

CSE 160 Computer Networks

Fall 2021 -- Syllabus

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Goal and Topics

This course introduces the basics of networking, ranging from sending bits over wires to the Web and distributed computing. We focus on the internetworking ground between these two extremes, particularly focusing on the protocols and design aspects of the Internet. The goal of the course is to give you an appreciation of the fundamental challenges of networking, design strategies of proven value, and common implementation technologies. Topics will include: framing, error correction, packet switching, multi-access (Ethernet), addressing and forwarding (IP), distance vector and link-state routing, queueing and scheduling, reliable transport, congestion control (TCP), quality of service, naming (DNS), security and diverse applications (HTTP, SMTP, Peer2Peer). In addition to learning about all these different topics, by the end of the class, you should be able to model a network problem, understand the trade-offs in the design of a solution, identify and formulate the hardware and software needs for the solution, and being able to implement a protocol, system, and scheme that solves a networking problem. In the overall picture of the CSE program, this is one of the few classes that will teach you skills to develop large-scale programs on your own and provide you with experience in system design in general beyond networking concepts.

Course Format

This course will be delivered mostly in a synchronous in-person format, with some synchronous and asynchronous online activities. Synchronous in-person sessions will be used for course lectures and lab sections. Synchronous online sessions will be used for office hours, both for the instructor and the TA. Asynchronous content will be required to be viewed in online videos, homeworks, and project assignments, all accessed through CatCourses.

Weekly Activities

- Monday – Reading assignments (book and extra papers) for the week due. Instructor synchronous online office hours available.
- Tuesday – Synchronous in-person lecture (SSM 104). Homeworks and Projects may be due.
- Wednesday – Synchronous in-person lab session (CSE-160-02L -- SE1 100).
- Thursday – Synchronous in-person lecture (SSM 104). TA synchronous online office hours available. Homeworks and Projects may be due.
- Friday – Synchronous in-person lab session (CSE-160-03L -- SE1 138).

This semester we will have the full class in-person for both lectures and labs, with synchronous online activities only for office hours. We will use the Zoom system for office hours. All students at UC Merced

can get a Zoom account, and installing and using it should be pretty easy. Just click on the links below, and follow the instructions from your browser to install the desktop version of it. For more information about installing Zoom on your computer, please refer to [Zoom Desktop/Laptop Installation](#) .

Zoom Links:

- **Office Hours (Al Cerpa)*** - Mon 2:00 pm to 4:00 pm: <https://ucmerced.zoom.us/j/89333162026>

- **Office Hours (Hamid Rajabi)** - Thu 10:00 am to 12:00 pm: <https://ucmerced.zoom.us/j/87164553503>

* as indicated below (see Contact Information), if you are planning to use the instructor's office hours, please send me (Al Cerpa) an email 24 hours in advance, so I can make sure I can schedule it.

As usual, if you have further questions, please do not hesitate to contact me.

Textbook and class materials

We will use a combination of textbooks, class notes, and papers available online. The main textbook used in class is:

Title: **Computer Networks, a systems approach**

Authors: **Larry L. Peterson and Bruce S. Davie**

Sixth Edition

Morgan Kaufmann

ISBN-13: 978-0-12-818200-0

The source for this book is available on <https://github.com/SystemsApproach> and is available under the terms of the Creative Commons (CC BY 4.0) license.

An online version of the book (with no exercises at the end of each chapter!) is available online at: <https://book.systemsapproach.org/index.html>

You could find it in the University Library and/or buy it online. Please make sure it is the Sixth Edition. If you would like to use previous editions, just be aware that there are some new topics not included in the old editions that we will cover in class. The numbering of many of the chapters has also changed, so the reading assignments will be off in the schedule if you use a different edition (e.g. Fifth Edition). Also, the numbering of all the homework problems is different, so it is your responsibility to figure this out.

