statement on Academic Integrity

RIT, the Department of Computing Security, and I expect students to behave honestly and ethically. This is especially important when submitting work that is evaluated in courses or related to degree requirements. Students are encouraged to review the RIT Honor Code (https://www.rit.edu/academicaffairs/policiesmanual/p030) and the RIT Student Academic Integrity Policy (https://www.rit.edu/academicaffairs/policiesmanual/d080).

Statement on Academic Adjustments

RIT is committed to providing academic adjustments to students with disabilities. If you would like to request academic adjustments such as testing modifications due to a disability, please contact the Disability Services Office. Contact information for the DSO and information about

how to request adjustments can be found at www.rit.edu/dso. After you receive academic adjustment approval, it is imperative that you contact me as early as possible so that we can work out whatever arrangement is necessary.

Statement on Title IX

As stated by the RIT Office of Compliance and Ethics, “Title IX violations are taken very seriously at RIT. RIT is committed to investigate complaints of sexual discrimination, sexual harassment, sexual assault and other sexual misconduct, and to ensure that appropriate action is taken to stop the behavior, prevent its recurrence and remedy its effects.” (https://www.rit.edu/fa/compliance/title-ix-policies-and-resources)

COVID-19

The COVID-19 pandemic presents a unique set of circumstances for the semester. RIT has consulted federal, state, and local guidelines and policies to implement a safe and educational environment for students, faculty, and staff. These guidelines, located at www.rit.edu/ready/ are routinely updated as conditions change.

Please notify me if you are unable to attend class either in person or virtually so that we can determine the best way to meet your needs. I encourage your communication about any needs or concerns.

Other Elements

Syllabus Changes

This syllabus is subject to change throughout the semester.