



SACRAMENTO  
STATE

# Course Change Proposal Form A



<b>Academic Group (College):</b> <b>Engineering &amp; Computer Science</b>	<b>Academic Organization (Department):</b> <b>Computer Science Department</b>	<b>Date:</b> <b>November 12, 2008</b>
<b>Type of Course Proposal:</b> New ___ Change <u>X</u> Deletion ___	<b>Department Chair:</b> <b>Anne-Louise Radimsky</b>	<b>Submitted by:</b> <b>Anne-Louise Radimsky</b>
<b>Does this course fulfill a requirement for single-subject or multiple subject credential students? Yes ___ No <u>X</u></b>	<b>For Catalog Copy: Yes <u>X</u> No ___</b> <b>CCE (Extension): Yes ___ No <u>X</u></b>	<b>Semester Effective:</b> <b>Fall <u>X</u> Spring __, 2009__</b>

<b>This course replaces experimental course Subject Area (prefix) and Catalog Nbr (course number):</b>	
<b>If changing an existing course, should new version be considered a repeat of the original version? If so, the same Course ID will be maintained. If not, a new Course ID will be assigned. Note: In PeopleSoft terminology, the Course ID is the unique system identifier, not the Catalog Nbr.</b>	<b>Yes <u>X</u> No ___</b>

**Change from:**

<b>Subject Area (prefix) &amp; Catalog Nbr (course no.):</b> <b>CSC 255</b>	<b>Title:</b> <b>Computer Networks</b>	<b>Units:</b> <b>3</b>
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**Change to:**

<b>Subject Area (prefix) &amp; Catalog Nbr (course no.):</b> <b>N/A</b>	<b>Title:</b> <b>N/A</b>	<b>Units:</b> <b>N/A</b>
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**JUSTIFICATION:**

**Change in prerequisite only. Current Catalog Prerequisite is: CSC138 or CPE 138. The proposed New Catalog Prerequisite is: Fully classified graduate status in Computer Science, Software Engineering, or Computer Engineering. The proposed change will better reflect the level of preparation students are expected to have. The change will also allow fully classified graduate students to enroll in CSC 255.**

**NEW COURSE DESCRIPTION:** (Not to exceed 80 words, and language should conform to catalog copy. See <http://www.csus.edu/umannual/acad.htm> - Guidelines for Catalog Course Description)

N/A

**Note:**

**Prerequisite: Proposed new prerequisite: Fully classified graduate status in Computer Science, Software Engineering, or Computer Engineering.**  
**Enforced at Registration: Yes X No \_\_\_**

**Corequisite:**

**Enforced at Registration: Yes \_\_\_ No \_\_\_**

**Graded: Letter X Credit/No Credit \_\_\_**      **Instructor Approval Required? Yes \_\_\_ No X**

**Course Classification (e.g., lecture, lab, seminar, discussion):**  
**Seminar**      **Title for CMS (not more than 30 characters):**  
**Computer Networks**

**Cross Listed? Yes \_\_\_ No X**      **If yes, do they meet together and fulfill the same requirement, and what is the other course.**

How Many Times Can This Course be Taken for Credit?   1  

Can the course be taken for Credit more than once during the same term? Yes    No   X  

**FOR NEW COURSE PROPOSALS OR SUBSTANTIVE CHANGES ONLY:**

**Description of the Expected Learning Outcomes:** Describe outcomes using the following format: "Students will be able to: 1), 2), etc."  
See the example at <http://www.csus.edu/acaf/example.htm>

**\*\*Attach a list of the required/recommended course readings and activities [Note: it is understood that these are updated and modified as needed by the instructor(s).] This attachment should be forwarded only to your Dean's office, not Academic Affairs.**

**Assessment Strategies:** A description of the assessment strategies (e.g., portfolios, examinations, performances, pre-and post-tests, conferences with students, student papers) which will be used by the instructor to determine the extent to which students have achieved the learning outcomes noted above:

For whom is this course being developed?

Majors in the Dept    Majors of other Depts    Minors in the Dept    General Education    Other   

Is this course required in a degree program (major, minor, graduate degree, certificate)? Yes    No   

If yes, identify program(s):

Does the proposed change or addition cause a significant increase in the use of College or University resources (lab room, computer facilities, faculty, etc.)? Yes    No   

If yes, attach a description of resources needed and verify that resources are available.