All class lectures will be available in PDF format from the class webpage. Therefore, it is not required that you write whatever is already in the slides. However, I do not write everything in the slides. I tend to interact a lot with the class, ask questions, and write examples on the marker board. You SHOULD take detailed notes since many of these things are not in the slides and will probably be part of the exams. It is therefore in your best interest that you take as detailed notes as possible for anything that is NOT in the slides. Alternatively, you can just read the book and read the lecture slides asynchronously once they are posted.

However, IMO, students get the most out of the lecture when they come to class with the material (book chapters and papers) already read, and they can ask clarification questions.

For certain topics, I ask you to read some classic research papers available online (the links are provided in the class schedule from the class webpage). Read the papers before the class meetings. I almost always ask a couple of questions regarding the papers in the midterm and finals.

Student Learning Outcomes

By the end of the course, through lectures, readings, homework assignments, projects, and exams, students will demonstrate:

- An ability to apply knowledge of computing and mathematics to the development of computer network protocols and applications.
- An ability to analyze a computer network problem and identify the computing requirements appropriate for its solution.
- An ability to design, implement, and evaluate a computer program to meet desired needs.
- An understanding of security issues and responsibilities related to the design of computer networks and applications.
- An ability to use several existing techniques, skills, and tools necessary for computing practice.
- An ability to apply mathematical foundations, algorithmic principles, and computer science theory to the modeling and design of computer networked systems in a way that demonstrates comprehension of the trade-offs involved in design choices.
- An ability to apply design and development principles in the construction of software systems of varying complexity.

Contact Information

Alberto Cerpa's (instructor) Office Hours: *Monday 2:00 pm to 4:00 pm via Zoom (see link above).* Email: acerpa@ucmerced.edu

If you are planning to come to office hours, please send me an email ahead of time (24 hrs will suffice), since my schedule is full and students many times don't show up, so I recycle the slots for other meetings.

If this time is not convenient for you, please send me an email to arrange another time to meet and discuss it. I am flexible and willing, but my schedule **is crazy**, so be aware that it may take some time to find an empty slot, so please send your requests even weeks in advance. I may not find a time slot for last-minute requests, so *caveat emptor*.

If you send me an *email* regarding a CSE 160 matter, you **MUST** include the keyword "*CSE 160*" in the subject of the email (please notice the space between CSE and 160, my filter matches exactly this string). If you fail to do so, your email may or may not be answered. Let's say this once again: If you send me an *email* regarding a CSE 160 matter, you **MUST** include the keyword "*CSE 160*" in the subject of the email. I strongly prefer that you send me a regular email using your UCM email address. If you contact me through the CatCourse system, my response time will be larger than usual, and many times there are no easy ways to

attach documents, etc. So I strongly suggest you send me a regular email using your UCM email address.

Hamid Rajabi's (TA) Office Hours: *Thursday 10:00 am to 12:00 pm via Zoom (see link above).* Email: hrajabi2@ucmerced.edu

The TAs may also provide extended office hours when there are system issues with the lab and/or TinyOS at his discretion.

Please notice that **every day of the week** you have someone (the TA or the instructor) to ask questions. We have schedule things this way by design, so there is no excuse for you not to seek help any day of the week.

All the questions regarding lectures, homeworks, extra credit, exams, and high-level code design questions may be addressed to the **instructor (Al Cerpa)**. All the questions related to the projects, installation of TinyOS, and debugging issues should be addressed to the **TA (Hamid Rajabi)**. Please notice that due to fairness issues, the instructor cannot debug the code of each student and/or group. Also note that while the TA can give you more detailed support, he will NOT give you the answer, NOR he will code the project for you.

