

CPSC 3600: Networks and Network Programming

Spring 2021 Syllabus

Course Information:

Instructor

Dr. Svetlana V. Drachova ("Dr. D."), sdracho@clermson.edu

Zoom Office hours

T & TH 1:00pm - 2:30pm and by appointment (link on canvas)

Teaching Staff/Zoom Office hours

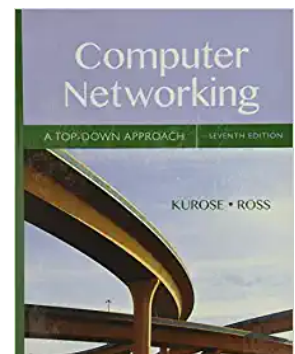
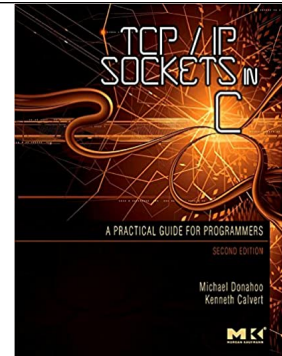
Mr. Thomas Randall, tlranda@clermson.edu

TBD (link posted on Canvas)

Section	Section	CRN	Meeting time/location
CPSC 3600	002	16405	TTh 9:30 am - 10:45 am (Zoom link on Canvas)

Required Textbooks, Software, Hardware, and Materials:

1. M. Donahoo, K. Calvert, *TCP/IP Sockets in C Practical Guide for Programmers*, second edition, Morgan Kaufmann Publishers, (ISBN-978-0-12-374540-8).
2. J. Kurose, K. Ross, *Computer Networking: A Top-Down Approach*, seventh edition, ISBN-9780133594140, Addison-Wesley Publishers. (ISBN-9780133594140) (*NO access code needed*)
3. Oracle VM Virtual Box (free dnld): <https://www.virtualbox.org/>
4. Course Management System: <http://www.clemson.edu/canvas/>
5. Zoom conference software client: <https://zoom.us/download>
6. A digital device with both video and audio capabilities to virtually attend lectures that has 4GB or RAM and at least 10GB free disk space to run a VM.



Optional Resources:

Students are encouraged to use additional resources of their choice on Networking concepts.

Course Catalog Description

Introduction to basic concepts of computer network technologies and network programming. Topics include network programming, layered protocol architectures, local and wide area networks, internetwork and intranetwork concepts, security. Socket level programming is introduced and used throughout the course.

Prerequisites

CPSC 2120 and CPSC 2150 with a C or better.

You should also be familiar with simple probability and stats. STATS3090 is not a prereq but you will be expected to be able to apply basic statistics to time series data (e.g., a set of Round Trip Times). This includes being able to plot the probability distribution (PDF) of a data set. There will be a very brief review of this material.

You should be familiar with Linux/Unix, and be comfortable writing "C" programs in a Linux environment.

Key Topics

Topics covered in class include:

- TCP/IP sockets and socket programming
- Internet and Computer Networks
- Layered Network Architecture
- Application, Transport, Network and Link-Layer layer protocols
- Wireless Networks

Learning Outcomes

Students who successfully complete this course should be able to:

- Demonstrate an understanding of basic networking concepts.
- Demonstrate an understanding of the set of protocols and architectures that define the Internet.
- Demonstrate an understanding of performance and security issues that impact Internet applications.
- Implement moderately complex sockets-based networked applications using either a client/server or peer-to-peer model.

More specifically, course goals include:

- Describe the layered structure of a network
- Define the principles behind naming schemes and resource location
- Implement a simple client-server socket-based application
- Describe how packets are forwarded in an IP network
- Describe the differences between the terms IP and Ethernet
- Correlate application performance requirements to network system requirements
- Apply systems modeling concepts to monitor and assess network performance

Course Website

Canvas course website for CPSC 4240/6240, accessible from <https://www.clemson.edu/canvas> will be used throughout the course. Students will submit assignments, and grades will be posted on that site. Course materials such as instructional material, handouts, quizzes, and links will be posted on the course website.

Students are responsible for checking the course website daily for new information and announcements.

Course Delivery Mode

This is a *synchronous online course taught via Zoom conferencing system* at the time stated in the syllabus. To virtually attend lectures students are required to have a working digital device that has video and audio capabilities (phone, laptop with built-in or peripheral webcam, etc.) Video is required to be on and students present “live” during all lectures. Students may also be required to have a Respondus Monitor/Lockdown Browser for taking tests/exams.

