

Kingdom of Saudi Arabia

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

COURSE SPECIFICATION

Course Specification

Institution: Umm Al-Qura University
Department: Computer Engineering Department

A. Course Identification and General Information

1. Course title and code: Computer Communication Systems – 14033102-4
2. Credit hours: 04
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. Momen Al-Rawi
5. Level/year at which this course is offered Level 07
6. Pre-requisites for this course (if any) Signals and Systems
7. Co-requisites for this course (if any) N/A
8. Location if not on main campus Umm Al-Qura University – Abadia Campus

B Objectives

1. Summary of the main learning outcomes for students enrolled in the course.
<ul style="list-style-type: none"> An ability to understand the fundamentals of a data communications and network layers using the encapsulation and addressing mechanism through the OSI and TCP/IP model. An ability to understand the fundamental principles of communication media, and communication channels; including concepts of signal conversion, modulation, signal transmission and propagation, bandwidth, throughput, multiplexing, channel capacity and transmission impairment, switching in circuit and datagram networks. Understanding the concepts of planning and designing basic communication networks.
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)
N/A

C. Course Description (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

1. Topics to be Covered		
List of Topics	No. of Weeks	Contact hours
Networks and Data Communication; Data flow, Physical Structure and Topologies. The concept of internetworking, The advent of the Internet, Categories of Networks (LAN, MAN, WAN), The role of protocols in networking and their standardization. The concept of layers and encapsulation in networking. An overview of the OSI and TCP/IP models' layers and their tasks. The mechanism of addressing in the TCP/IP layer structure.		
Data and Signals' Representation in Networking; Analog and digital, periodic and non-periodic and composite signals, Time and Frequency domains. Transmission of digital signals (Base-band, and Broadband using modulation), The negative effects of attenuation, distortion, and noise in transmission. Data rate limits underlying the use of Nyquist bit rate and Shannon capacity. Network performance parameters; Bandwidth, Throughput, Latency, Jitter, Bandwidth-Delay Product.		
Digital and Analog Transmission; Digital-To-Digital Conversion, explaining Line Coding, Block Coding, Scrambling, Analog-To-Digital Conversion, explaining PCM, and DM. Parallel and Serial Transmission. Digital-To-Analog Conversion, explaining ASK, FSK, PSK, QAM. Analog-To-Analog Conversion, AM, FM, PM.		
Bandwidth Optimization; using Multiplexing (FDM, WDM, TDM), and Spreading (FHSS, DSSS)		
Transmission Media; Guided media (TP, Coax, Fiber-Optics), Unguided media (Radio waves, Microwaves, Infrared).		
Switching Network; Circuit-Switched Networks, Datagram Networks, looking at the role of routing table in determining the Internet data traffic paths. Structure of the switch and switching fabric. Network Data Transmission Through Circuit-Switched Networks; Modem, DSLs.		

2. Course components (total contact hours per semester):				
Lecture: 42 contact Hrs	Tutorial: N/A	Laboratory: N/A	Practical/Field work/Internship: N/A	Other: Exams & Reading assignments

<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>An average student is expected to learn 04 hours per week other than class teaching.</p>

<p>4. Development of Learning Outcomes in Domains of Learning</p> <p>For each of the domains of learning shown below indicate:</p> <ul style="list-style-type: none"> 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
<p>(i) Description of the knowledge to be acquired</p> <p>This course provides a conceptual view of data communications and network layers and models (OSI, TCP/IP), explaining the idea of internetworking of networks and addressing. Emphasis on the Physical Layer underlying data and signal transmission and transmission impairment, signal conversion, modulation, bandwidth and throughput, Multiplexing (FDM, WDM, TDM), FHSS, an overview of transmission media (TP, Coax, Fiber-Optic, Radio Waves, Microwaves), Switching (Circuit Switched and Datagram networks), a basic idea of the switching fabric, Modems and DSLs.</p>
<p>(ii) Teaching strategies to be used to develop that knowledge</p> <p>Teaching strategies used to develop knowledge of the course include classroom lectures, interactive learning sessions, power point slides, assignments and individual attention.</p>
<p>(iii) Methods of assessment of knowledge acquired</p> <p>Assessment methods include two exams and a final exam, reading assignments.</p>