Tutoring Resources

There are plenty of resources that can help your academic success:

- **The Math Center** is a dedicated resource for learning mathematics. Provides support for all undergraduate math courses, develops problem-solving skills, receives assistance from graduate students, trained undergraduate students, and instructors. <http://mathcenter.ucmerced.edu/>
- **PALS Learning Center** has free tutoring, in addition to info and workshops on effective time management and study strategies. <http://learning.ucmerced.edu/programs/tutoring>
- **STEM Resource Center** has free tutoring and workbooks and internship info. <http://stemresourcecenter.ucmerced.edu/academic-services>
- **The Writing Center** Offers assistance to all stages of the writing and research process. <http://library.ucmerced.edu/research/students/writing-center> **To schedule an appointment, please visit** <https://wconline.ucmerced.edu/>
- **CSE Majors: Association for Computing Machinery Student Chapter Coffee and Code** This is an opportunity for students to work on homework and receive help from other students with their studies. Enjoy some Coffee, Bagels, and Muffins while you work! *Coding is Optional. [Check in the CatLife link for dates, times, and locations](#). Changes each term.
- Review some of the [Bright Success Center Online Workshops](#). The Bright Success Center offers multiple workshops in a multitude of mediums that meet the needs of our students. Whether on campus or the Web, these workshops aim to help students through academic and life endeavors while being as accessible as possible.
- [Career Assessments](#) are a great way to learn about your skills, interests, personality, and values. Remember that assessments should be used to help provide ideas for career options. They should not be used as the deciding factor for pursuing one career over another. The online assessments require a username & password. To receive the username & password, schedule an initial consultation by clicking [here](#).

I am trying to find suitable tutors for CSE 160 with both the STEM and PALS Learning Centers. If some

become available, I'll post the detailed info here.

Grading Policy

I reserve the right to change this, but grades will be assigned roughly as follows:

- Projects: 55%
 - Project 1: 5%
 - Project 2: 17.5%
 - Project 3: 25%
 - Project 4: 7.5%
- Homeworks: 10% (~2.5% each depending on the total number of questions)
- Midterm: 15%
- Final: 20%

I may also give out a few extra credit problems, which in aggregate can earn you up to an additional 5-10%. As you can see from the grade distribution, the most critical aspect of the class is the projects, so you should plan to spend a significant amount of time working on the programming projects. Below you will find detailed information for each specific type of assignment/exam.

Exams

There will be one midterm exam and a final exam for this course:

- **Midterm:** 10:30 am to 12:30 pm Friday, October 15th, 2021 at KOLLIG 217 (2 hours)
- **Final:** 06:30 pm to 09:30 pm Monday, December 13th, 2021 at SSM 104 (3 hours)

The exams will be in-person closed-book exams. This means you will need to physically come to campus to take the exam, which will be proctored by the TA and me.

The midterm and final exams will be changed only under ***extremely exceptional*** circumstances. For all practical purposes, you should assume they are set in stone. This means that you should plan to physically assist both the midterm and the final at the dates and times given above. *Failure to do so means an automatic zero in the exam(s)*. If you have an exceptional circumstance for that date and time, I would **ONLY** consider you taking an alternative exam ***before*** the dates and times given above for each exam. Makeup exams will never be provided ***after*** the above dates. In this case, since I have to prepare for a special exam just for you, I cannot guarantee that the level of difficulty will be the same as the original exam, so I very strongly advise you to take the exams on the dates given above. Moreover, I'll need at least **2 weeks'** notice so I can prepare an alternative exam and also find a suitable date for you to take it (once again, only before the date(s) given above for each exam). I reserve the right to determine what an exceptional circumstance is and my decision is final. Overall, please make sure you take the exams on the dates and times provided above.

Due to the current pandemic, I understand a few students may not assist in person if they are under quarantine. Since the quarantine is for 2 weeks, there will not be sufficient time to prepare an alternative exam before the scheduled dates. I'll treat this circumstance as cases in the past where hospitalizations were

involved. The student missing the midterm and/or the final may get an **Incomplete (I)** grade in the course, and then take the exam(s) the following semester to complete their grade in the course at a time and place to be determined.

