

Network Management

1. Course title and code: Network Management [CS- 6624]
2. Credit hours: 5 hrs.
3. Program(s) in which the course is offered: M.tech. (Network Management)
4. Name of faculty member responsible for the course: Ms. Preeti Saxena
5. Level/year at which this course is offered: I year I Semester
6. Pre-requisites for this course (if any): Data and Computer Communication, Computer Networks
7. Co-requisites for this course (if any) : Network Security
8. Date of approval of the course specification within the institution :
9. Location if not on main campus : NA

B Aim and Objectives

<p>1. Aim of the Course: Network Management is a five credit hour course designed to familiarize the student with the design, analysis operation and management of modern data communications networks. The course will provide the student with a working knowledge of the types of communications network management systems and their strengths and weaknesses in solving various information network management problems. The syllabus is designed to provide a theoretical foundation of Network Management and equip the students with an in-depth knowledge of how to install, maintain, and manage a Local Area Network, which helps the students to understand the actual working of computer network.</p>
<p>2. Briefly describe any course development objectives that are being implemented.</p> <ol style="list-style-type: none">1. Use of presentation slides for teaching.2. Time to time we give references of web based material for various topics.3. Understand the fundamental concepts of network management.4. Examine network management protocols.

C. Course Description

Week	TOPIC	Readings
1	Introduction:- Computer Network, Goals and Applications, Data Communications and Network Management Overview : Communications protocols and Standards	Chapter 1
2	Case Histories of Networking and Management, Network Management: Goals, Organization, and Functions, Network and System Management, Network Management System Platform, Current Status and future of Network Management.	Chapter 1
3	Fundamentals of computer network technology: Network Topology, LANs.	Chapter 2
4	Network node components Hubs, Bridges, Routers, Gateways, Switches, WAN, ISDN Transmission Technology.	Chapter 2
5	Network Management Standards, Network Management Model, Organization Model, Information Model, Communication Model, ASN.1, Encoding Structure.	Chapter 3
6	SNMPV1 Network Management: Managed network: Case Histories and Examples, The History of SNMP Management. The SNMP Model, The Organization Model, System Overview.	Chapter 4
7	The Information Model, The SNMP Communication Model, Functional Model.	Chapter 5
8	SNMP Management: SNMPv2: Major Changes in SNMPv2, SNMPv2 System Architecture, SNMPv2 Structure of Management Information. The SNMPv2 Management Information Base, SNMPv2 Protocol, Compatibility With SNMPv1.	Chapter 6
9	SNMP Management- RMON: Introduction, RMON SMI and MIB, RMON1.	Chapter 8
10	Broadband Network Management-ATM Networks: Broadband Networks and Services, ATM Technology, ATM Network Management.	Chapter 9
11	Broadband Network Management: Broadband Access Networks and Technologies, HFC Technology, HFC Management, DSL Technology, ADSL Technology, ADSL Management.	Chapter 10

12	Telecommunication Management Network: Introduction, Operations Systems, TMN conceptual Model, TMN Architecture, TMN Management Service Architecture, An integrated view of TMN.	Chapter 11
13	Network Management Tools and Systems: Network Management Tools, Network Statistics Measurement Systems, History of Enterprise Management. Network Management systems, Commercial Network management Systems, System Management, Enterprise Management Solutions.	Chapter 12
14	Network Management Applications: Configuration management, Fault management, performance management.	Chapter 13
15	Event Correlation Techniques, security Management, Accounting management, Report Management, Policy Based Management Service Level Management.	Chapter 13

2 Course components (total contact hours):			
Lecture: 36	Tutorial: 12	Practical/Fieldwork/ Internship:	Other:
3. Additional private study/learning hours expected for students: 30 Hrs.			
4. Development of Learning Outcomes in Domains of Learning			
For each of the domains of learning shown below indicate:			
(i) A brief summary of the knowledge or skill the course is intended to develop;			
(ii) A description of the teaching strategies to be used in the course to develop that knowledge or skill;			
(iii) 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			
<ul style="list-style-type: none"> • Understand the structure and organization of computer networks; including the division into network layers, role of each layer, and relationships between the layers. • In depth understanding of transport layer concepts and protocol design; including connection-oriented and connection-less models, techniques to provide reliable data delivery, and algorithms for congestion control and flow control. 			

- In depth understanding of various network management standards and their perceptives.
- Understand the SMTP protocol and its working in detail.
- Understand the basic concepts of broadband network Telecommunication network and their management.
- Understand the basic concepts of network security concepts; including authentication, integrity, key distribution, and system security design challenges.

Critically appraise current and possible future technological innovation and assess them.

(ii) Teaching strategies to be used to develop that knowledge: Lectures, tutorials and theoretical assignments.

Assignments require use of library reference material and web sites to identify information required to complete tasks.