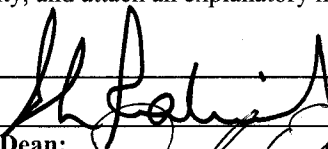
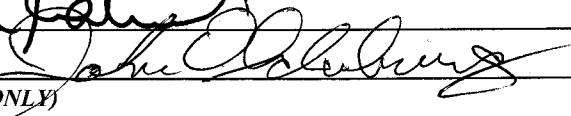
Indicate which department or programs will be affected by the proposed course (if any). \_\_\_\_\_

*The Department Chair's signature below indicates that affected programs have been sent a copy of this proposal form.*

**Approvals:** If proposed change, new course or deletion is approved, sign and date below. If not approved, forward without signing to the next reviewing authority, and attach an explanatory memorandum to the original copy.

**Signatures:**

**Date**

Department Chair:		12/9/08
College Dean or Associate Dean:		12/9/08
CPSP (for school personnel courses ONLY)		
Associate Vice President and Dean for Academic Programs		

**Distribution:** Academic Affairs (original), Department Chair and College Dean. Dean's office to send original after approval to Academic Affairs, at mail zip 6016. An electronic copy must also be sent.

## **CSUS**

COLLEGE OF ENGINEERING AND COMPUTER SCIENCE  
Department of Computer Science

### **C Sc 255 - Computer Networks, Fall 2008 (MW 4-5:15p; RVR 1004)**

**INSTRUCTOR:** *Isaac Ghansah*

**CCDC Assistant:** *TBA*

Office: RVR (ECS)-4004; Phone:278-7659; Email: [ghansah@csus.edu](mailto:ghansah@csus.edu) ;

WWW: <http://gaia.ecs.csus.edu/~ghansahi/> ;

Office Hours: TR 2:50-3:35pm, MW 5:15-6pm; and other times by appointment

#### ***COURSE DESCRIPTION:***

Computer networking fundamentals with emphasis on higher level protocols and functions. Course contents include network design considerations, software design and layering concepts, interface design, routing and congestion control algorithms, internetworking, transport protocol design, end-to-end communication, session and application protocols. Specific examples of commercial and international standards are cited.

**Prerequisite:** C Sc/CPE 138, or Fully Classified Graduate Standing in CSC, CPE, or SE, or permission of instructor.

#### **Prerequisite Proof:**

The Computer Science Department has a policy that each instructor will 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 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 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 Dept. Chair.

### **TEXTBOOK:**

1. Peterson, L. and Davie, B., *Computer Networks: Systems Approach, 4 Ed* 2007 Morgan-Kaufmann (required)
2. Ghansah I., *C Sc 255 Class Notes, 2007 Online* (required)
3. Panwar, S. et al, *TCP/IP Essentials: A Lab-Based Approach, 2004* Cambridge University Press (recommended)

### **REFERENCES:**

1. Stevens, W., *TCP/IP Illustrated, Vols 1, 2, & 3*, 1996, Addison Wesley
2. Comer, D., *Internetworking with TCP/IP, Vols. I, II, III* Prentice-Hall (recommended)
3. Tanenbaum, A., *Computer Networks, 4ed.*, 2003, Prentice-Hall, Inc.
4. Stallings, W., *Data and Computer Communications, 7ed.*, 2004 Prentice-Hall
5. Leon-Garcia, A. and Widjaja, I., *Communication Networks*, 2Ed 2004, McGraw Hill
6. Stallings, W., *High Speed Networks and Internets*, 2Ed 2002 Prentice Hall
7. Hassan, M., Jain, R, *High Performance TCP/IP Networking*, 2004, Pearson Prentice Hall
8. Research papers

### **GOALS:**

1. To provide the student with understanding of Higher Level Protocols and Functions of Computer Networks especially TCP/IP Architecture and companion protocols.
2. To provide depth of knowledge of commercially available wide area networks.
3. To develop proficiency in access and use of current literature in the area.

### **Prerequisites by Topic:**

1. The TCP/IP Architecture model
2. Data communications of the physical and data link layers
3. Packet, Circuit and Message Switching.