Homeworks

There will be three kinds of homework assignments given throughout the class:

- **Reading:** you will be given reading assignments from the course textbook associated with each lecture. You should finish the reading **before** coming to the lecture. I will assume you've done this reading, and my lectures will enhance the material, rather than regurgitating it.
- **Textbook-style questions:** occasionally, I will assign written homework based on either questions from the text, or made-up questions. These assignments should be submitted online at the date/time available in CatCourses (*Make sure you read the late policy below*).
- **Extra-credit questions:** from time to time, I may pose a question or give a programming assignment that is purely extra credit.

Projects

As you've probably guessed from the allocation of grades, programming projects will be a major portion of this class. This semester, we will be implementing various protocols on top of a TinyOS network emulator and simulator called "TOSSIM". Our goal is to give you a good balance between the depth (the messy details of the implementation of a real protocol) and breadth (exposure to many different layers of the network stack). The projects are built on top of each other, so you'll need to have project 1 running correctly before you can tackle project 2, you'll need to have both projects 1 and 2 running correctly before you can tackle project 3, and so forth. It is therefore critical that you keep up with the projects on time if you want to be successful in this class. Getting delayed with the projects produces a cascade/chain effect that is very difficult to recover due to the dependency among projects, so start coding immediately.

Remember to please get the TinyOS development environment set up ASAP because you need to start working on project 1 from the very beginning. Take a look at the full course schedule below, but you have the following days for each project:

- Project 1: 21 days (3 weeks)
- Project 2: 26 days (almost 4 weeks)
- Project 3 -- Mid-Review: 21 days (3 weeks)
- Project 3 (mid-review + extra): 42 days (6 weeks)
- Project 4: 21 days (3 weeks)

I want to reemphasize what has already been stated. The projects are **cumulative** (i.e. you need project 1 to finish project 2, you need projects 1 and 2 to finish project 3, and you need projects 1, 2, and 3 to finish project 4). There is no partial release of code from us, so if you get stuck with any of the projects (except 4), a cascade effect is produced, since you have to work on the previous non-working project before you can start and finish the next one. I repeat: you (or your team) **MUST** work and have running implementations of the projects to continue advancing, even if by the time of the project deadline your implementation is still buggy

and not perfect.

In this class, you are building a networking stack, which means your project represents the different networking layers that are stacked on top of each other. This means that it is critical that you start working on the projects early and often because delays have a significant impact on your working schedule for the remainder of the semester. We put a lot of thought into the schedule, lead times, etc. to make things as smooth as possible for you. The only thing we ask is that you put in the time and effort to complete the assignments.

TinyOS is implemented in nesC, a dialect of the C programming language. Correspondingly, you need to be very comfortable programming in C. If you're not already well-versed in C programming, you will need to teach yourself, and do so in a hurry. This will put you at a disadvantage relative to your classmates. There is also a little bit of programming in Python for the simulation commands and setup. If you are comfortable programming in C, this should not be an issue.

Students should team up in teams of two (2) students to complete the projects. Team assignments are due in the first 2 weeks of class. Please email the TA what are the team members so we can keep track of all the teams. It is **strongly** encouraged that both team members attend the same Lab section (see below) since this will facilitate grading. If you are not able to find a partner, we will randomly allocate one for you among the pool of students that do not have a partner, so we **strongly** encourage you to find your partner if you don't want a random student allocated to you (you can use the Discussion section in CatCourses to search for a partner). If one of the students in the group withdraws from the class, it is the remaining student's responsibility to either find a new partner or to do the assignments on her/his own. Students do have to option to continue on their own in this situation or to rebuild the group with a different (orphan) classmate in a similar situation. In previous years, projects were done individually, so this is possible and doable. Under **no circumstances** we will accept groups of 3 or more students.

