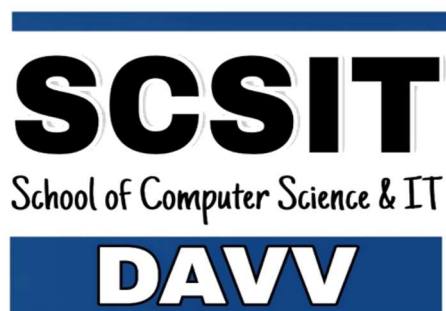# SYLLABUS

MTech (NM & IS)

1st SEMESTER

To produce world-class professionals who have excellent analytical skills, communication skills, team building spirit and ability to work in cross cultural environment.

To produce international quality IT professionals, who can independently design, develop and implement computer applications.

Professionals who dedicate themselves to mankind, who are environment conscious, follow social norms and ethics.

School of Computer Science & IT,
Devi Ahilya Vishwa Vidyalaya, Indore
www.scs.dauniv.ac.in

Course Name: **MTech (NM & IS) 1st Semester**

Subject Code: **CS-6624**

Subject Name: **Network Management**

Aim of the Subject

To familiarize the student with the design, analysis, operation and management of data communications networks.

Learning Outcomes

The students are expected to learn following after completion of the course:

- 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 connectionoriented
- 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 perceptive.
- Understand the SMTP protocol and its working in detail.
- Understand the basic concepts of broadband network Telecommunication network and their management.

Unit 1

Introduction: Computer Network, Goals and Applications, Data Communications and Network Management Overview : Communications protocols and Standards. 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.

Fundamentals of computer network technology: Network Topology, LANs, Network node components Hubs, Bridges, Routers, Gateways, Switches, WAN, ISDN Transmission Technology. Network Management Standards, Network Management Model, Organization Model, Information Model, Communication Model, ASN.1, Encoding Structure.

Unit 2

SNMPv1 Network Management: Managed network: Case Histories and Examples, The History of SNMP Management. The SNMP Model, The Organization Model, System Overview. The Information Model, The SNMP Communication Model, Functional Model.

SNMPv2 Management: Major Changes in SNMPv2, SNMPv2 System Architecture, SNMPv2 Structure of Management Information. The SNMPv2 Management Information Base, SNMPv2 Protocol, Compatibility with SNMPv1.

Unit 3

SNMP Management-RMON: Introduction, RMON SMI and MIB, RMON1.

Broadband Network Management-ATM Networks: Broadband Networks and Services, ATM Technology, ATM Network Management.

Unit 4

Broadband Network Management: Broadband Access Networks and Technologies, HFC Technology, HFC Management, DSL Technology, ADSL Technology, ADSL Management.

Telecommunication Management Network: Introduction, Operations Systems, TMN conceptual Model, TMN Architecture, TMN Management Service Architecture, An integrated view of TMN.

Unit 5

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.

Network Management Applications: Configuration management, Fault management, performance management. Event Correlation Techniques, security Management, Accounting management, Report Management, Policy Based Management Service Level Management.

Text Book(s)

• Mani Subrahmanian, Network Management: Principles and Practice, Pearson Education, 2nd Edition 2010.

Reference Material(s)

- Morris, Network management, Pearson Education.

- Mark Burges, Principles of Network System Administration, Wiley Dreamtech Publication.

- Paul, Distributed Network Management, John Wiley Publication.

- Andrew S. Tanenbaum, Computer Networks, Addison-Wes

Course Name: **MTech (NM & IS) 1st Semester**

Subject Code: **CS-6220**

Subject Name: **Internet Programming Using Java**

Aim of the Subject

To make students learn fundamental concept of coding and perform them practically and to develop problem-solving skills

Learning Outcomes

The students are expected to learn following after completion of the course:

- Have understanding of concepts logically.
- Have improvement of mathematical logics.
- understand of concepts practically of inheritance ,exceptional handling,
- multithreading ,applets and Jdbc.
- Have understanding of Jsp lifecycle and connection of Jsp with different
- database like oracle, ms-sql server and performing operations.

Unit 1

Review of java concepts: Features of Java, Object-oriented programming overview, Introduction of Java Technologies, How to write simple Java programs, Data Types, Variables, Memory concepts, control statements, looping, Method Call Stack and Activation Record, Argument Promotion and Casting, Scope of declaration and Method Overloading, String Handling: The String constructors, String operators, Character Exaction, String comparison, String Buffer. Arrays: Declaring and Creating Arrays, Enhanced for Statement, Passing Arrays to Method, Multidimensional Arrays, Variable-Length Argument lists, Using Command-line Arguments

Unit 2

Inheritance: Extending classes & related things. Packages and Interfaces: Defining a Package, Understanding CLASSPATH, Access Protection, Importing packages, creating own packages Exception Handling: Introduction, overview of doing it and keywords used, when to use it, Multithreading: What are threads, The java thread

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model, Thread priorities, Thread life cycle, Thread Synchronization, Applets: Applet basics, Applet Architecture, Applet life cycle methods, Database connectivity: JDBC, The design of JDBC, Typical uses of JDBC

Unit 3

Introduction to HTTP, web Server and application Servers, Installation of Application servers, Config files, Web.xml. Java Servlet, Servlet Development Process, Deployment Descriptors, Generic Servlet, Lifecycle of Servlet. Servlet Packages, Classes, Interfaces, and Methods, Handling Forms with Servlet, Various methods of Session Handling, various elements of deployment descriptors.