### **Expected Learning Outcomes:**

*At the end of this course you should be able to:*

1. Explain the service provided by IP to upper layers and the specific functions performed to provide the service
2. Explain the service provided by TCP to upper layers and the specific functions performed to provide the service
3. Identify different methods that can be used to implement congestion control at both the network and transport (TCP) layers.
4. Calculate performance measures for error and flow control protocols.
5. Calculate performance measures of routing algorithms and TCP protocol.
6. Analyze and estimate performance measures of IP fragmentation over multiple networks.
7. Differentiate between IPv4 and IPv6 in detail.
8. Distinguish between IP companion protocols such as ICMP, ARP, RARP, BOOTP, DHCP

9. Know the details of TCP including its limitations and how to improve on those limitations.
10. Understand IP and its design concepts including fragmentation and re-assembly.
11. Distinguish between the switching schemes: virtual circuit, datagrams, cell switching; their advantages and disadvantages; and how they are implemented.
12. Distinguish between routing algorithms that are used in the Network Layer.
13. Understand IP Tunneling and its purpose.
14. Understand MPLS, its purpose and advantages.
15. Understand all the issues involved with designing transport layer (i.e. flow control, error control, connection management, etc.) including timers and quantification of performance.
16. Understand quality of service and security issues of the networks.
17. Demonstrate knowledge of high performance issues of TCP/IP Protocols, and the Internet in general.

**GRADING POLICY:**

Midterm	25%
Final	40%
Assignments	15%
Project/Oral and Written Communication	15%
Attendance to Oral Presentations	5%

**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

**You 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.**

**COURSE POLICIES:**

1. Information in this syllabus is subject to change with notice.
2. Attendance to class and frequent check of email is expected. Class roll will not be checked after first week of classes. However, you are responsible for material presented and announcements made in class or by email. This could include changes to the syllabus, exam dates, etc.
3. Late assignment/project will be penalized by 20% if one lecture late. Nothing will be accepted if more than one lecture late, or if solution has been posted.
4. Make-up exams will only be given under extreme circumstances. The instructor reserves the right to reject make-up requests.

5. Be aware of the school's policy on *drops, incomplete, repeats, and ethics/academic honesty.*

### **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](http://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) 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.*

### **ADVICE on WORKLOAD and CLASS NOTES:**

There are a lot of *reading assignments*. You should endeavor to read the assigned pages before coming to class. There will also be *homework* assignments to be handed in. In addition, you will be required to complete an *independent project*, which is worth a considerable fraction of your grade for the course.

The *class notes are online* and should be considered as a guide. Many parts of it are not detailed enough to be self-contained. In addition, experience shows that new material is added every semester. Therefore, *attendance* to class is necessary in order to understand the details.

### **INDEPENDENT PROJECT/ORAL AND WRITTEN COMMUNICATION**

Independent student projects involving programming (ie. simulation or implementation), or research paper. A list of possible projects are provided by the instructor. Students may choose their own topics upon approval of instructor. Joint programming projects are encouraged. Oral and written communication skills are essential for any work environment you find yourself. Therefore, the deliverables for the projects will include a detailed report and oral presentation report and/or demonstration. The grading will verify your written and/or oral communication skills. For details of the specific grading criteria see details of Independent Project call for proposals.

### **COMPUTER ACCOUNTS AND ELECTRONIC COMMUNICATION:**

#### **a) gaia account**

**You must have a UNIX account on the ECS system "gaia" for this class. If you don't have a UNIX account on gaia,**

- a. Use your favorite Browser and Go to [www.ecs.csus.edu](http://www.ecs.csus.edu)
- b. Click on Computing Services -> Network Accounts -> Get a new Account.
- c. Fill out all required fields

You can also obtain an account by getting one from the College IT staff in room 2011. For both security reasons and convenience all email to me must be sent from that account. The College has a web-based email system on gaia ( [gaia.ecs.csus.edu/mail](mailto:gaia.ecs.csus.edu/mail) ) that you can use for email. You must also use your gaia account for subscribing to the class mailing list which is described below.

**b) Mailing List**

I have established a Mailing List for this course with a web-based maillist interface called Mailman. It is **MANDATORY** for every student accepted into the course to subscribe to the Mailing List within the first two weeks of classes. The list will be used to facilitate electronic communication for the course. Failure to subscribe to the list in a timely manner could result in your missing important assignments, clarifications, announcements, etc that are sent by email. You must check email on a regular basis and I will assume that you have received and read all messages I send to the list. The instructor will not be held responsible for your failures. To subscribe to the list go to the following website and fill out appropriate forms there.