To receive a grade for projects, you **must** demonstrate your assignment in the lab. This will occur during the lab session right after the deadline. If an assignment is turned in late (see Slip Days and Late Policies below), you must demonstrate the project at the next scheduled lab session. Alternatively, if you finished before the deadline, you also have the option of demonstrating your assignment ahead of schedule. Typically, we will be ready one week in advance for in-lab grading. The in-lab demonstration will count toward the implementation scores of your project (please refer to the grading guidelines). **If you do not demonstrate your work during the lab, you will receive a zero (0) for the entire project. Notice that both members of the group should be there in the demonstration, and the TAs will ask individual questions to each member of the group. Also, we will ask each member what he thinks about the contribution of the other to the project just to check the internal group dynamics and workload distribution. Notice that it may be possible for the students in the same group to receive different grades based on the outcomes above.**

Come prepared to give us a brief overview of how your project works and its design features. Know where the key algorithms and logic take place and how they function. In particular, come prepared to prove your solution works. Adding debug statements to help prove your solution works is recommended. Crafting your test files for demonstration purposes is also a good idea. Based on your explanations, we may ask additional questions. We will also have additional test files to run with your program.

Class Policies

- **Policy on Personal Electronic Devices:** Our classroom is a haven from the distractions of everyday

life, giving us a place to focus attentively, in collaboration, on learning. Listening to each other is imperative and enables focused concentration. "Multitasking" inhibits learning and disrupts communication; unexpected beeps and surprising ring tones distract us all. Thus, I would strongly advise you to just listen and participate in the lecture, trying to answer questions. My policy on this matter can be summed up in one phrase: "class in the foreground." **Examples of "backgrounding" the class include: answering or making a cell phone call; texting or IMing; checking or writing e-mail; surfing the web; logging into LinkedIn, Facebook, Instagram, Twitter, your blog, or other social networking sites; and handheld gaming. Please set your cell phones in "silent" mode before class begins.**

- **Slip Day(s) Policy:** For both projects and homeworks you have **three (3)** slip days available that you could use at any time. If you are running late on a project or homework, you can use one (1), two (2), or the full three (3) days to give yourself extra time for the final submission of a project and/or homework without being applied late penalties (see late policy below). Please note that project 4 must be demonstrated on Wednesday/Friday the week is due, since it is the last week of classes before final exams. To use the slip days, you **MUST** send an email to the TA stating that you are using X amount of slip days for project A or homework B and the TA should acknowledge the email. There **MUST** be a written record of this request (i.e. "*I mentioned this to the TA while in the last lab session*" does **not** cut it!). The lack of a written record means that the TA *may or may not* assign your slip days at his sole discretion, and late penalties will be enforced (see below). Therefore, it is in your own best interest to send an email to the TA and receive an acknowledgment from him. While slip days can be used for any projects and homework, it is *strongly* suggested that you use them for projects, since the former is valued more than 3 times than the latter. No more slip days will be provided during the year, so these days are your only buffer, and you should use them wisely.
- **Late Policy:** unless otherwise indicated, homeworks and projects are due by the *beginning* of the lecture on their due date. If you submit an assignment late, we will take off 20% for each day (or portion thereof) it is late. We will not consider granting Incompletes grades for any homework and project. Assignments are to be submitted electronically using CatCourses. We will use the clock on CatCourses to determine the time of submission.
- **Submission File Format:** all electronic submissions of homeworks, projects, and extra credit must be done in PDF, EPS, or simple text (ASCII). Any other format will not be accepted. You can work with any editor software you prefer, but please convert to one of the formats mentioned above for final submission. If you do the homework in a handwritten format, please scan it and submit it in one of the file formats mentioned above. *Failure to do this implies no submission, and you will be assigned a zero (0) for the assignment.*
- **Reasonableness:** the "Reasonable Person Principle" applies throughout this course. This principle simply states that a reasonable request made reasonably shall be reasonably handled by reasonable persons. The TA and I are reasonable people: we expect that everybody else involved in this class will be as well.

Student Accessibility Services Information

University of California, Merced is committed to creating learning environments that are accessible to all. If you anticipate or experience physical or academic barriers based on a disability, please feel welcome to contact me privately so we can discuss options. Also, please contact Student Accessibility Services (SAS) at

(209) 228-6996 or disabilityservices@ucmerced.edu as soon as possible to explore reasonable accommodations. All accommodations must have prior approval from Student Accessibility Services based on appropriate documentation.