Unit 4

JSP Basics: JSP lifecycle, Directives, scripting elements, standard actions, implicit objects. Connection of JSP and Servlet with different database viz. Oracle, MS-SQL Server, MySQL. java.sql Package. Querying a database, adding records, deleting records, modifying records, types of Statement. Separating Business Logic and Presentation Logic, Building and using JavaBean. Session handling in JSP, Types of errors and exceptions handling.

Unit 5

MVC Architecture Introduction to Remote Method Invocation, Introduction to Enterprise Java Bean, Types of EJB, Creating and working with Session Bean

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Text Book(s)

1. Java 2: The Complete Reference by Herbert Schildt, Tata McGraw- Hill, 8th Edition, 2011.

2. K. Mukhar, "Beginning Java EE 5: From Novice to Professional", Wrox Press.

Reference Material(s)

1. The Java Programming Language, Ken Arnold , James Gosling , David Holmes, 3rd Edition, Person Education, 2000.

2. Head First Java, Kathy Sierra, Bert Bates, O'Reilly Publication, 2nd Edition, 2005

3. M. Hall, L. Brown, "Core Servlets and Java Serve

Course Name: **MTech (NM & IS) 1st Semester**

Subject Code: **CS-6516**

Subject Name: **Advanced Operating Systems**

Aim of the Subject

To understand the principles in the design of distributed, multiprocessor and database operating systems.

Learning Outcomes

The students are expected to learn following after completion of the course:

- To get a comprehensive knowledge of the architecture of distributed systems.
- To understand the scheduling, process migration and shared memory issues and their solutions in distributed environments.
- To study and the distributed file system and naming for distributed computing environments.
- To get a knowledge of multiprocessor operating system and database operating systems.

Unit 1

Review of Operating System Concepts: Process management, Synchronization, Interprocess Communication techniques, Processor Scheduling, Memory Management, Device Management, File System etc. Limitations of centralized and uniprocessor operating systems. Need of advance operating systems, Types of advance operating systems.

Unit 2

Distributed Systems: Difference between network and distributed operating systems, Design objectives and features of distributed operating systems, Distributed systems architectures, distributed system software, and distributed operating systems.

Unit 3

Resource Management in distributed Computing:

(i)   Distributed Scheduling, process management, process migration

(ii)   Distributed Shared Memory

(iii)   Distributed File System: File caching, replication management, Naming of resources, name resolution process.

Unit 4

Process management in distributed operating systems: Process synchronization and IPC, RPC, Clock synchronization, mutual exclusion, deadlock handling, security aspects, case studies.

Unit 5

Multiprocessor systems: Multiprocessor architecture, multiprocessor Operating systems, process synchronization and IPC, processor scheduling, memory management.

Database Systems' support: Need of OS support for databases, concurrency control in database systems.

Text Book(s)

[i]   Distributed Operating Systems (Concept and Esign), II Edition, P. K. Sinha, PHI, 1997.

[ii]   Advance Concepts in Operating Systems, MukeshSinghal, Niranjan G. Shivaratri, Mc Graw Hills, 1994.

Reference Material(s)

[iii]   Modern Operating Systems(III Edition) , Andrew S.Tanenbomb, Pearson.

[iv]   Distributed Systems (Concept and Design), II Edition, GEprgeCouloris, Jean Dollimore and Tim Kindberg, Addison-Wesley, 1994.

Course Name: **MTech (NM & IS) 1st Semester**

Subject Code: **CS-5615**

Subject Name: **Information Security**

Aim of the Subject

The main aim of this course is to provide students a background, foundation and insight into the many dimensions of information security.

Learning Outcomes

The students are expected to learn following after completion of the course:

- Explain the challenges and scope of information security.
- Explain such basic security concepts as confidentiality, integrity, and availability, which are used
- frequently in the field of information security.
- Explain the importance of cryptographic algorithms used in information security in the context
- of the overall information technology (IT) industry.
- Identify and explain symmetric algorithms for encryption-based security of information.
- Describe the access control mechanism used for user authentication and authorization.

Unit 1

Computer Security Concepts: Introduction to Information Security, Confidentiality, Integrity; Attacks and Threats: Attacks Threatening Confidentiality, Attacks Threatening Integrity, Attacks Threatening Availability; Active versus Passive attacks; Security Services, Security Mechanisms etc.