Course Components

Lectures

Lectures will be held on Zoom on Tuesdays and Thursdays and will cover the chapters of the required textbook and other materials. Textbook readings, tutorials and papers will be assigned during lecture periods, and students should keep up with these readings throughout the semester. Lectures will not cover all the necessary material, but students will be responsible for covering the rest on their own. Students are expected to take notes and participate in the classroom discussions regularly.

Quizzes

Throughout the semester, there will be a variable number of announced and unannounced online graded quizzes. *You should always expect a pop-up quiz!* The total number of points a student can earn on the quizzes by the end of the semester is 100. Missed quizzes cannot be made up, except in cases of a documented illness, or a documented emergency (See **Late Work** policy below).

Homeworks/Assignments

- Students will be assigned four programming assignments/homeworks (HW 1, 2, 3, 4) during the semester.
- Each homework will be worth 50 points and due as specified.
- Homeworks will be submitted to Canvas, and all programming parts should compile and run on SoC Linux lab machines.
- Programs that do not compile receive no credit.
- Late submissions will be accepted for 24 hours after the due date with 10 point penalty.
- Corrupt/empty archives receive no credit and no chance of resubmission.
- Unless otherwise stated, all programming assignments are individual work. You cannot discuss the assignment/solution with anyone except your teacher, or your TA.
- Missed homeworks cannot be made up, except in cases of a documented illness or emergency (See **Late Work** policy below).

Exams

- There are two online Midterm Exams and one online Final Exam in this course.
- Exams will require Respondus Monitor/Lockdown browser.
- Each exam may be different in terms of what materials students are allowed to use. Exam day/time will be announced in class.

- Midterms are worth 100 points, and final exam is worth 100 points.
- Missed exams cannot be made up, except in cases of a documented illness, or an emergency (See **Late Work** policy below).
- Students going into the final exam with an A average are exempt from taking the final exam.
- Students that want their final grade to be based on the coursework prior to the final examination may be exempt from taking the final examination (at the discretion of the teacher). In such case the total number of points that could be earned in the course will have the exam worth deducted from it and will be 520 instead of 620 (Explained below). The grade will be calculated by dividing points earned by the student by 520.

The final exams' week is April 26 – April 30 (M-F). Your final exam, as listed on <https://www.clemson.edu/registrar/student-menu/exam-spring.html> will be held online on **Wednesday, April 28th, at 8-10:30 am.**

Exam may not be available at an earlier day/time, so please make your travel plans accordingly.

Class Activities

There will be a number of class activities during the semester. Activities may include, but not limited to, solving problems, playing games, doing group activities, etc. Student can learn up to 20 points on select class activities during the semester. Not all activities will earn points.

Extra Credit

There is NO *individual* extra credit in this course. The only extra credit that *may* be assigned in the course is assigned to the entire class. Extra Credit is optional and does not guarantee that student will pass the course, if that student has a failing course average before submitting extra credit work.

Late Work

Late assignments will be accepted withing 24 hours after the due date with 10 point penalty. The late penalty may be waived in the case of a documented illness or a documented emergency. In case of an illness student must provide instructor with the documentation on the official medical clinic/hospital letterhead, stating the exact date that the student became ill, and the date student was released back to class/work. In case of other emergency, documentation should state the exact date of the emergency.

In case of military deployment/exercises, student must obtain a copy of orders from the CO. If student misses class due to a University sanctioned event (conference travel, athletic event, etc.) documentation must be provided as well. All documentation must be provided ahead of time, or within 3 days of a missed quiz, exam, lab, or project deadline.

Notification of Absence

The Notification of Absence form in Canvas allows students to quickly notify instructors of an absence from class. The notification form requires a brief explanation, dates and times. *This does not serve as an "excuse" from class*, and students are encouraged to discuss the absence with their instructors. If a student is unable to report the absence

electronically, he/she may call the Office of Advocacy and Success at 656-0935 for assistance and guidance.

Medical Withdrawal

Sometimes due to illness or other life circumstances, students may not be able to complete academic work for the term and will need to withdraw from all classes. The Division of Undergraduate Studies will process medical withdrawals. Students should contact the Division by sending an email from their Clemson email address to Lisa Traynham at lltrayn@clemson.edu

Technical Issues

Every student is responsible for maintaining their computer equipment in working order and free of malware. Every student also needs to have a contingency plan in case of equipment failure. Always have a plan A, and a plan B! Two is one, and one is none! If a student waits until the last day to complete their assignment, and experiences technical difficulties, such student will not be granted any extensions. Planning is a key to timely completion of assigned work.

In case of technical issues students will be required to submit screenshots/photographs of the error message they have received, or other evidence. Allowing student to make up the missed work will be at the discretion of the course instructor after the documentation has been reviewed.

