

Kingdom of Saudi Arabia

**The National Commission for Academic Accreditation &
Assessment**

COURSE SPECIFICATION

14033103-4 Computer Networks

Course Specification

Institution	Umm Al-Qura University
College/Department	Computer Engineering Department, College of Computer Information Systems

A Course Identification and General Information

1. Course title and code:	Computer Networks 14033103-4
2. Credit hours	4
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs)	Computer Engineering
4. Name of faculty member responsible for the course	Dr. Anas Basalamah
5. Level/year at which this course is offered	Level 8
6. Pre-requisites for this course (if any)	Discrete Structures-II
7. Co-requisites for this course (if any)	N/A
8. Location if not on main campus	Al-Abidiyah Umm Al Qura University - Makkah Al Mukarramah

B Objectives

<p>1. Summary of the main learning outcomes for students enrolled in the course.</p> <p>Fundamentals of network architectures and Internet protocols. Network layer design issues, Error detection/correction techniques, LAN switching, internetworking, Addressing, Routing techniques and protocols, Transport layer design issues and protocols, Application protocols (HTTP, FTP, DNS), Examples of protocol suites and networks.</p>
<p>2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)</p> <ol style="list-style-type: none">1. Involving students in presentation of advance topics in Computer Networks to know current research in the field.2. Use of Simulation tools to virtually observe the system performance and verifying using real-time experiments3. Lecture slides and tutorials, Animations to further clarify the theoretical concepts4. Use of packet capturing tools to analyse different protocols of computer networks

C. Course Description

Major Topics to be Covered		
List of Topics	No of Weeks	Contact hours
<ol style="list-style-type: none">1. Network Architectures and the ISO/OSI and TCP/IP Layers<ul style="list-style-type: none">o Motivation of networking and the Interneto Network Core and its Componentso Performance metrics: delay, loss, throughputo Protocol Layers and Their Service Models		
<ol style="list-style-type: none">2. Application Layer<ul style="list-style-type: none">o Principles of Network Applicationso The Web applications: HyperText Transport Protocol (HTTP)o File Transfer Protocol (FTP)o Domain Name System (DNS)o Peer-to-Peer Applications		

3. Transport Layer		
<ul style="list-style-type: none"> o Transport-Layer Services o Connectionless Transport UDP, o Principles of Reliable Data Transfer o Connection-oriented Transport TCP 		
4. The Network Layer		
<ul style="list-style-type: none"> o An overview of the Network layer: forwarding and routing o Network services and internetworking o Virtual Circuit and Datagram Networks o Addressing, Internet Protocol (IP) o IP Helpers (ARP, DHCP, ICMP, ...) o Routing and Routers o Routing Algorithms: Distance-Vector and Link-State o Routing in the Internet: RIP and OSPF 		
5. The Link Layer		
<ul style="list-style-type: none"> o Overview of link layer o Error detection and correction o Multiple Access Links and Protocols o LAN switches 		
6. An overview of Wireless and Mobile Networking		

2 Course components (total contact hours per semester):				
Lecture: 42hr	Tutorial:	Laboratory: 30	Practical/Field work/Internship	Other:

<p>3. Additional private study/learning hours expected for students per week. (This should be an average :for the semester not a specific requirement in each week)</p> <p>3 x 50 mins lectures</p>

4. Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:

- A brief summary of the knowledge or skill the course is intended to develop;
- A description of the teaching strategies to be used in the course to develop that knowledge or skill;
- The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.

a. Knowledge

(i) Description of the knowledge to be acquired

A student who successfully fulfills the course requirements will have demonstrated:

1. A comprehension of the fundamental principles underlying packet switching networks, Multiple Access, Channelization.
2. Testing and constructing cable connection, including CAT 5 Straight-Through Ethernet network cable, and CAT 5 Cross-Over Ethernet network cable.
3. Building peer-to-peer, and Switch-based networks.
4. Configuration of domain controller and DNS server. Installation and configuration of DHCP server and client.
5. Using packet analyzer and packet capturing software to capture and analyze traffic of several protocols. Also using PING and TraceRoute.
6. Simulation of CISCO Router and Switches, including Packet Tracer installation.
7. Comparison of network protocols' operations, addressing and socket approach implementation, IPv4 and IPv6 issues.
8. Recognizing of the key principles behind retransmission protocols, the role of TCP in providing reliability, congestion control algorithms, and techniques to enhance QoS.
9. Grasping of the basic concepts of routing, NATing, and DNS.

