

METROPOLITAN STATE UNIVERSITY OF DENVER
Office of Academic and Student Affairs

REGULAR COURSE SYLLABUS

College of: Letters, Arts, and Sciences

Department: Mathematical and Computer Sciences

Prefix & Course Number: CS 3700 Crosslisted With*: _____

Course Title: Computer Networks

Transcript Course Title (30 characters): Computer Networks

Check All That Apply: Required for Major: _____ Required for Minor: _____ Specified Elective: _____
Required for Concentration: _____ Elective: X Service Course: _____

To receive Title IV financial aid funds, all institutions of higher education must comply with the federal definition of a credit hour. The Higher Learning Commission requires institutions to maintain policies and procedures for verifying compliance with this definition.

Federal Credit Hour Definition: A credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally-established equivalency that reasonably approximates not less than:

(1) one hour of classroom or direct faculty instruction and a minimum of two hours of out-of-class student work each week for approximately fifteen weeks for one semester or trimester hour of credit, or ten to twelve weeks for one quarter hour of credit, or the equivalent amount of work over a different amount of time; or (2) at least an equivalent amount of work as required in paragraph (1) of this definition for other activities as established by an institution, including laboratory work, internships, practica, studio work, and other academic work leading toward to the award of credit hours. 34CFR 600.2 (11/1/2010)

Credit Hours: 4 (4+0) Schedule Type: Lecture Grade Mode: Letter

Face-to-Face or Equivalent Hours per course:

Lecture 60 Lab _____ Internship _____ Practicum _____ Other (please specify type and hours): _____

Additional Student Work Hours per course: 120

Variable topics umbrella course: No X Yes _____ If Yes, number of credit hours allowed _____

Specified repeatable course: No X Yes _____

Prerequisite(s): CS 1400 and CS 2050, each with a grade of "C" or better, or permission of instructor

APPROVED:

Department Curriculum Committee

9/14/14
Date

GPacker
Department Chair OR Program Director

9.12.2014
Date

Anna Lopez-Serrano
Dean OR Associate Dean

9/15/14
Date

Joe Shevalier
Associate VP, Academic Affairs

09/17/14
Date

Corequisite(s): none

Prerequisite(s) or Corequisite(s): _____

Banner Enforced Coding:

Prerequisite(s): CS 1400 and CS 2050 each with a minimum grade of C

Corequisite(s): _____

Prerequisite(s) or Corequisite(s): _____

Registration restrictions: Level UG Class _____ Program/Major _____ Student attribute _____

Catalog Course Description:

This course provides a comprehensive study of computer networks, from the physical aspects to the high-level application protocols with which most people interact. The software that provides the communication is emphasized. The methods for creating connections, making sure they are error free and in order, performing routing, and creating client/server interactions are discussed.

Specific Variable Topics Course Description (if applicable, umbrella course description included above):

Required Reading and Other Materials will be equivalent to:

Kurose, James F & Ross, Keith W. (2013). Computer Networking: A Top-Down Approach. 6th edition. Boston, MA: Addison-Wesley. ISBN-13 978-0132856201

Specific, *Measurable* Student Behavioral Learning Objectives:

Upon completion of this course the student should be able to

1. Outline the hierarchical, layered structure of typical network architecture and describe the use of each layer.
2. Demonstrate the ability to use effectively a range of common network applications including email, telnet, FTP, wikis, web, and instant messaging.
3. Describe emerging technologies in the net-centric computing area and assess their current capabilities, limitations, and near-term potential.
4. Compare and contrast protocols for reliable data transfer.
5. Compare and contrast connection-oriented and non-connection-oriented protocols.
6. Compare and contrast methods for packet routing.
7. Compare and contrast different approaches to network security.
8. Create an Internet application using net-centric programming techniques.

Detailed Outline of Course Content (Major Topics and Subtopics):

I. Network Architectures

- A. Packet-switched and circuit-switched networks.
- B. Delay, loss, and throughput in packet-switched networks
- C. Internet architecture (layers and protocols)

II. Networked applications

- A. Protocols at the application layer
- B. Client-server and peer-to-peer paradigms
- C. Common Internet applications

III. Net-centric programming techniques

- A. Socket programming
- B. Client-side scripts and server-side programs

IV. Transport Layer Services

- A. Connectionless transport: UDP (User Datagram Protocol)
- B. Connection-oriented transport: TCP (Transmission Control Protocol)
- C. Reliable data transfer
- D. Congestion control

V. Internetworking and Routing

- A. The Internet Protocol (IP)
- B. Routing algorithms
- C. Mobile and wireless internetworking

VI. Link Layer Concepts

- A. Multiple access protocols
- B. Local area, mobile and wireless networks

VII. Security in Computer Networks

- A. Principles of cryptography
- B. Authentication and integrity of messages
- C. Attacks and countermeasures

Evaluation of Student Performance:

A combination of the following:

1. Homework and Programming Assignments
2. Quizzes and Examinations
3. Research Papers and/or Book Reports
4. Oral Presentations
5. Final Examination

Program Student Learning Outcomes Assessment

Students should achieve the Program Student Learning Outcomes (Program SLOs) by the time of graduation. Each individual Program SLO is assessed by selecting one or more course SLOs that contribute to the evaluation of that one Program SLO.

1. Program SLO c: An ability to design, implement and evaluate a computer-based system, process, component, or program to meet desired needs.
 - Course SLO #3: Describe emerging technologies in the net-centric computing area and assess their current capabilities, limitations, and near-term potential.
 - Course SLO #7: Compare and contrast different approaches to network security.
2. Program SLO i: An ability to use current techniques, skills, and tools necessary for computing practices.
 - Course SLO #1: Outline the hierarchical, layered structure of typical network architecture and describe the use of each layer.
3. Program SLO j: An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.
 - Course SLO #2: Demonstrate the ability to use effectively a range of common network applications

including email, telnet, FTP, wikis, Web, and instant messaging.

Course SLO #4: Compare and contrast protocols for reliable data transfer.

Course SLO #5: Compare and contrast connection-oriented and non-connection-oriented protocols.

Course SLO #6: Compare and contrast different packet routing methods.

4. Program SLO k: An ability to apply design and development principles in the construction of software systems of varying complexity.

Course SLO #8: Create an Internet application using net-centric programming techniques.