Grade Calculation

Students must be registered for this course in order to attend class and to receive any grades. Students who are auditing this course may not receive graded feedback. Student grade will be based on the total number of points that the student earned during the semester. Distribution of points is shown below. Approximate weight of the components is also shown below to indicate the portion of each component in the student grade. Grades will only be rounded to the first decimal point. To determine student's grade in the course, points earned by that student will be divided by 580 (after the final exam), or 480 (in case of the final exam exemption). There is no need to do any multiplication, all weights have been worked into the point value of the components.

There is NO attendance component in the course grade. Attendance does not earn any points, but is mandatory and will be taken.

Components:	Points:	Approx. Weight:
Quizzes	(variable #) = 100 points	17%
Assignments	4*50 = 200 points	32%
Exams	3*100 points = 300 points	48%
Class Activities	(variable #) = 20 points	3%
Total:	620 points	100%

Final Letter Grades

Final letter grades will be determined according to the scale shown below. Final course grades *may* be curved at the discretion of the course instructor.

Undergraduate Grading Scale

A (90-100%), B (80 – 89%), C (70 – 79%), D (60-69%), F (59% or less)

Conduct Policy

Students are expected to be courteous and respectful in all interactions with fellow class members, TAs, and the instructor (whether this interaction occurs online, during class, or outside of class). Student misconduct will not be tolerated. Student misconduct includes, but not limited to, arguing with an instructor or TA about course policies, being rude or disrespectful towards a fellow class member or an instructor, sleeping in class, disrupting class, using a computer or other device during class without authorization from the instructor, showing up to class late or leaving class early without permission from the instructor, and refusing to follow course policies or instructions stated by an instructor.

The instructor and TAs have the right to assign seats or to ask students to move to another seat if they feel it is necessary, and refusing to sit in an assigned seat will also be considered as an act of student misconduct. NO tobacco products or electronic cigarettes are allowed to be used during class or labs, including cigarettes, cigars, chewing tobacco, dip, etc. For the first case of student misconduct, students may have points deducted from their Quiz grades or their final grade might be lowered by one full letter grade (i.e. an A becomes a B, B becomes a C, etc.) at the instructor's discretion. In extreme cases, or if the misconduct persists, a grade of F will be assigned to the student, and the student will not be allowed to attend class thereafter.

Academic Honesty

"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."

When, in the opinion of a course instructor, there is evidence that a student has committed an act of academic dishonesty, the instructor must make a formal written charge of academic dishonesty, including a description of the misconduct to Dr. Jeff Appling, Associate Dean of Undergraduate Studies. The reporting instructor may, at his/her discretion, inform each involved student privately of the nature of the alleged charge. In cases of plagiarism (I.B.2.) instructors may use the Plagiarism Resolution Form available from the Office of Undergraduate Studies.

Steps to help prevent academic dishonesty are:

1. Familiarize yourself with the regulations.
2. Refuse to assist students who want to cheat.
3. Protect your work! Do not allow anyone to copy any part of your work, and report anyone who tries to copy from you to the instructor or TA.
4. Do not copy any code from any unauthorized source. An unauthorized source includes, but not limited to, any webpage, online source, document, book, or person not affiliated with our course.
5. If you have any doubt about what constitutes academic dishonesty, ask your instructor before you turn in an assignment.

Furthermore, selling, posting, or giving away course content such as slides, notes, or any information about exams, quizzes, assignments, projects, or lectures is considered an act of academic dishonesty (unauthorized assistance) unless you have written permission from the instructor. All work submitted for grades should be your own work, and you cannot copy, paraphrase, or modify any work from any source not explicitly permitted by the instructor. The instructor has the right to run programs to detect evidence of unauthorized assistance (usually in the form of copying from another person or unauthorized source) in any assignment submitted by a student in this semester, previous semesters, or future semesters.

Cheating has severe consequences, please do your own work!

Class Accommodation and Accessibility

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 professor 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, by emailing studentaccess@lists.clemson.edu, or by visiting Suite 239 in the Academic Success Center building. Appointments are strongly encouraged – drop-ins will be seen if possible, but there could be a significant wait due to scheduled appointments. Students who receive Academic Access Letters are strongly encouraged to request, obtain and present these to their professors 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/>.

If You Need Help

Your teacher is here to help you learn the material. To get help you have several options.

1. Talk to your teacher, many times a brief discussion will clarify things enough to get you back on track.
2. Get an additional textbook/materials to help practice programming concepts outside of class.
3. Use search engine to get clarification or another perspective on a difficult concept.
4. Explore tutoring options available from Clemson's Academic Success Center (ASC) at <https://www.clemson.edu/asc/>, or Peer & Wise at <http://www.clemson.edu/cecas/departments/peer-wise/index.html>
5. Be a self-advocate. It is not always apparent if a student needs help until that student falls far behind. Seek help as soon as you feel you have questions about the material.

