17CS42O4 - NETWORK MANAGEMENT

(Common to ECE, EEE, CE and ME)

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| **Course Category:** | Open Elective | **Credits:** | 3 |
| **Course Type:** | Theory | **Lecture – Tutorial – Practical:** | 2-2-0 |
| **Prerequisite:** | Networking essentials and basics of Internet is required | **Sessional Evaluation:**  **Univ. Exam Evaluation:**  **Total Marks:** | 40  60  100 |
| **Objectives** | * To understand the need for interoperable network management. * To learn to the concepts and architecture behind standards based network management. * To understand the concepts and terminology associated with various protocols * To understand network management as a typical distributed application to explore management issues | | |

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| **Course Outcomes** | Upon successful completion of the course, the students will be able to: | |
| CO1 | Analyze the issues and challenges pertaining to management of emerging network technologies such as wired/wireless networks and high-speed internets. |
| CO2 | Apply network management standards to manage practical networks |
| CO3 | Study the role of Network Management in SNMP. |
| CO4 | Study RMON and broadband access network and supporting technologies for network establishment. |
| CO5 | Learn ADSL network and its merits and demerits based on various applications |
| CO6 | Identify the various components of network and formulate the scheme to manage it. |
| **Course Content** | UNIT – I  **Introduction**: Analogy of Telephone Network Management, Data and Telecommunication Network Distributed computing Environments.  **TCP/IP-Based Networks**: The Internet and Intranets, Communications Protocols and Standards- Communication Architectures, Protocol Layers and Services;  **Case Histories of Networking and Management**: The Importance of topology, Filtering Does Not Reduce Load on Node, Some Common Network Problems; Challenges of Information Technology Managers.  **UNIT – II**  **Network Management**: Goals, Organization, and Functions- Goal of Network Management, Network Provisioning, Network Operations and the NOC, Network Installation and Maintenance; Network and System Management, Network Management System platform, Current Status and Future of Network Management.  **Basic Foundations - Standards, Models, and Language**: Network Management Standards, Network Management Model, Organization Model, Information Model – Management Information Trees, Managed Object Perspectives, Communication Model;  **UNIT - III**  **ASN.1:** Terminology, Symbols, and Conventions, Objects and Data Types, Object Names, An Example of ASN.1 from ISO 8824; Encoding Structure; Macros, Functional Model.  **SNMPv1 Network Management**: Managed Network: The History of SNMP Management, Internet Organizations and standards, Internet Documents, The SNMP Model, The Organization Model, and System Overview.  **The Information Model**: Introduction, The Structure of Management Information, Managed Objects, Management Information Base. The SNMP Communication Model – The SNMP Architecture, Administrative Model, SNMP Specifications, SNMP Operations, SNMP MIB Group, Functional Model SNMP Management.  **UNIT – IV**  **RMON**: Remote Monitoring, RMON SMI and MIB, RMONI1- MON1 Textual Conventions, RMON1 Groups and Functions, Relationship Between Control and Data Tables, RMON1 Common and Ethernet Groups, RMON Token Ring Extension Groups, RMON2 – The RMON2 Management Information Base, RMON2 Conformance Specifications.  **Broadband Access Networks, Broadband Access and HFCT Technology**: The Broadband LAN, The Cable Modem, The Cable Modem Termination System, The HFC Plant, The RF Spectrum for Cable Modem; Data Over Cable, Reference Architecture; HFC Management – Cable Modem and CMTS Management, HFC Link Management, RF Spectrum Management, DSL Technology;  **UNIT – V**  **Asymmetric Digital Subscriber Line Technology**: Role of the ADSL Access Network in an Overall Network, ADSL Architecture, ADSL Channelling Schemes, ADSL Encoding Schemes; ADSL Management – ADSL Network Management Elements, ADSL Configuration Management, ADSL Fault Management, ADSL Performance Management, SNMP -Based ADSL Line MIB, MIB Integration with Interfaces Groups in MIB-2, ADSL Configuration Profiles.  **Network Management Applications**: Configuration Management: Network Provisioning, Inventory Management, Network Topology, Fault Management- Fault Detection, Fault Location and Isolation 24 Techniques, Performance Management – Performance Metrics, Data Monitoring, Problem Isolation, and Performance Statistics.  **UNIT – VI**  Event Correlation Techniques, Rule-Based Reasoning, Model-Based Reasoning, Case Based Reasoning, Codebook correlation Model, State Transition Graph Model, Finite State Machine Model, Security Management – Policies and Procedures, Security Breaches and the Resources Needed to Prevent Them, Firewalls, Cryptography, Authentication and Authorization, Client/Server Authentication Systems, Messages Transfer Security, Protection of Networks from Virus Attacks , Accounting Management, Report Management, Policy- Based Management, Service Level Management. | |
| **Text Books and References:** | **Text Books:**   1. Mani Subramanian: Network Management- Principles and Practice, 2nd edition, Pearson Education 2010.   **Reference Books:**   1. J. Richard Burke: Network management Concepts and Practices: a Hands-On Approach, PHI, 2008. | |
| **E-Resources** | 1. [**https://nptel.ac.in/courses**](https://nptel.ac.in/courses) 2. [**https://freevideolectures.com/university/iitm**](https://freevideolectures.com/university/iitm) | |