



Course Specification

(Bachelor)

Course Title: **Network Design and Management**

Course Code: **CENX 446**

Program: **B.S. in Computer Engineering**

Department: **Department of Computer Engineering**

College: **College of Computer and Information Sciences**

Institution: **King Saud University**

Version: *Course Specification Version Number*

Last Revision Date: *Pick Revision Date.*

Table of Contents

A. General information about the course:	3
B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods	4
C. Course Content	5
D. Students Assessment Activities	5
E. Learning Resources and Facilities	5
F. Assessment of Course Quality	6
G. Specification Approval	6

A. General information about the course:

1. Course Identification

1. Credit hours: (3 hours)

2. Course type

A. ☐ University ☐ College ☒ Department ☐ Track ☐ Others
B. ☐ Required ☒ Elective

3. Level/year at which this course is offered: (Level 10)

4. Course general Description:

Internetworking: Internetworking hardware, Bridging and switching technologies, Virtual LANs; **Network Design:** the network development life cycle, Network analysis and design methodology, Enterprise network design model, backbone design concepts; **Network Management:** foundations of network management, management architectures, information model, organizational model, communication model, functional model; **Network Management Standards,** Network Management Protocols, Abstract Syntax Notation One (ASN.1), Simple Network Management Protocol (SNMP), SNMPv2 and SNMPv3, Structure of Management Information (SMI), Management Information Base (MIB), Remote Monitoring RMON 1 and 2.

5. Pre-requirements for this course (if any):

CENX 441, Computer Networks

6. Co-requirements for this course (if any):

7. Course Main Objective(s):

The objective of this course is to introduce the fundamental principles of internetworking design, network analysis and design methodologies network management concepts, architectures, and protocols.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	4 hours per week	100%
2	E-learning		
3	Hybrid - Traditional classroom - E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	15
5.	Others (specify)	
Total		60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Describe the network internetworking technologies.	4	Lectures and Tutorials	Exams and Homework
1.2	Demonstrate understanding of network monitoring protocols	2	Lectures and Tutorials	Exams and Homework
2.0	Skills			
2.1	Compare and contrast the different options in designing a network.	2	Lectures and Tutorials	Exams and Homework
2.2	Apply algorithms to solve network design problems.	2	Lectures and Tutorials	Exams and Homework
2.3	Demonstrate the design and functionality of the SNMP protocol.	2	Lectures and Tutorials	Exams and Homework
2.4	Recognize the differences between SNMPv.1, SNMPv.2 and SNMPv.3 protocols.	2	Lectures and Tutorials	Exams and Homework
3.0	Values, autonomy, and responsibility			
3.1	Analyze and design an enterprise network.	6	Lectures and Tutorials	Exams and Homework

C. Course Content

No	List of Topics	Contact Hours
1.	Principles of internetworking. Types of internetworking devices. Repeaters, hubs, bridges, routers, switches and gateways. Transparent and source-routing bridges. Multilayer switches. VLANs. Routing strategies. Addressing	8
2.	The Network Development Life Cycle: Network analysis. Network design methodology. Writing of a Request For Proposal (RFP) and quotation analysis. Prototyping/simulation. Implementation.	12
3.	Enterprise Network Design: Enterprise Network Design Model. Backbone design concepts.	8
4.	Introduction to Basic Management Concepts and Architectures: Network management standards, Network management architecture, Abstract Syntax Notation (ASN.1), BER encoding	8
5.	SNMP Management: Organization and Information Models, Communication and Functional Models, MIB, SMI	12
6.	SNMPv2 SNMPv3: System architecture, Information Model & Communication model, Security Model	8
Total		60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Midterm Examination (1)	5	15%
2.	Midterm Examination (2)	10	15%
3.	Homework Assignments	Bi-weekly	15%
4.	Project	7	10%
5.	Quizzes	Random	5%
6.	Final Exam	End	40%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	- Network Management: Principles and Practice, Mani Subramanian, Prentice Hall, 2nd Ed., 2012 - Top-Down Network Design, P. Oppenheimer, Cisco Press, 3rd Ed., 2010.
Supportive References	Computer Networking: A Top-Down Approach, J. Kurose and K. Ross, 6th Ed., 2013
Electronic Materials	https://lms.ksu.edu.sa





Other Learning Materials

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room with number of seats enough to accommodate enrolled students.
Technology equipment (projector, smart board, software)	Overhead projector with required software to facilitate presentations on smart board.
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Department Council	Course reports are evaluated by the Department Council.
Effectiveness of Students assessment	Faculty-Peer Review	Final examination is moderated.
Quality of learning resources	Students	Indirect – Edu-gate survey.
The extent to which CLOs have been achieved	Students	Attainment level of every CLO is measured directly.
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	