Inclement Weather Policy:

Any exam that was scheduled at the time of a class cancellation due to inclement

weather, University power outage, etc. will be given at the next class meeting unless contacted by the instructor. Any assignments due at the time of a class cancellation due to inclement weather will be due at the next class meeting unless the instructor contacts students. Any extension or postponement of assignments or exams must be granted by the instructor via email or Canvas within 24 hours of the weather-related cancellation

Late Instructor Policy

If the instructor is late to class, then students should wait at least 15 minutes and check the course announcements before leaving.

Clemson University Title IX (Sexual Harassment)

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 (e.g., opposition to prohibited discrimination or participation in any complaint process, etc.) 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.

The University is committed to combatting sexual harassment and sexual violence. As a result, you should know that University faculty and staff members who work directly with students are required to report any instances of sexual harassment and sexual violence, to the University's Title IX Coordinator. What this means is that as your professor, I am required to report any incidents of sexual harassment, sexual violence or misconduct, stalking, domestic and/or relationship violence that are directly reported to me, or of which I am somehow made aware.

There are two important exceptions to this requirement about which you should be aware:

- Confidential Resources and facilitators of sexual awareness programs such as "Take Back the Night and Aspire to be Well" when acting in those capacities, are not required to report incidents of sexual discrimination.
- Another important exception to the reporting requirement exists for academic work. Disclosures about sexual harassment, sexual violence, stalking, domestic and/or relationship violence that are shared as part of an academic project, a research project, classroom discussion, or course assignment, are not required to be disclosed to the University's Title IX Coordinator. This policy is located at <http://www.clemson.edu/campus-life/campus-services/access/title-ix/> Ms. Alesia Smith is the Executive Director for Equity Compliance and the Title IX Coordinator. Her office is located at 223 Holtzendorff Hall, phone number is 864.656.3181, and email address is alesias@clemson.edu.

Covid-19 Specific Information

Absences

For a student who reports testing positive or is being asked to quarantine because of exposure to the virus, it will be up to the student to inform the instructor that

they will be moving to online only instruction for at least the next two weeks. Students are directed to use the Notification of Absence form in Canvas to initiate this notification, which can be found under the “Help” button on the left navigation. (For courses where Canvas is not used, the direct link to the Notification of Absence form can be found through the Division of Student Affairs site.) Additional communication via email is encouraged; students should follow up with their instructor to develop a continued plan of study for each course. Students cannot be penalized in their grade for needing to move to online instruction.

Expectations for Face Coverings

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. Please be familiar with the additional information on the Healthy Clemson website, such as the use of wipes for in-person classes. If an instructor does not have a face covering or refuses to wear an approved face covering without valid accommodation, students should notify the department chair. If a student does not have a face covering or refuses to wear an approved face covering without valid 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.

Safe Environment

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:

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

Copyright Statement

Materials in courses are considered copyrighted. They are intended for use only by students registered and enrolled in a particular 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 must seek permission from instructors to record any class activity, including lectures, discussions, and presentations. Students should be reminded to refer to the Use

of Copyrighted Materials and “Fair Use Guidelines” policy on the Clemson University website for additional information (link <https://clemson.libguides.com/copyright>).

Syllabus Policy

Students are responsible for learning and following all policies stated in this syllabus. This course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary. Tentative course schedule will be frequently updated. Instructor reserves the right to make changes to the syllabus when circumstances require it.

Tentative Course Schedule on next page

Tentative Course Schedule

Week	Date	Tentative Topic Outline	Important Dates
1	1/7	Welcome, syllabus, canvas	
2	1/12 1/14	Intro to networking, IoT, Linux Virtual Machines, paper	1/12 Last day to register, add a class or declare audit
3	1/19 1/21		1/18 MLK holiday 1/20 Last day to drop or withdraw without a W
4	1/26 1/28		1/27 Last day to apply for May Commencement
5	2/2 2/4		
6	2/9 2/11	Midterm Exam I (tentative)	
7	2/16 2/18		
8	2/23 2/25		2/26 Midterm evaluations are issued
9	3/2 3/4		
10	3/9 3/11		3/12 Last day to drop a class or withdraw from CU without final grades
11	3/16 3/18	Spring Break, NO CLASS Spring Break, NO CLASS	3/15 - 3/19 Spring break
12	3/23 3/25	Midterm Exam II (tentative)	4/12 Spring/Summer registration begins
13	3/30 4/1		4/4 Easter Holiday
14	4/6 4/8		
15	4/13 4/15		
16	4/20 4/22	Final Exam Review	