Unit 2

Symmetric Cipher Model: Cryptography, Cryptanalysis and Brute-Force Attack; Substitution Techniques: Caesar Cipher, Monoalphabetic Ciphers, Playfair Cipher, Hill Cipher; Polyalphabetic Ciphers, One-Time Pad; Transposition ciphers: keyless transposition ciphers, keyed transposition ciphers, combining two approaches; Steganography etc.

Unit 3

Stream Ciphers and Block Ciphers, Synchronous and Non-synchronous Stream Ciphers, Attacks on Block Ciphers, Substitution and Transposition, P-Boxes and S-Boxes, Diffusion and

Confusion, Feistel Cipher, DES Encryption and Decryption, Double and Triple DES, Strength and weakness of DES etc

Unit 4

AES General Structure, AES-128, AES-192 and AES-256, AES Transformation Functions: Substitute Bytes Transformation, Shift Rows Transformation, Mix Columns Transformation, Add Round Key Transformation, Strength and weakness of AES; Use of modern block ciphers: Electronic Codebook (ECB) Mode, Cipher Block Chaining (CBC) Mode, Cipher Feedback (CFB) Mode, Output Feedback (OFB) Mode and Counter (CTR) Mode; Use of stream ciphers: RC4 238 and A5/1

Unit 5

Public-Key Encryption, Introduction to Public-Key Cryptography, Public-Key Encryption Algorithms, RSA Public-Key Algorithm, Diffie-Hellman Algorithm; Access Control Mechanisms, Authentication, Access Control and Authorization, Security Protocols and Solutions, Internet Protocol Security, Firewalls, Intrusion Detection, and Intrusion Prevention.

Text Book(s)

William Stallings,"Cryptography and Network Security: Principles and Practice", 6th Edition, Pearson/Prentice- Hall.

Reference Material(s)

1. Behrouz A. Forouzan "Introduction to Cryptography and Network Security", McGraw-Hill Higher Education, 2008

2. Atul Kahate; "Cryptography and Network Security"; Tata McGraw-Hill

3. Mathew Bishop; Computer Security; Art and Science; Addison-Wisley Oct.

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Course Name: **MTech (NM & IS) 1st Semester**

Subject Code: **CS-6622**

Subject Name: **Advanced Computer Network**

Aim of the Subject

This course aims to provide advanced background on relevant computer networking topics to have a comprehensive and deep knowledge in computer networks. Laboratory Work: consists of creating simulated networks and passing packets through them using different routing techniques.

Learning Outcomes

The students are expected to learn following after completion of the course:

- To identify and discuss the concepts underlying IPv6 protocol, and their main
- characteristics and functionality.
- To understand the principles and functionality of mobile IP, explaining its concretization
- in IPv6; to understand the needs of optimization of the mobility mechanisms and
- description of some extensions that aim to reduce handover latency and requirements
-
- To recognize the need for service integration and discuss how it can be accomplished.

Unit 1

Review of Basic Network Architectures: OSI reference model, TCP/IP reference model, ATM reference model; Applications (WWW, Audio/Video Streaming, Video conference, Networked Games, Client/Server); Traffic Characterization (CBR, VBR); Switching Paradigms; Multiplexing; Error Control; Flow Control, SONET, Optical Networks.

Unit 2

Local Area Network Technologies: Wired LANS: Ethernet Protocol, IEEE MAC Sublayer protocols - 802.3, 802.4, 802.5 and their management, Fast Ethernet, Gigabit Ethernet, Wireless LANs, IEEE 802.11 Project, Bluetooth, Connecting LANs.

Unit 3

Internetworks: Host-to-Host Delivery, Addressing - classful and classless addressing, subnetting and supernetting. Internetworking: Interdomain Routing, Border Gateway Protocol version 4, IPv6, Multicast Routing Protocols, Multi-Protocol Label Switching, Virtual Private

Networks, High speed transport protocols, Quality of Service Mechanisms, Improving QoS in Internet.

Unit 4

Distributed Systems: Naming, DNS, DDNS, Paradigms for Communication in Internet, Caching, Issues of Scaling in Internet and Distributed Systems, Caching Techniques for Web, Protocols to Support Streaming Media, Multimedia Transport Protocols, Content Delivery Networks, Overlay and P2P Networks.

Unit 5

Applications and Other Networking Technologies: RTP, RTSP, SIP, VoIP, Security Systems, SSH, PGP, TLS, IPSEC, DDoS Attack, Mitigation in Internet, Security in MPLS; Introduction to Cellular, Satellite and Ad hoc Networks.

Text Book(s)

1. Behrouz A. Forouzan, Data Communications and Networking, Fourth Ed., Tata McGraw Hill.

2. 2. Larry L. Peterson and Bruce S. Davie, Computer Networks: A Systems Approach, Fourth Ed., Morgan Kaufmann .

Reference Material(s)

1. Jean Walrand and Pravin Varaiya, High performance Communication Networking, 2nd Ed., Morgan Kaufmann, 1999.

2. Markus Hoffmann and Leland R. Beaumont, Content Networking: Architecture, Protocols, and Practice, Morgan Kaufmann, 2005.