CSUS, College of Engineering and Computer Science

Department of Computer Science
CSC/CPE 138 – Computer Network + Internet

Instructor:	Xuyu Wang, Assistant Professor in Department of Computer Science
Office:	RVR 3002
Email:	Emails through Canvas (preferred) or xuyu.wang@csus.edu (**Please include "CSC/CPE 138" at the beginning of the subject line**)
Office Hours:	Tuesday, 3:45 pm-6:45 pm

Textbook: Kurose & Ross, Computer Networking A Top-Down Approach, Addison Wesley, $6^{th}/7^{th}/8^{th}$ Edition.

As a plus to the textbooks, course slides, assignments and other artifacts will be available to you through Canvas.

Course Content:

Overview, structure, models, concepts, principles and protocols of computer networking. Network architecture, ISO/OSI reference model, TCP/IP protocol stack, layering. Protocol, encapsulation, socket. HTTP, FTP, SMTP, DNS, P2P, TCP, UDP. Multiplexing and demultiplexing, reliable data transfer, flow control, congestion control. Internet addressing, routing, forwarding, IP, ICMP. Error detection and correction, multiple access problem, LAN vs WAN, Ethernet, ARP, switching. Wireless standards. Network security, threats and attacks, defense and countermeasures.

Prerequisite:

This course requires satisfactory completion of CSC 35, CSC 60 and CSC 130 or their equivalents. It is assumed that each student is prepared for this course and meets the following criteria. If not then it may require outside preparation.

Student Learning Objectives:

1. Explain the basic principles, architecture, and implementations of computer networks and the Internet.
2. Describe the differences between different types of networks.
3. Describe network architecture, layered model, and protocol stack.
4. Describe the details of the different types of network protocols.
5. Apply reliable communication including the various methods for handling error detection, correction, flow control, and congestion control.
6. Distinguish among the different components of computer networks.
7. Demonstrate working knowledge of network management including monitoring, measurement, analysis, change, employee devices and control.
8. Demonstrate ability to develop communication protocols and networking applications.
9. Apply the knowledge to properly analyze and describe network performance issues especially delays.

10. Apply the knowledge to assess potential network threats and mitigate them via common security defense mechanisms and countermeasures.
11. Demonstrate a thorough understanding of the Python scripting language.
12. Analyze network traffic using tools like Wireshark.

Course Policies:

Tentative Grading Policy (subject to change during the semester):

Midterm exam + Final exam	25% + 35%
Homework Assignments	40%

Grading Breakdown (%):

A = 93-100	C = 73-76
A- = 90-92	C- = 70-72
B+ = 87-89	D+ = 67-69
B = 83-86	D = 63-66
B- = 80-82	D- = 60-62
C+ = 77-79	F = 59 or below

Students are required to keep backup (machine-readable) copies of all submitted work, and also to keep all returned (graded) work, until after final grades are posted.

The final scores will then be the weighted score and rounded up to match the above scale. Please note that final score is not negotiable. Also, the highest grade in the university system is A. You will need a passing grade for all course exams to pass the whole class.

For labs and socket programming, as long as your answer involves certain commands or operations in specific software, screenshots are also needed to demonstrate your result.

The lab and socket programming report are supposed to illustrate or explain **what you did** (commands or configurations) and **what you got** (screenshots and analysis). They will all be evaluated based on the following grading criteria.

Correctness	25%
Completeness	25%
Clearness	25%
Quality of English writing	25%

Online Instruction/Remote Learning

This class will be instructed remotely throughout this semester. The course materials will be organized via Canvas and the lectures will be given synchronously via Zoom (see below for quick links). For this purpose, this course requires access to a computer with internet connectivity. Hardware requirement: audio capability, such as microphone and speaker. Software requirement: Wireshark, Python.

Online class netiquettes:
Be mindful of your personal safety.
Use humor, joking with caution.
What you write is public—respect your audience and be mindful of proper netiquette.
Be professional, clear and respectful.
Read and Formulate Communications Carefully.
Be Tolerant and Cooperative.

Remember, This Course is Online.
Provide Enough Detail in Your Messages.

COVID-19

If you are sick, stay home and do not attend class. Notify your instructor. If you are experiencing any COVID- like symptoms (fever, cough, sore throat, muscle aches, loss of smell or taste, nausea, diarrhea, or headache) or have had exposure to someone who has tested positive for COVID contact **Student Health & Counseling Services (SHCS) at 916-278-6461** to receive guidance and/or medical care. You are asked to report any possible COVID related illnesses/exposures to SHCS via this link COVID-19 Illness/Exposure Report Form. Expect a call from SHCS within 24 hours.