b. Cognitive Skills
<p>(i) Description of cognitive skills to be developed</p> <p>The course will develop the ability to optimization of data communication in the students.</p>
<p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <p>Different teaching strategies are used to develop cognitive skills including practical examples during the lectures and practiced those examples in project. Assignments include some open ended tasks to apply the knowledge gained in the subject.</p>
<p>(iii) Methods of assessment of students cognitive skills</p> <p>The cognitive skills are assessed by using assignments and project. Quizzes are also designed to assess these skills.</p>
c. Interpersonal Skills and Responsibility
<p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <p>In this course project is assigned to students which is a group activity and play important role to improve students' interpersonal skills and personal and social responsibility.</p>
<p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <p>Group assignments and project are given to develop these skills.</p>
<p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <p>Assessment of students' interpersonal skills is performed by taking exam, report and presentation.</p>
d. Communication, Information Technology and Numerical Skills
<p>(i) Description of the skills to be developed in this domain.</p> <p>To develop skills in this domain technical programming and training is given to the students.</p>
<p>(ii) Teaching strategies to be used to develop these skills</p> <p>Students' are advised to write assignments and project reports as per standard format to develop writhing skills and presentations are arranged to give them chance to develop communication skills.</p>

<p>(iii) Methods of assessment of students numerical and communication skills</p> <p>To assess the students numerical and communication skills tests and conducted and presentations are arranged. Some of the marks are allocated for standard presentation.</p>
e. Psychomotor Skills (if applicable)
<p>(i) Description of the psychomotor skills to be developed and the level of performance required</p> <p>The course provides networking and data communication skills as psychomotor skill.</p>
<p>(ii) Teaching strategies to be used to develop these skills</p> <p>The student use different networking techniques to develop psychomotor skills.</p>
<p>(iii) Methods of assessment of students psychomotor skills</p> <p>The psychomotor skills developed in this course are assessed by assignments, presentations and Project.</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	Exam1	4 th	20
2	Exam 2	8 th	20
3	Reading Assignments		
4	Participation and Attendance		10
5	Final Exam	16 th	50

D. Student Support

<p>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)</p> <p>Arrangements are made for individual student consultations and academic advice for the duration of 6 hours per week</p>

E. Learning Resources

1. Required Text(s) Data Communications and Networking, By: Behrouz A. Forouzan (5th Edition).
2. Essential References Data and Computer Communications, By: William Stallings (6th Edition). Computer Networks, By: Andrew Tanenbaum. (4th Edition).
3. Recommended Books and Reference Material (Journals, Reports, etc) (Attach List) http://www.journals.elsevier.com/computer-communications/
4. Electronic Materials, Web Sites etc i. http://elc.edu.sa/modules/lmsportal/default-frame.php?cid=1403322_JAN2012&mod=course ii. http://journal.univagora.ro/ iii. http://www.nos.org/htm/funda4.htm iv. http://www.camiresearch.com/Data_Com_Basics/data_com_tutorial.html v. http://www.complextoreal.com/tutorial.htm vi. http://www.dave-cushman.net/computing/tutorialindex.html
5. Other learning material such as computer-based programs/CD, professional standards/regulations N/A

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.) Lecture room is required with multimedia projector.
2. Computing resources N/A
3. Other resources (specify e.g. If specific laboratory equipment is required, list requirements or attach list) N/A

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 The evaluation of teaching is performed by the department using student survey.
3. Processes for Improvement of Teaching The process for improvement of teaching is based on result of student survey and result of student outcomes. Individual attention is provided to weak students.
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) N/A
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. The course effectiveness is reviewed for planning and improvement on annual basis.