If you anticipate or experience barriers due to pregnancy, temporary medical condition, or injury, please feel welcome to contact me so we can discuss options. You are encouraged to contact the Dean of Students for support and resources at (209) 228-3633 or <https://studentaffairs.ucmerced.edu/dean-students>.

Student Accessibility Services are designed to provide equal access to the instructional learning environment for all qualified students with disabilities deemed eligible to receive academic adjustments according to the implementing regulations of Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act (ADA) of 1990. UC Merced Student Accessibility Services is the sole designated and authorized student support unit that determines a student's eligibility for accommodation services because of disability.

I have successfully accommodated students with disabilities in the past, and they have been able to successfully learn the content of the class and pass with a satisfactory grade. I urge any student with disabilities to contact the UC Merced Student Accessibility Services to make proper arrangements. Any student who feels he or she may need accommodation based on the impact of a disability should contact me privately to discuss his or her specific needs. Also, contact Student Accessibility Services (SAS) at (209) 228-6996 as soon as possible to become registered and thereby ensure that such accommodations are implemented in a timely fashion. More information can be found at <https://access.ucmerced.edu/>

Academic Integrity Policy

Academic integrity is the foundation of an academic community and without it, none of the educational or research goals of the university can be achieved. All members of the university community are responsible for their academic integrity. Existing policies forbid cheating on examinations, plagiarism, and other forms of academic dishonesty. The current policies for UC Merced are described in the UC Merced Academic Honesty Policy:

[U.C. Merced Academic Honesty Policy](#)

Familiarize yourself with this document. Know the rules -- ignorance is no defense! Those who violate campus rules regarding academic misconduct are subject to disciplinary sanctions, including suspension and dismissal.

Examples of academic dishonesty include:

- Receiving or providing unauthorized assistance on examinations
- Using unauthorized materials during an examination
- Plagiarism - using materials from sources without citations (see below)
- Altering an exam and submitting it for re-grading
- Fabricating data or references
- Using false excuses to obtain extensions of time or to skip coursework

The ultimate success of a code of academic conduct depends largely on the degree to which the students fulfill their responsibilities towards academic integrity. We simply will not tolerate any breaches of academic

integrity.

Plagiarism is a type of academic misconduct. Please review the UC Merced Library webpage to learn more about what plagiarism is and how to avoid it.

http://libguides.ucmerced.edu/citing_sources/citing-sources_avoiding-plagiarism

Common types of plagiarism: <https://www.bowdoin.edu/studentaffairs/academic-honesty/common-types.shtml>

References, also referred to as citations, are ways to document where you obtained content used in your work. You can locate more information on how to create references using the Purdue Owl (Online Writing Lab) https://owl.purdue.edu/owl/research_and_citation/apa_style/apa_style_introduction.html

More information about the policy and the Office of Student Conduct can be found here:
<http://studentconduct.ucmerced.edu/>

Please note that concerning the programming assignments we run your code through a system to detect similarity with other projects submitted by your classmates and a database of previous (5) year's submissions. The algorithm analyses the structure and flow of the code, so simply changing the variable names and introducing minor changes will not be effective to defeat it. You would have to modify the code so much, that you are better off writing the code on your own. So **caveat emptor**.

Some students may still have some confusion (albeit the policy is quite clear), in particular concerning collaboration. The following rules are in place to make this issue clearer, from the perspective of my class.

Cheating vs. Collaboration: Collaboration is a very good thing. On the other hand, cheating is considered a very serious offense. Please don't do it! Concern about cheating creates an unpleasant environment for everyone. If you cheat, you risk losing your position as a student in the college. The school's policy on cheating is to report any cases to the university judicial office. What follows afterward is not fun. So how do you draw the line between collaboration and cheating? Here's a reasonable set of ground rules. Failure to understand and follow these rules will constitute cheating and will be dealt with as per university guidelines.