If you are ill or are placed under quarantine during the COVID-19 pandemic, which impacts your attendance or course work submission (assignments, projects, exams, etc.), **please notify the instructor so that extensions or accommodations can be provided.**

CARES

If you are experiencing challenges with food, housing, financial or other unique circumstances that are impacting your education, help is just a phone call or email away! The CARES office provides case management support for any enrolled student. Email the CARES office at cares@csus.edu to speak with a case manager about the resources available to you. Check out the CARES website.

Zoom Links

Lecture and Office Hour Zoom Meeting information here (including link and dial-in numbers)

Topic: Xuyu Wang's Personal Meeting Room

Join Zoom Meeting
https://csus.zoom.us/j/4717673880

Meeting ID: 471 767 3880
One tap mobile
+16699006833,,4717673880# US (San Jose)
+12532158782,,4717673880# US (Tacoma)

Dial by your location
- +1 669 900 6833 US (San Jose)
- +1 253 215 8782 US (Tacoma)
- +1 346 248 7799 US (Houston)
- +1 301 715 8592 US (Germantown)
- +1 312 626 6799 US (Chicago)
- +1 646 876 9923 US (New York)

Meeting ID: 471 767 3880
Find your local number: https://csus.zoom.us/u/acEKeHpDzt

Join by SIP
4717673880@zoomcrc.com

Join by H.323
162.255.37.11 (US West)

162.255.36.11 (US East)
115.114.131.7 (India Mumbai)
115.114.115.7 (India Hyderabad)
213.19.144.110 (Amsterdam Netherlands)
213.244.140.110 (Germany)
103.122.166.55 (Australia)
149.137.40.110 (Singapore)
64.211.144.160 (Brazil)
69.174.57.160 (Canada)
207.226.132.110 (Japan)
Meeting ID: 471 767 3880

Individual Work
All the parts in this course should be accomplished **independently**!

Note: **Specific instructions for labs, including the deliverable requirements and due dates, will be assigned in separate documents after corresponding lectures. So, please make sure you get this important information in class or via Canvas/email**. Programming exercises will be graded for appearance, programming style and comments as well as for correctness. All output should be identified and illustrated, and the input used for any program should be listed and explained. Your programming assignments will be completed on a Linux system (or Windows if possible). When applicable, input should be read from a file/console, and output redirected to a file/console, so that the inputs, outputs and program listings can be easily printed/snapshotted.

Submission Rules:

Each submission needs to be in an **electronic version** (through Canvas). Any file needs be named according to one of the following formats (depending on the submission type). **Please do NOT use txt format**. **Word** format is preferable. Please also write your class **section number** in document (otherwise, you will lose points).

CSC138_sec#_lab#_name,

For example, if James Green is submitting lab 1, the file name of the submission should be CSC138_lab1_James_Green. **On the first page of each submitted document, please always list your name as the author**. Please note: if the attachment is not according to proper format as stated above, it will not be accepted.

Due Date and Late Submission:
Please see above due dates specified in instruction documents at Canvas from the instructor. The mid-term exam will be performed respectively at week 8.

Late submission will be penalized by the following rules:

- Second day submission: **20% off** the assignment grade;
- Third day submission: **50% off** the assignment grade;
- After the third day: **100% off** the assignment grade.

Laptop and Cell Phone Regulation:

Laptop and cell phone can be used if necessary, but NO game, NO noise and NOT in the quizzes/exams! In any case, you are not allowed to disturb others in the classroom.

Other Course Policies:

- Information in this syllabus is subject to change with notice.
- Attendance to class and frequent check of email is expected. Class roll will be checked randomly after first week of classes. You are responsible for materials presented and announcements made in class or by email. This could include changes to the syllabus, exam dates, etc. Three absences at class rolls will automatically exclude you from possible curving at final grades.
- Make-up exams will only be given under extreme circumstances. The instructor reserves the right to reject make-up requests. There will be no make-up for unannounced quizzes (if any) under any circumstances.
- Be aware of the institution policy on drops and incomplete.

University or Department Policies:

Prerequisite Proof (if the course has specific prerequisites listed above):

The Department of Computer Science has a policy that each instructor needs to verify the student transcript and ascertain that the student has the prerequisites. You can log on to My Sac State go to "Student Center" and select "Unofficial Transcripts" to print. You also can select and print "Transfer Credit Report" if you have transferred from another institution. You must submit your transcript for verification. Any student who has completed one or more prerequisites at another school must provide similar verification to the instructor. Any student who has not submitted their transcript for verification by the end of the second week will be dropped from the class.

Repeat Policy:

The department has a policy specifying that students may not repeat a computer science course more than once. Any student who wishes to repeat a course more than once (that is, take a course for a third time) must submit a petition requesting the permission to do so. Student records will be reviewed to determine whether a student is taking this course for three or more times. Any such student must return an approved petition to the instructor within the first two weeks of class. Any student who does not submit an approved petition will be dropped from the class. Petitions are available in the department office (RVR 3018) and require the signature of both the instructor and the department chair.

Drop Policy

If you plan to drop this course, please make sure you understand the following information.