(iii) Methods of assessment of knowledge acquired: One multiple choice test and one theoretical test as Internal Tests will be carrying 30% of marks.

b. Cognitive Skills

(i) Cognitive skills to be developed

- The ability to develop understanding of layering approach and management services at each layer in different management standards that provides the basis of logic behind separating the various management services and protocols at different layers .

The ability to develop general abilities of an intellectual, analytical problem-solving nature related to networking area.

(ii) Teaching strategies to be used to develop these cognitive skills

Comparing the task of each layer with modular programming approach. Making them understand that each layer works like a function of programming language and return some services to its upper layer.

The assignment exercise will also help in developing the understanding various services and protocols.

(iii) Methods of assessment of students cognitive skills : The programming assignments and objective type tests will be carrying 30% of marks.

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed

Team work: Division of work, group discussion on the various topics of computer networks. Preparing group for seminars on any latest topic in data communication technology and finally

presenting it.			
(ii) Teaching strategies to be used to develop these skills and abilities: 5% of assessment is based on individual's contribution to the group task and on the presentation			
(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility The presentation will be given by all the group members indicating his/her subtopic in the main topic. The individual will be assessed on whether he/she is involved in learning and understanding other's subtopic and correlated it in as any idea in his/her presentation.			
d. Numerical and Communication Skills			
(i) Description of the numerical and communication skills to be developed Seminar presentation, Numerical problems will be given on the topics like : ATM networks , Virtual LANs, IP Addressing , Cryptographic Algorithms etc.			
(ii) Teaching strategies to be used to develop these skills: Presentation of work can help in improving communication skills:			
(iii) Methods of assessment of students numerical and communication skills: It will be assessed by the presentation			
5. Scheduling of Assessment Tasks for Students			
Assessment	Assessment task (eg. essay, test, group project, examination etc.)	Week due	Proportion of Final Assessment
1	Multiple choice test	5 th week	5%
2	Theoretical test	10 th week	20%
3	Assignments	Bi-weekly	5%
4	Practical Assignments and Lab Viva	Bi-weekly (assignments) + 11 th week (Viva)	20%
5	End-semester Examination	12 th week	50%

D. Faculty and Staff Requirements for the Course

1. Numbers of Faculty and Staff Required							
Category of Faculty and Staff	Minimum Number	Equivalent Full	Additional Number of Faculty and Staff Required if Student numbers Increase				
			___ to ___ Students	___ to ___ Students	___ to ___ Students	___ to ___ Students	

Faculty	1		NA			
Laboratory Assistants	1		NA			
Other (Specify)	NA		NA			
2. Arrangements made for availability of faculty for individual student consultations and academic advice. (include amount of time faculty are available each week)						

E Learning Resources

1. Required Text(s) <ul style="list-style-type: none"> • Network Management, Principles and Practice, Mani Subrahmanian, Pearson Education.
2. Essential References <ul style="list-style-type: none"> • Network management, Morris, Pearson Education. • Principles of Network System Administration, Mark Burges, Wiley Dreamtech. • Distributed Network Management, Paul, John Wiley. • Computer Networks, Andrew S. Tanenbaum, Addison-Wesley, 4th Ed. •
3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List) <ul style="list-style-type: none"> • Data Communications and Networking, B.A. Forouzan, McGraw-Hill. • Data and Computer Communications : W.Stallings, , Prentice-Hall, 5th Ed., 1997. • Computer Networking : James F. Kurore & Keith W. Rose , Pearson Education, Third Edition, 2005. • Communication Networks : Fundamentals Concepts and Key Architecture : Alberto Leon-Garcia and Indra Widjaja, , Tata McGraw-Hill Publishing Company Limited, ISBN 0-07-0402235-3. • Data and Network Communication : Michael A. Miller, Delmar Thomson Learning inc. ISBN 0-07668-1100-X. • Introduction to Computer Networks : Douglas E. Comer , Prentice-Hall. • Alberto Leon-Garcia and Indra Widjaja, Communication Networks –Fundamentals Concepts and Key Architecture , Tata McGraw-Hill Publishing Company Limited, ISBN 0-07-0402235-3
4-.Electronic Materials, Web Sites etc
5- Other learning material such as computer-based programs/CD, professional standards/regulations

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.): One Lecture Room of sixty sitting capacity with LCD.
2. Computing resources

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: University has already adopted student feedback system to improve upon effectiveness of teaching.

2 Other Strategies for Evaluation of Teaching: Asking the related questions from the students on the other day of teaching the topic, so as to evaluate adaptiveness of students towards the subject and related topics.

3 Processes for Improvement of Teaching

- i) Revision of topics already taught on periodic basis,
- ii) Conducting the mock tests after the completion of topics.
- iii) Additional attention to be given to weak students.
- iv) Usage of real life examples for the lively explanation of cumbersome technical topics.