



ECE 4490, 6490: **Computer Network Security**
Sections 1, 843, YY
FALL 2020

MEETING TIME: Tues. 5:00 to 5:50 PM

MEETING LOCATION: Riggs 226, Zucker Center TBD, and Zoom link posted to IROAR

INSTRUCTOR(s):

R. R. Brooks
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OFFICE HOURS AND PROCEDURES:

Dr. Brooks, Office hours 4:00 to 5:00 PM on Tuesdays. Online. Link shared on request.

Mr. Shao, TBD

COURSE MODALITY: **HYBRID**

COURSE DESCRIPTION: Hands-on practicum in the administration and security of modern network service emphasizing intrusion prevention techniques, detection, and recovery. Preq: (ECE4490) Senior standing in Computer Engineering or Electrical Engineering. (ECE6490) Graduate standing in computing related field. Coreq: ECE 4491/ECE6491

COURSE PREREQUISITES: **Instructor permission.**

STUDENT LEARNING OUTCOMES: At the completion of the course the student will:

- o Understand prevalent computer and network security issues,
- o Avoid common implementation mistakes,
- o Be able to configure VPNs,
- o Exploit memory configuration errors,
- o Create self-replicating programs, and
- o Explain the role of ethics in system design/implementation.

REQUIRED MATERIALS:

- o Introduction To Computer and Network Security: Navigating Shades of Gray, by R. R. Brooks, CRC Press
- o Computer capable of running simultaneously at least 2 virtual machines,
- o Webcam
- o Microphone
- o Internet connections
- o Cell phone

TOPICAL OUTLINE:

Date	Due	Reading assignments	Lecture topic	Attendance code
8/25/2020		Syllabus, IEEE Security and Privacy, Introduction to Computer and Network Security: Navigating Shades of Gray: Chapters 5 and 6	Introduction to course, history of security, discussion of first assignment	0
9/1/2020		Introduction to Computer and Network Security: Navigating Shades of Gray: Chapter 3	Cryptography basics	1
9/8/2020	VPN and sniffer assignment, Graduate research topic due	Introduction to Computer and Network Security: Navigating Shades of Gray: Chapters 7 and 8	Buffer overflow details	2
9/15/2020		Introduction to Computer and Network Security: Navigating Shades of Gray: Chapters 4 and 11	Privacy	0
9/22/2020		Introduction to Computer and Network Security: Navigating Shades of Gray: Chapter 1 and 2	Survey of security issues - Ross Anderson	1
9/29/2020	Buffer overflow assignment due	Introduction to Computer and Network Security: Navigating Shades of Gray: Chapter 9	Virus execution details	2
10/6/2020			Game console security	0
10/13/2020	War Game in Class, or Internet Censorship discussion	External materials provided	How to survive under an authoritarian government	1
10/20/2020		Introduction to Computer and Network Security: Navigating Shades of Gray: Chapter 10 and 12	Automotive System Security	2
10/27/2020	Virus assignment due		Wireless security / Ethical Hacker Presentation	0
11/3/2020	Fall break			
11/10/2020		Introduction to Computer and Network Security: Navigating Shades of Gray: Chapters 13 and 14	Digital Rights Management / Ethics	1
11/17/2020	Graduate research		Graduate student research presentations	2
11/24/2020	Graduate research		Graduate student research presentations	0
12/1/2020	Wireless assignment due		Class has presentations of wireless assignment. Review during the week	1
12/8/2020	Final at 7:00 PM			

CLASS CANCELLATION POLICY: Class will be canceled if instructor is more than 15 minutes late. Attempts will be made to inform students in advance of any calendar modifications.

GRADING POLICY:

Assignment	Group or Individual	Deliverable	Due	Points (and weighting) Undergraduate	Weighting for Graduate
VPN and sniffer installation, use, and analysis	Individual	Document and presentation	09/08/20	15	10
Graduate research topic	Individual (6490 only)	1 page abstract	09/08/20	5	3.33333333
War game (maybe)	Groups (dynamic)	In class competition (maybe)	10/13/20	10 points extra credit for winners	0
Buffer overflow implementation	Individual	Report and demonstration	09/29/20	25	16.6666667
Polymorphic virus implementation	Individual	Report and demonstration	10/27/20	25	16.6666667
Wireless Security	Group	Report and Demonstration	12/01/20	15	10
Graduate research project (6490 only)	Individual	Report and in-class presentation	11/17/20	45	30
Class participation	Individual	N/A		10	6.66666667
Final exam	Individual	Examination	12/8/2020	10	6.66666667
Total Undergrad				100	
Total Grad				150	100

ATTENDANCE POLICY:

- Approximately 1/3 of students can attend at any lecture. Students with a given attendance code can appear on that day. A python script will be provided that outputs the attendance code. How the script works will be discussed in the first lecture. Some lectures are likely to be entirely online. Students will be informed in advance if no in person lecture is being given on a specific day. On days when your code is not selected, you must attend on-line. Students who attend in person are expected to have laptops active for participating in polls, online chats, etc.
- Attendance on days students are to come physically is optional.
- Online attendance is optional. Plans are to post videos of classes.
- Assignments are due BEFORE class on the marked day. No late assignment will be accepted. No credit for late assignments.
- The VPN/Sniffer, buffer overflow, virus, and wireless assignments include in person presentations of the work outside of class hours. Times for those presentations will be assigned.
- If class is canceled on the day an assignment is due. Assignments can still be submitted. Students are responsible for guaranteeing that the assignment is in the instructor's inbox. Before class. If class is not possible on the finals day (unlikely), an alternative time will be arranged.
- Notification of Absence in Canvas or email to inform the instructor of student absences is in general not needed. If a medical problem or accomadation issue results in a late assignment, this will be dealt with appropriately.
- To maintain physical distancing, individuals arriving first to the classroom should sit farthest from the door. Similarly, at the conclusion of class, students closest to the door should leave first.
- While on campus, face coverings are required in all buildings and classrooms. Face coverings are also required in outdoor spaces where physical distance cannot be guaranteed. If a student does not have a face covering or refuses to wear an approved face covering without valid documented accommodation, the instructor will ask the student to leave the academic space and may report the student's actions to the Office of Community & Ethical Standards as a violation of the Student Code of Conduct. If the student's actions disrupt the class to the extent that an immediate

response is needed, the instructor may call the Clemson University Police Department at 656-2222.

10. Please note that the University may convert to a purely online mode at any time. University classes are initially in a purely online mode and will remain so until Sept. 21.

ACCESSIBILITY STATEMENT: Clemson University values the diversity of our student body as a strength and a critical component of our dynamic community. Students with disabilities or temporary injuries/conditions may require accommodations due to barriers in the structure of facilities, course design, technology used for curricular purposes, or other campus resources. Students who experience a barrier to full access to a class should let the instructor know and make an appointment to meet with a staff member in Student Accessibility Services as soon as possible. You can make an appointment by calling 864-656-6848 or by emailing studentaccess@lists.clemson.edu. Students who receive Academic Access Letters are strongly encouraged to request, obtain, and present these to their instructors as early in the semester as possible so that accommodations can be made in a timely manner. It is the student's responsibility to follow this process each semester. You can access further information here: <http://www.clemson.edu/campus-life/campus-services/sds/>.

TITLE IX STATEMENT: Clemson University is committed to a policy of equal opportunity for all persons and does not discriminate on the basis of race, color, religion, sex, sexual orientation, gender, pregnancy, national origin, age, disability, veteran's status, genetic information or protected activity in employment, educational programs and activities, admissions and financial aid. This includes a prohibition against sexual harassment and sexual violence as mandated by Title IX of the Education Amendments of 1972.

SAFE CAMPUS: Clemson University is committed to providing a safe campus environment for students, faculty, staff, and visitors. As members of the community, we encourage you to take the following actions to be better prepared in case of an emergency:

- a. Ensure you are signed up for emergency alerts (<https://www.getrave.com/login/clemson>)
- b. Download the Rave Guardian app to your phone (<https://www.clemson.edu/cusafety/cupd/rave-guardian/>)
- c. Learn what you can do to prepare yourself in the event of an active threat (<http://www.clemson.edu/cusafety/EmergencyManagement/>)

ACADEMIC INTEGRITY: As members of the Clemson University community, we have inherited Thomas Green Clemson's vision of this institution as a 'high seminary of learning.' Fundamental to this vision is a mutual commitment to truthfulness, honor, and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form. In instances where academic standards may have been compromised, Clemson University has a responsibility to respond appropriately to charges of violations of academic integrity. Further information on Academic Integrity can be found in the [Undergraduate Announcements](#) and in the [Graduate School Policy Handbook](#).

COPYRIGHT STATEMENT: Materials in this course are copyrighted. They are intended for use only by students registered and enrolled in this course and only for instructional activities associated with and for the duration of the course. They may not be retained in another medium or disseminated further. They are provided in compliance with the provisions of the Teach Act. Students should be reminded to refer to the Use of Copyrighted Materials and "Fair Use Guidelines" policy in on the Clemson University website for additional information: <https://clemson.libguides.com/copyright>.

MODIFICATION STATEMENT: The instructor reserves the right to modify any aspect of the syllabus at any time during the semester for reasons including but not limited to COVID-related situations.