

**NEW YORK CITY COLLEGE OF TECHNOLOGY
THE CITY UNIVERSITY OF NEW YORK**

DEPARTMENT: Electrical and Telecommunications Engineering Technology

SUBJECT CODE: TCET4140/TC740

TITLE: Telecommunications Network Management

COURSE DESCRIPTION: This course deals with the technical management of a telecommunication network, personnel tasks, staffing patterns suitable to diverse telecommunications firms and users, with an overview of the issues facing the network manager. Included are studies of cost and trade-offs involved in the design and operation of a telecommunications network. Reliability, MTBF, RFP, and MTTR life cycle are analyzed. Traffic patterns and the study of equipment/manpower balance considerations are covered.

Prerequisite: TCET 3142/TC 570

Pre- or Corequisite: ECON 1101/EN 101

TEXTBOOK: Haojin Wang,
Telecommunications Network Management
McGraw-Hill, 2000, ISBN 0-07-068170-8
Plus supplemental handouts

COURSE OBJECTIVES/COURSE OUTCOMES:

Upon completion of this course, students will possess the ability to:

1. Describe the five major areas of network management and their interrelationship. Describe the major components of a Network Management System and list network objects to be managed.

Describe the major components of SNMP.

(ABET Criterion 2a, 2b, 2c, 2f)

2. Understand the importance of the Service Level Agreement in directing all Network Management activities. The students will be able to describe the major components of the agreement. Describe methods for improving network availability and avoiding service-affecting faults. Describe and calculate response time, throughput, utilization, and availability in a network.

(ABET Criterion 2a, 2b, 2f)

3. Describe the different threats to a communications network, both active and passive. Describe the challenges that are presented in the cost allocation of complex communications systems and to describe some approaches. Know the concept of IP modeling for data and be familiar with the voice modeling techniques. (ABET Criterion 2a, 2b, 2f)

4. Estimate throughput, response time and utilization in a data communications network. Estimate the availability of network components based on given statistical information and the overall availability of a network given the availability of the components.

(ABET Criterion 2a, 2b, 2c, 2f)

5. Describe the performance versus cost trade-off required to construct a network to meet given Service Level Objectives. (ABET Criterion 2a, 2b, 2d, 2f)

TOPICS: General Architecture of a Network Management System; Network Maintenance and Upgrades; Basic Network Troubleshooting; Performance and Fault Management; Accounting and Security Management; Sizing and Optimizing Voice Networks; Cost justification of implementing network management solutions; Introduction to cash flow analysis. Managing telecommunications for the enterprise.

CLASS HOURS: 3
CREDITS: 3
PREPARED BY: Xinzhou Wei, Assistant Professor
Bob O'Brien, Adjunct lecturer
Frank Paccione, Adjunct Lecturer
Fall 2006

COURSE COORDINATOR: Professor M. Razani
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GRADING POLICY:
Homework (2).....20% (10% for each assignment)
First Exam.....25%
Second Exam.....25%
Final Project.....30%

SCORE AND GRADES:

Quality Points	Numerical	Letter Grade Equivalent
4.0	93-100	A
3.7	90-92.9	A-
3.3	87-89.9	B+
3.0	83-86.9	B
2.7	80-82.9	B-
2.3	77-79.9	C+
2.0	70-76.9	C
1.0	60-69.9	D
0.0	59.9 and below	F

ATTENDANCE REQUIREMENT:
A student is allowed to be absent not more than twice during the semester. A student is late if he/she appears after attendance is taken. Three lateness are equal to one absence.

Assessment

The following assessment techniques are correlated to the course objectives as follows: In addition, each assessment technique incorporates one or more of the following ABET Criterion 2 outcomes (2a, 2b, 2c, 2d, 2e, 2f, 2g, 2h, 2k).

COURSE OBJECTIVES	ASSESSMENT Evaluation methods and criteria
Upon the completion of the course, the student should be able to :	Students will be assessed based on their ability to:
Describe the five major areas of network management and their interrelationship. Describe the major components of a Network Management System and list network objects to be managed. Describe the major components of SNMP.	The student must be able to describe the improvements made between SNMP versions 1 and 2 and MIB-1 and MIB-2.
Understand the importance of the Service Level Agreement in directing all Network Management activities. The student must be able to describe the major components of the agreement. Describe methods for improving network availability and avoiding service-affecting faults. Describe and calculate response time, throughput, utilization, and availability in a network.	The students will demonstrate how to improve the network availability to avoid service affecting faults, how to calculate the response time, throughput, utilization, and availability in a network.
Describe the different threats to a communications network, both active and passive. Describe the challenges that are presented in the cost allocation of complex communications systems and to describe some approaches. Know the concept of IP modeling for data and be familiar with the voice modeling techniques.	The students will identify all kinds of threats for a communication network. They will also show the comprehensions of IP modeling and voice modeling techniques.
Estimate throughput, response time and utilization in a data communications network. Estimate the availability of network components based on given statistical information and the overall availability of a network given the availability of the components.	The student must be able to show the methods of estimating throughput, response time and utilization in a network. Know how to estimate the different treatment of capital acquisition costs and recurring expenses. The student must be able to show the impact of propagation delay, line speed, and error rate on the network performance.
Describe the performance versus cost trade-off required to construct a network to meet given Service Level Objectives.	Students must demonstrate the methods to develop an approach to a business problem requiring network services in a logical manner. Identify more than 25 tasks that a telecommunications manager performs in the normal course of work.

WEEK NO.	TOPICS	READING ASSIGNMENT	HOMEWORK PROBLEMS
1	Introduction. What is Network Management? Critical Success Factors in Network Management.	Chapters 1,	Exercises 1.1-1.5,
2	Network management General Architecture of a Network Management System	Bigelow chapter 28 handout Wang Chapter 7	Exercises 7.1, 7.2, and 7.7
3	Site Visit NYC Transit Network Center		130 Livingston Plaza 5:45 PM sharp
4	Network Maintenance and Upgrades	Bigelow chapter 22 handout	
5	Configuration Management	Chapter 8, pp. 279-299	Homework # 1 – Depict a network. Assigning Real Managed Object names, Generic Managed Object names and Domains to each network object.
6	Provisioning	Readings from Flanagan handouts	
7	Basic Network Troubleshooting Performance and Fault Management	Bigelow Chapter 29 Wang Chapters 9 – 10	Exercises 9.3-9.8, 10.1-10.8
8	Review and Midterm		
9	Troubleshooting with a Protocol Analyzer	Bigelow Chapter 30	
10	Accounting and Security Management	Chapters 11 – 12	Exercises 11.3-11.4, 12.1-12.2, 12.4-12.10
11	Sizing and Optimizing Voice Networks.	Chapter 8, pp. 271-279	Exercises 8.1-8.5
12	Sizing and Optimizing Networks (continued)	OPNET Modeler	Homework # 2 – Using OPNET examples & tables, determine the process to model private and public network connections
13	Network Availability calculations	Chapter 8,	Exercises 8.6-8.8

	Cost justification of implementing network management solutions. Introduction to cash flow analysis.	pp. 273-293, 305-306 Chapter 11, pp. 407-421, 426-433	Exercises 11.1-11.2, 11.5-11.8
14	Managing telecommunications for the enterprise. Guest Lecture	Chapter 6, pp.195-226; Chapter 13, pp. 486-500	Exercises 6.1-6.4, 13.1-13.7
15	Final exam. Final Project due.		