CSUS, College of Engineering and Computer Science

Department of Computer Science

CSC/CPE 138 – Computer Networks and Internets

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(**Please include "CSC/CPE 138" at the beginning of the subject line**)

Office: RVR 3024 (shared office)

Office Hours: TBD

Textbook: Kurose & Ross, Computer Networking A Top-Down Approach, Pearson, 7th Edition, 2017. - **REQUIRED**

In addition to the textbook, course slides, assignments and other artifacts will be available to you through Canvas.

Course Content:

We will study computer networking from the modern top-down approach, starting with the application-level protocols and then working down the protocol stack. It puts an early emphasis on application-layer paradigms and application programming interfaces, allowing the student to get their "hands dirty" early studying and implementing protocols in the context of applications they use daily. We will proceed down through the layered network services that are needed and study how these services can be provided. A large part of the semester will be spent on client server paradigm and use programming assignments to implement client and/or server programs using sockets. Then, we will study circuit and packet switching and how to categorize networks as: LANs, local loops, MANs, WANs, public or private, connection-oriented or connectionless. Finally, we see how the underlying hardware works, how the energy or electrical signaling technology and the various media are used in networks.

Course Objectives:

This course introduces computer science, computer engineering and electrical engineering students to fundamental network architecture concepts and to their application in the network of networks. This course provides a solid foundation of networking that can lead to study of advanced topics and detailed network architectures.

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.

Course Policies:

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

Class Attendance	10%
Exams (2 exams + Final)	15% + 15% + 30%

Labs + Socket Programming Assignments	15% + 15%

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.

All the assignments will be graded with 100 as highest. 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.

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

The lab report, project report and oral presentation (as required) 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%

Individual Work

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

Note: **Specific instructions for labs and projects, including the deliverable requirements and due dates, will be assigned in separate documents after corresponding lectures. Make sure you get this important information in class or via Canvas**. 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. Unlike labs and projects, homework assignments (as assigned) will not be graded, but it is a good idea to do them because it they will help you in the quizzes/exam.

Submission Rules:

Each submission needs to be in an **electronic version** (through Canvas). Please also write your class **section number** in document (otherwise, you will lose points).

CSC138_sec#_project#_name,
CSC138_sec#_lab#_name,

For example, if James Green in CSC-138 Section 1 is submitting project 1, the file name of the submission should be CSC138_01_project1_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 due dates specified in instruction documents at Campus from the instructor.

Late submission will be penalized by the following rules:

- < 24 hours late submission: **20% off** the assignment grade;
- < 48 hours late submission: **50% off** the assignment grade;
- > 48 hours late: **No credit (0%)** for the assignment.

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 consistently** 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.
- Make-up exams will only be given under extreme circumstances. The instructor reserves the right to reject make-up requests.
- 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. Please visit http://www.csus.edu/admbus/umanual/UMA00150.htm) for additional information. 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 Topics & Schedule (subject to change)

Weeks	Topics
1-2	Syllabus-Course Introduction Topic 1: Computer Networks & Inet -What is the Internet? -Network Edge, Network Core -Delay, loss & throughput -Protocol layers (OSI, TCP/IP) -TCP/IP protocol stack -Networks under attack -History of networking & the Internet
3-5	Topic 2: Application Layer -Application architecture -Web, HTTP -Email, SMTP -Domain Name System -Peer-to-Peer -Video Streaming and CDNs -Socket programming-UDP/TCP python
6-8	Topic 3: Transport Layer -Transport-layer services -Multiplexing and de-multiplexing -Connection-less transport: UDP -Principles of reliable data transfer -Connection-oriented transport: TCP -Principles of congestion control / TCP congestion control
9-11	Topic 4: Network Layer – Data Plane -Virtual circuit and datagram network -What's inside a router -Internet protocol --datagram format --IPv4 & IPv6 -Generalized forwarding & SDN
12-14	Topic 5: Network Layer – Control Plane -Routing algos -Intra-AS routing: OSPF -Routing b/w ISPs: BGP -SDN control plane -ICMP -Network management & SNMP
15-16	Topic 6: Link Layer -Intro -Error detection, CRC -Multiple access protocols -Switched LANs -Ethernet, switch, VLAN -Link virtualization: MPLS -Data center networking -Day in the life of a web request