

Global Learning Semesters

Course Syllabus

Course: COMP-613 Computer Communication

Department: Computer Science

Host Institution: University of Nicosia, Nicosia, Cyprus



Course Summary		
Course Code	Course Title	Recommended Credit Hours
COMP-613	Computer Communication	4
Semester Offered	Contact Hours	Prerequisites
Please contact us	42-45	Students are expected to have undergraduate-level knowledge of programming and networks. Basic knowledge of operating systems and algorithms is an added advantage. Referring to the Computer Science undergraduate-level courses offered at Intercollege, the students are expected to have covered at least one of the following: COMP-324 Programming the Internet, COMP-358 Networks and Data Communications, COMP-368 Computer Network Protocols, or COMP-470 Internet Technologies and Lab.
Department	Level of Course	Language of Instruction
Computer Science	Upper Division	English

Course Description

Over the past few years, the explosive growth of the Internet and World Wide Web applications and services facilitated the expansion and the rapid development of new telecommunications network technologies. This has caused a tremendous growth in network traffic and the need for transporting multimedia information efficiently at high speeds.

The focus of this course is to provide an in-depth understanding of the design and development of advanced computer communication networks: distributed and survivable routing in large and dynamic networks, gateways and interconnection of heterogeneous networks, flow control and congestion avoidance techniques, network architectures, communication protocol standards, and network security.

Prerequisites

Students are expected to have undergraduate-level knowledge of programming and networks. Basic knowledge of operating systems and algorithms is an added advantage. Referring to the Computer Science undergraduate-level courses offered at Intercollege, the students are expected to have covered at least one of the following: COMP-324 Programming the Internet, COMP-358 Networks and Data Communications, COMP-368 Computer Network Protocols, or COMP-470 Internet Technologies and Lab.

Topic Areas

Introduction. Network Architectures. Layering and Protocols.

Physical and Data-Link Layer Understanding. Transmission Media, Encoding, Framing and Synchronization, Error Detection and Correction, Flow control and the sliding window algorithm.

Principles of Medium Access Control. Ethernet (802.3), Token Ring (802.5), FDDI, Wireless (802.11).

Network Layer, Switching and Routing. Internetworking protocols, IP, ICMP, ARP, DHCP, VPN. Routing principles (distance vector, link state, inter-domain), mobile host routing, IPv6, multiprotocol label switching, cell switching and ATM networks.

Transport layer Services and Protocols. User Datagram Protocol (UDP), Transmission Control Protocol (TCP), TCP congestion control (slow start, fast retransmit and recovery)

Resource Allocation and Quality of Service. Reliability, Resource Allocation (Queuing disciplines), Congestion Avoidance (RED, RIO etc), Quality of Service (DiffServ and IntServ).

Network Security. Principles of cryptography, Cryptographic Algorithms (DES, RSA, MD5 etc), Key Distribution, Authentication protocols, Protocol security (SSL, HTTPS, IPSEC), Internet/Intranet firewall security issues.

Network Management. Principles of Network Management. Network Management Infrastructure. The Internet Network-Management Framework

Applications. Networked applications (mail, file transfer, www), multimedia applications (RTP, H.323).

Course Assessment

Students will be assessed through a series of weekly assignments, a paper presentation, a semester project and presentation, a midterm and a final exam. The percentages contributing to the final grade are as follows:

Weekly Assignments:	10%
Paper Presentation:	15%
Semester Project and Presentation:	25%
Midterm Exam:	20%
Final Exam:	30%

Paper Presentation

Each student (individually) will choose a paper related to networking issues. A set of recent Journals and conference proceedings will be provided by the instructor and will be available through the library or the Internet. The student will then prepare a presentation on the paper to be given in front of the class and write a 3-page summary of the paper and its conclusions.

Project Details

The course will include a group project (2-3 students) requiring either:

- the design, implementation and evaluation of a non-trivial networked service or protocol in one of topics 5-9
- a research-based work seeking to answer interesting problems and complement on-going research work.

The goal should be to carry the project as far as possible, achieve the most out of it and prove that students can do some independent work producing a solid result. Project deliverables will include a Specification Report by midterm and a Final Report (and code) by the end of the exam period.

Readings and Resources

Required Textbook

- James F. Kurose and Keith W. Ross, Computer Networking: A Top-Down Approach Featuring the Internet, Addison Wesley, 2nd Edition, ISBN: 0-201-97699-4, 2002.

Recommended Textbooks

- Larry L. Peterson and Bruce S. Davie, Computer Networks: A Systems Approach, Second Edition, Morgan Kaufman, ISBN 1-55860-514-2, 1999.

- Leon-Garcia and I. Widjaja, Communication Networks: Fundamental Concepts and Key Architectures, McGraw Hill, ISBN 0-07-250353-X, 2001.
- William Stallings, High-Speed Networks and Internets: Performance and Quality of Service, Prentice Hall, 2nd edition, ISBN: 0130322210, 2001.