<http://www.ecs.csus.edu/mailman/listinfo/csc255>

This will add your email address (the one from which you send the message, hopefully gaia) to the *csc255* mailing list. Subsequently you can send questions or discussion items regarding topics in *csc255* to everyone on the list. To do this, just send an email message to the address "[csc255@ecs.csus.edu](mailto:csc255@ecs.csus.edu)". This is a good way to send messages to other students in the class regarding clarifications about assignments, lecture, etc. Note that these email messages are sent to *everyone* on the *csc255* list (including the instructors). If you need to communicate privately with the Instructor, use the instructor's individual email address as given above. **Note: Do not send HTML e-mail to the list. Some mail reader programs do not understand HTML Tags.**

To make sure all students have subscribed to the mailing list we would like you to submit a separate e-mail to the instructor indicating your real name, your e-mail address and the course number (CSC 255) on the subject line. I will check the list from time to time to determine who is registered. If I notice any email address other than the one I received from you I will delete it. The instructor will not be held responsible if you do not receive messages sent to the list.

**c) Assignment/Homework Submission**

You must submit all homework/assignments/project reports electronically via SacCT (formerly WebCT), which can be reached from mySacState ( [my.csus.edu](http://my.csus.edu) ) or Online.csus.edu. *I will not accept a hardcopy.* Any file which is placed in WebCT will be named according to one of the formats below (depending on the type of assignment). Please do NOT submit pdf files as I will not be able to make comments on them. Word format is preferable.

*Your-name\_course#\_hmkw\_hmkw#, your-name\_course#\_lab\_lab#, your-name\_course\_project\_project#*

For example if a student named John Doe is submitting homework#1 the file name of the email attachment should be *doe-john\_255\_hmkw\_1*

Please note: If the attachment is not according to proper format as stated above, it will not be accepted.

**C Sc 255 - TENTATIVE SCHEDULE SUBJECT TO CHANGE**

<b>WEEK</b>	<b>TOPICS</b>	<b>READING</b>
1	Introduction. Requirements. Layered Architectures. Packet and Circuit Switching. Tradeoffs. Direct Link and Shared Networks. Hardware, Encoding, Errors, MAC Protocols, Wireless Examples: HDLC, SONET, 802.3, FDDI, 802.11, etc	Ch. 1, 2
2-3	Packet Switching. Routing/Switching. Virtual Circuits and Datagrams. Cell Switching (ATM). Bridges.	Ch. 3
4-5	Internetworking. Simple Internet. Routing. Global Internet. Addressing including masking and CIDR. IP, ARP, DHCP, ICMP, RIP, OSPF, BGP, IPv6, Mobile IP, MPLS, etc Tunneling.	Ch. 4
6-8	End to end Protocols. Transport Protocols. Transport Layer Design Concepts. End-to-end flow control, error recovery, and connection management. Internet Transmission Control Protocol (TCP). Congestion Control. Performance. RPC	Ch. 5
9-10	Congestion Control. Resource Allocation. Application Issues. Examples: RED, DECbit, RSVP	Ch. 6.
11-12	Network Security concepts, including secure protocols, IPSec, VPNs, VoIP security etc.	Ch. 8
13	Application Layer Protocols –HTTP, DNS, etc. Advanced topics as time permits – VoIP, Peer-to-peer and Overlay networks.	Ch. 7, 9
14-15	Independent Project Presentations	

**IMPORTANT DATES:**

Thanksgiving Break: 11/27-28/2008; FINAL EXAM: M 12/15/08 3-5 pm

CSC 255

JUSTIFICATION:

The proposed change will better reflect the level of preparation students are expected to have. The change will also allow fully classified graduate students to enroll in CSC 255.

OLD DESCRIPTION:

PLEASE NOTE: DESCRIPTION WILL NOT CHANGE.

Computer networking fundamentals with emphasis on higher level protocols and functions. Network design considerations, software design and layering concepts, interface design, routing and congestion control algorithms, internetworking, transport protocol design, and end-to-end communication, session and application protocols. Specific examples of commercial and international standards.