- **Simpson's Rule:** This rule says that you are free to meet with a fellow student(s) and discuss assignments with them. Writing on a board or shared piece of paper is acceptable during the meeting; however, you should not take any written (electronic or otherwise) record away from the meeting. This applies when the assignment is supposed to be an individual effort or whenever two teams discuss common problems they are each encountering (inter-group collaboration). After the meeting, engage in a half-hour of mind-numbing activity (like watching an episode of the Simpsons), before starting to work on the assignment. This will assure that you can reconstruct what you learned from the meeting, by yourself, using your brain.
- **The Freedom of Information Rule:** To assure that all collaboration is on the level, you must always write the name(s) of your collaborators on your assignment.

Computer Science Department Policy on Academic Honesty

As stated in the campus-wide Academic Honesty Policy (AHP), "academic integrity is the foundation of an academic community". Accordingly, the CSE faculty takes this matter very seriously and has embraced zero

tolerance on this matter. The process described in the following establishes the minimum consequences for violations of the AHP in CSE courses, but repercussions may be more severe for egregious violations. The Computer Science Department Policy on Academic Honesty ("CSE Policy" from now onwards), does not substitute the AHP but rather specifies how it will be implemented when students enrolled in classes offered by Computer Science and Engineering (CSE) department are found in violation of the AHP. In particular, the CSE Policy defines how the CSE faculty implements the "Instructor-Led Process" described in AHP 802.00.A. This policy and the associated processes have been developed in collaboration with the Office of Student Conduct and the School of Engineering and are jointly implemented by the CSE Faculty, the School of Engineering, and the Office of Student Conduct. The CSE Policy becomes effective starting from the Fall 2019 term.

Preamble

Computer science education relies on a variety of methods to assess students' preparation and learning. The term "assignment" shall be interpreted as any method or process resulting in a grade or contributing to the final grade for a class. Accordingly, the term "assignment" used in the following includes, but is not limited to: homeworks, quizzes, in-class exams, take-home exams, programming assignments, software projects, and presentations.

Shared Responsibility

Maintaining an environment where academic integrity is valued and enforced requires commitments by both instructors and students. Instructors will specify what type of collaboration is allowed or disallowed for a given assignment, and students should strictly follow the provided guidelines. When in doubt, students should contact the instructor and ask for clarification.

First Infraction

If it is determined that a student has cheated, plagiarized, or otherwise violated the AHP, the student will receive a 0 (or equivalent grade) for the assignment. As per the AHP, violations will be reported to the Dean of the School of Engineering and the Office of Student Conduct for review of possible violations of the Code of Student Conduct.

Additional Infractions

The School of Engineering keeps a record of all infractions reported by its faculty. If upon receiving a notification it is determined that the student has one or more prior violations of the AHP, the School will inform the instructor who reported the new violation. The additional violation will immediately lead to a failing grade (F) for the course. The student will be informed in writing and will not be allowed to withdraw from the class. According to CSE Policy, students should note that even the first infraction in a class may lead to a failing grade if after reporting it is determined that the student had been previously sanctioned for one or more infractions in other classes. Students will have the right to appeal the instructor's decision as per AHP 802.00.A.

Resources

If in doubt, students are encouraged to seek guidance from the faculty, advisors, and the Office of Student Conduct. Additional resources can be found on:

<http://studentconduct.ucmerced.edu/>

<https://ombuds.ucmerced.edu/>

https://eecs.ucmerced.edu/computer_science_department_policy_on_academic_honesty_fall_2019.pdf

Class Schedule

The full schedule for the Fall 2021 semester is given below. Please note the order of the lecture and the expected reading assignments (from the book and papers). You can also find here when each homework and project is released, as well as their due dates. The schedule is subject to change.