(ii) Teaching strategies to be used to develop that knowledge

1. Assignments and solutions to the assignments, so that student can know their problems
2. Open-communication with students – show willingness to assist and take questions from students and clarify explanations in the class
3. Students presentations
4. Hands on practical networking problems on cisco routers and switches.
5. Simulations assignments using Packet Tracer.

6. Packet capturing tool to study and analyse different protocols.
<p>(iii) Methods of assessment of knowledge acquired</p> <ol style="list-style-type: none"> 1. Assessment methods include two exams and a final exam, reading assignments. 2. Review outputs from the assignments and exam results in the computer lab.
b. Cognitive Skills
<p>(i) Description of cognitive skills to be developed</p> <ol style="list-style-type: none"> 1. Ability to solve problems. 2. Ability of deduction and inference. 3. Ability of analysis and design network architectures
<p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ol style="list-style-type: none"> 1. Labs
<p>(iii) Methods of assessment of students cognitive skills</p> <ol style="list-style-type: none"> 1. Two exams and a Final Exam. 2. Labs Exams.
c. Interpersonal Skills and Responsibility
<p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <p>Students should be able to</p> <ol style="list-style-type: none"> 1. Understand and communicate to others the importance and relevance of statistics in the modern world 2. Be an independent learner, able to acquire further knowledge with some guidance or support. 3. Participate in group discussions 4. Manage time and meet deadlines.
<p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <ol style="list-style-type: none"> 1. Enticing students to participate by encouraging them to explain what they learned from the reading assignment.

<ul style="list-style-type: none"> 2. Labs 3. Students Presentations 4. Practical Scenarios for designing and troubleshooting.
<p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> 1. Two Exams, and a Final Exam 2. Labs Exams.
<p>d. Communication, Information Technology and Numerical Skills</p>
<p>(i) Description of the skills to be developed in this domain.</p> <ul style="list-style-type: none"> 1. Case studies: the key method of discovering a student's dexterity in analyzing 2. their recommendations, opinions and suggestions 3. Assignments, exams, reports, presentations and quizzes will test their analytic skills and communication skills 4. Class discussions should indicate a student's prowess in responding
<p>(ii) Teaching strategies to be used to develop these skills</p> <ul style="list-style-type: none"> 1. Written Examinations 2. Reading Assignments 3. Lab Sessions.
<p>(iii) Methods of assessment of students numerical and communication skills</p> <ul style="list-style-type: none"> 1. Assignments, exams, reports, presentations and quizzes will test their analytic skills and communication skills 2. Class discussions should indicate a student's prowess in responding
<p>e. Psychomotor Skills (if applicable)</p>
<p>(i) Description of the psychomotor skills to be developed and the level of performance required</p>
<p>(ii) Teaching strategies to be used to develop these skills</p>
<p>(iii) Methods of assessment of students psychomotor skills</p>

5. Schedule of Assessment Tasks for Students During the Semester			
Assessment	Assessment task (eg. essay, test, group project, examination etc.)	Week due	Proportion of Final Assessment
1	Attendance and Participation	Through out Semester	5
	Labs evaluation		25
2	1st Exam	4	15
3	2nd Exam	8	15
4	Final Exam	16	40

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

Faculty is available 10 hours per week for student help and consulting.

E Learning Resources

1. Required Text(s)
<ul style="list-style-type: none"> Computer Networking, a Top-Down Approach; J. F. Kurose, K. W. Ross
2. Essential References
<ul style="list-style-type: none"> Computer Networks: A Systems Approach; Larry Peterson and Bruce Davie, 4/E
3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)
4-.Electronic Materials, Web Sites etc http://elc.edu.sa/jusur/mycourses.php?mod=mycourses www.linuxhomenetworking.com www.howstuffworks.com
5- Other learning material such as computer-based programs/CD, professional standards/regulations
Windows Server 2008, Cisco Packet Tracer, Wireshark packet capturing tool,

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Lecture rooms, laboratories, etc.) 1. A Lecture room having Multimedia projector for lectures and students presentation. 2. Well equipped lab with Cisco routers and switches for practical networking 3. Internet
2. Computing resources 1. There is computer lab available for practical networking and for simulations. 2. Students are encouraged to bring in their laptops and use them in solving problems in the class.
3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching To improve effectiveness of teaching student feedback is obtained in the form of Exams, class and individual interaction with students, and unofficial student survey initiated by the professor.
2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department 1. Faculty meetings to discuss best practices and issues related to the course 2. Comparison of the course content with similar courses offered in others colleges 3. Updating course curriculum according to latest research done in the field.
3 Processes for Improvement of Teaching 1. Departmental Meetings 2. Faculty Trainings
4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)
5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. 1. Departmental Meetings