

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: Communication Networks – 14034104-3
2. Credit hours: 03
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. Khaled Al-Motairi
5. Level/year at which this course is offered Level 9/10
6. Pre-requisites for this course (if any) Computer Communication Systems, Probability and Statistics for Engineers, Computer Networks
7. Co-requisites for this course (if any) N/A
8. Location if not on main campus Umm Al Qura University - Abdeya - Makkah Al Mukarramah

B Objectives

1. Summary of the main learning outcomes for students enrolled in the course. Introduction to communications networks. Various network architecture. OSI and TCP/IP reference model. Queuing analysis. Digital transmission. Error control. Media access control. Local area networks (LANs). Dynamic routing. Congestion control. System analysis and performance evaluation.
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) Communications Networks provides the students the general concepts and this area is changing very rapidly, the instructor has to update the content of the course to reflect state-of-the-art technologies.

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
• Introduction to communication networks ○ Circuit switching ○ Packet switching ○ Virtual circuit switching (ATM networks) ○ Peer-to-peer networks ○ Network layers and models	2	3
• Elements of queueing analysis ○ Review of probability and random variables ○ Queueing system ▪ Markov Chains ▪ M/M/1 queue ▪ multi-server (M/M/n/k) queues ▪ Erlang-B formula and Little's law	4	9
• Physical layer: data transmission ○ Bandlimited channel ○ White Gaussian noise ○ Baseband transmission ○ Nyquist channel and rate ○ Optimal receiver ○ System criteria ○ error control	3	9

- Local area networks (LANs) and medium access control (MAC) - Error control and retransmission protocols - ALOHA - Carrier Sensing Multiple Access - Multiplexing		3	9
- Network Layer: routing - Optimal routing - Bellman-ford algorithm - Dijkstra's algorithm - Other approaches - Congestion control and resource allocation		3	9
2. Course components (total contact hours per semester):			
Lecture: 45	Tutorial: 0	Laboratory: 0	Practical/Field work/Internship: 0
			Other: 0

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) An average student is expected to learn 08 hours per week other than class teaching.

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 Understanding of Communication Networks and their needs. Demonstrating the basic components of networks. Study of basic of digital communications and how the students calculate bit error rate.

Study of queuing theory and understanding of quality of services.
(ii) Teaching strategies to be used to develop that knowledge Classroom lectures, power point slides and individual attention is used to develop knowledge of the course.
(iii) Methods of assessment of knowledge acquired 1. Exercises & Home works , Quizzes, Midterm, Project , Final Exam 2. Review outputs from the assignments in the computer lab and also from their assignments and projects.
b. Cognitive Skills
(i) Description of cognitive skills to be developed The student will be able to design and conduct experiments, analyze and interpret data. The student will design a system, component, or process. The student will design a system, component, or process. The student will identify, formulate, and solve engineering problems The student will know and identify contemporary issues.
(ii) Teaching strategies to be used to develop these cognitive skills 1. Assignments.
(iii) Methods of assessment of students cognitive skills 1. Mid and Final Exams
c. Interpersonal Skills and Responsibility
Students should be able to 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. - Participate in group discussions - Manage time and meet deadlines.
(ii) Teaching strategies to be used to develop these skills and abilities Hands on-training on real examples, applications, software, and Internet surfing
(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility Mid and Final Exams
d. Communication, Information Technology and Numerical Skills
(i) Description of the skills to be developed in this domain. - Case studies: the key method of discovering a student's dexterity in analyzing - Their recommendations, opinions and suggestions - Assignments, exams, reports, presentations and quizzes will test their analytic skills and communication skills - Class discussions should indicate a student's prowess in responding
(ii) Teaching strategies to be used to develop these skills - Written Examinations - Assignments - Quizzes
(iii) Methods of assessment of students numerical and communication skills - Assignments, exams, reports, presentations and quizzes will test their analytic skills and communication skills - Class discussions should indicate a student's prowess in responding
e. Psychomotor Skills (if applicable): Not Applicable
(i) Description of the psychomotor skills to be developed and the level of performance required

(ii) Teaching strategies to be used to develop these skills
(iii) Methods of assessment of students psychomotor skills

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	Quizzes	4, 10	10
2	Mid Term	8, 12	20
3	Assignments	Throughout semester	5
4	Lab or Project	Throughout semester	25
5	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) For individual student consultations and academic advice teaching staff is expected to be available 8 hours per week
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E. Learning Resources

1. Required Text(s) Alberto Leon-Garcia and Indra Widjaja, Communication Networks - Fundamental Concepts and Key Architectures, Second Edition, McGraw Hill, 2004.
2. Essential References John Proakis, Digital Communications

A. Bruce Carlson, Communication Systems. J. F. Kurose, K. W. Ross, Computer Networking: A Top-Down Approach
3. Recommended Books and Reference Material (Journals, Reports, etc) (Attach List) N/A
4. Electronic Materials, Web Sites etc Provided by the instructors such as coursa, youtube, different articles.
5. Other learning material such as computer-based programs/CD, professional standards/regulations Using of Matlab or different simulations such as ns-2 or ns-3.

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.) A Lecture room having Multimedia projector for lectures and students presentation.
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 Course Survey and students Feedback for each learning outcome of the course.
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) N/A
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. 1. Departmental Meetings