Date	Lecture	Readings	Homework	Project
Thu 08/26	L01: Introduction Remote Instruction: https://ucmerced.zoom.us/j/3420184557	Chapters 1.1, 1.2		out: Proj 0
Tue 08/31	L02: Protocols and Layering	Chapter 1.3	out: hw 1	out: Proj 1
Thu 09/02	L03: Bits and Bandwidth	Chapters 1.5, 2.1, 2.2		
Tue 09/07	L04: Framing, Error Detection, and Correction	Chapter 2.3, 2.4		
Thu 09/09	L05: Multiplexing and Randomized Access	Chapter 2.6 Ethernet research paper		

Tue 09/14	L06: Wireless and Contention-Free Protocols	Chapters 2.7, 2.8	due: hw 1 out: hw 2	
Thu 09/16	L07: Switching LANs	Chapter 3.1, 3.2 <u>Spanning Tree Algorithm research paper</u>		out: Proj 2
Tue 09/21	L08: IP/ICMP and the Network Layer	Chapters 3.3.1, 3.3.2, 3.3.3, 3.3.8, 3.5, 4.4		due: Proj 1
Thu 09/23	L09: Intro to Routing Protocols	Chapters 3.4.1, 3.4.3, 3.4.4		
Tue 09/28	L10: Intra-Domain Routing	Chapters 3.3.6, 3.3.7, 3.4.2, 4.2		
Thu 09/30	L11: Inter-Domain Routing	Chapters 4.1.1, 4.1.2		
Tue 10/05	L12: IP Addressing	Chapters 3.3.3, 3.3.4, 3.3.5, 4.2	due: hw 2	
Thu 10/07	L13: Sliding Windows and ARQ	Chapters 2.5, 5.1, 5.2.1, 5.2.2, 5.2.4 (midterm material cutoff)		

Tue 10/12	Review Session - Q&A			due: Proj 2 out: Proj 3
Friday 10/15		Midterm Exam, 10:30 am - 12:30 pm KOLLIG 217		
Tue 10/19	L14: Connections Example code: server.c, client.c	Chapters 1.4, 5.1, 5.2, 5.2.1, 5.2.2, 5.2.3		
Thu 10/21	L15: TCP and Network Congestion	Chapters 5.2.6, 6.1, 6.1.1, 6.3.2 Congestion Avoidance and Control research paper	out: hw 3	
Tue 10/26	L16: TCP Congestion Control	Chapters 5.2.6, 6.3		
Thu 10/28	L17: Quality of Service I	Chapters 5.4, 6.1, 6.4, 6.5, 6.5.1, 6.5.2, 9.2		

Tue 11/02	L18: Quality of Service II	Chapters 6.1, 6.2, 6.5, 6.5.2, 6.5.3		Project 3 Mid Review Due - Setup/Teardown + Stop & Wait
Thu 11/04	L19: Naming/DNS and Tunneling	Chapters 3.3.9, 8.5.2, 9.3.1	due: hw 3 out: hw 4	
Tue 11/09	L20: Web, HTTP, and CDNs	Chapters 9.1.2, 9.4.3 Improving HTTP Latency research paper		
Thursday 11/11		No Lecture - Veterans Day Holiday		
Tue 11/16	L21: Email, FTP, and NAT (SenSys/BuildSys 2021, possibly asynchronously if traveling)	Chapters 4.2 (NAT), 9.1, 9.1.1		out: Proj 4
Thu 11/18	L22: Security Building Blocks (SenSys/BuildSys 2021, possibly asynchronously if traveling)	Chapters 8.1--8.5		
Tue 11/23	L23: Security in Protocols	Chapters 8.1--8.5		due: Proj 3

Thursday 11/25		No Lecture – Thanksgiving Holiday		
Tue 11/30	L24: Security Attacks and Defenses	Chapters 8.1–8.5		
Thu 12/02	L25: Unstructured Peer to Peer Networks	Chapters 9.4, 9.4.1, 9.4.2	due: hw 4	
Tue 12/07	L26: Structured Peer to Peer Networks	Chapters 9.4, 9.4.1, 9.4.2		due: Proj 4
Thu 12/09	Review Session - Q&A			
Monday 12/13		Final Exam, 06:30 pm - 09:30 pm SSM 104		