- **There is no such thing as an "automatic drop"**. The instructor can drop you from the course, but this does not happen automatically. If you plan to drop the course, make sure to use MySacState.
- After the 2nd week, you cannot drop the course through MySacState. At this point, you must provide written verification of a compelling reason. Both the instructor and the Department Chair must approve.
- After the 4th week, you must fill out a "Petition to Drop after Deadline" form and collect all the necessary signatures. This must be turned into Admission and Records in Lassen Hall.

Students with Disabilities

If you have a disability and require accommodations, you need to provide disability documentation to SSWD (Services to Students with Disabilities), Lassen Hall 1008, (916) 278-6955. Please discuss your accommodation needs with me after class or in lab early in the semester.

Ethics/Academic Honesty

Any work submitted is a contractual obligation that the work is the student's and for which he/she could be quizzed in detail. Discussion among students in assignments and projects is part of the educational process and is encouraged. No discussion among students is allowed in any exams/quizzes. However, each student must make an effort to do his/her own work in all assignments and exams. No type of plagiarism will be tolerated except in the case of group work. In that case each student should indicate the part of the work, which was their major responsibility in their final joint submission. Nevertheless, I emphasize any work submitted is a contractual obligation that the work is the student's and for which he/she could be quizzed in detail. *The minimum* penalty for even a *single incident* of cheating brought to the attention of the instructor in this course is automatic failure of the course; additional more severe penalties may also be applied. Note that *cheating is grounds for dismissal from the University*.

Please refer to the Computer Science Dept. document entitled "Policy on Academic Integrity" (available online via the Computer Science department, www.ecs.csus.edu/csc home page) and to the University Policy Manual section on Academic Honesty (all available online via the instructor's home page. IT IS THE RESPONSIBILITY OF EACH STUDENT TO BE FAMILIAR WITH, AND TO COMPLY WITH, THE POLICIES STATED IN THESE DOCUMENTS. *In addition, unless otherwise stated, the use of the following devices during exams/quizzes is prohibited: cell phones, pagers, laptops, and PDAs*.

CSC/CPE 138 - TENTATIVE SCHEDULE SUBJECT TO CHANGE

Week	Topics and Major Content	Assignments	Reading Materials
1	Syllabus -Course Introduction Chapter 1: Introduction -Overview, Big picture -Network Edge, Network Core		Textbook, Chapter 1
2	Chapter 1: Introduction - Layering -TCP/IP protocol stack -Service, interface -Internet		Textbook, Chapter 1
3	Chapter 2: Application Layer -Application architecture -Web, HTTP		Textbook, Chapter 2
4	Chapter 2: Application Layer -Email, SMTP -Domain Name System		Textbook, Chapter 2
5	Chapter 2: Application Layer -Domain Name System, DNS security		Textbook, Chapter 2

	-P2P -Socket programming-UDP python		
6	Chapter 2: Application Layer -Socket programming-TCP python Chapter 3: Transport Layer -Transport-layer services -Multiplexing and demultiplexing -Connection-less transport: UDP		Textbook, Chapter 2 Chapter 3
7	Chapter 3: Transport Layer -Principles of reliable data transfer --stop and wait protocol versions --piplined protocol versions		Textbook, Chapter 3
8	Chapter 3: Transport Layer -Connection-oriented transport: TCP --segment structure	Mid-term exam	Textbook, Chapter 3
9	Chapter 3: Transport Layer -Connection-oriented transport: TCP --segment structure --reliable data transfer --flow control		Textbook, Chapter 3
10	Chapter 3: Transport Layer -Connection-oriented transport: TCP --3-way handshake -Congestion control --TCP faireness Topic 4: Network Layer -Introduction -What's inside a router		Textbook, Chapter 3 Chapter 4
11	Topic 4: Network Layer -What's inside a router -Internet protocol --datagram format --IPv4		Textbook, Chapter 4
12	Topic 4: Network Layer -Internet protocol --IPv6 -Routing -Routing protocols		Textbook, Chapter 5
13	Topic 4: Network Layer -broadcast, multicast Topic 5: Link Layer -introduction -error detection, CRC -multiple access protocols		Textbook, Chapter 5 Chapter 6
14	Topic 5: Link Layer -multiple access protocols -MAC address, ARP -Ethernet, switch, VLAN		Textbook, Chapter 6
15	Topic 5: Link Layer -link virtualization: MPLS -data center networking -a day in the life of a web request		Textbook, Chapter 6

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IMPORTANT DATES:

September 6, 2021	Labor Day (Holiday Campus Closed)
November 11, 2021	Veteran's Day (Holiday, Campus Closed)
November 25-26, 2021	Thanksgiving Holiday (Holiday, Campus Closed)
December 10, 2021	Last Day of Instruction
December 13-17, 2021	Finals Week
Final Exam	TBD by College Official Final Exam Schedules