Tilak Maharashtra Vidyapeeth
Department of computer Science

Subject –Principles and practices of Management (PPM)(MCA-200-22)

Sr. No.	Chapter / Topic Details	No. of hours
1	*Nature of management :* a. Meaning , Definition b. Nature of mgmt. c. Importance of mgmt. d. Functions of mgmt. e. Management as an art , a science and a profession f. Distinguish between management, organization and administration	*2*
2	*Evolution of Mgmt. thought :* a. Contribution of F.W.Taylor b. Contribution of Henry Fayol c. Contribution of Elten Mayo d. Various approaches to management	2
3	*Planning :* e. Meaning, definitions f. Nature , objectives g. Importance h. Process of planning i. Types of plans j. Advantages k. Disadvantages	2

4	*Organizing:*
	l. Meaning and definitions
	m. Importance of organizing
	n. Features of organizational structure
	o. Types of organization:
	   a. Line
	   b. Line and staff
	   c. Functional
	   d. Committee
	e. Departmentalization
	f. Span of management
	g. Delegation of authority
		4

	h. Centralization and decentralization	

5	*Motivation:*
	    a. Meaning and definitions
	    b. Objectives
	    c. Theories of motivation
	        a. Maslow's theory of hierarchy of needs
	        b. Herzberg's two factor theory
	        c. McClelland's theory
	        d. Expectancy theory
	        e. Equity theory
	        f. Reinforcement theory
	    d. Special motivational techniques
		4

6	*Leadership:*
	    a. Meaning and definitions
	    b. Features
	    c. Importance
	    d. Theories
	        a. Great man
	        b. Trait
	        c. Situational
	        d. Behavioral
	        e. Followers
	        f. Managerial grid
	        g. Path goal
	    e. Styles of leadership
	        a. Autocratic
	        b. Participative
	        c. Laissez faire
	    f. Qualities of a leader
		4

7	*Recent trends in management:*
	    a. Stress mgmt
	    b. Total quality mgmt.
	    c. Disaster mgmt.
	    d. Event mgmt.
		3

Subject: Green Computing(MCA-201-22)

Sr. No.	Chapter / Topic Details	No. of hours
1	**Introduction to Green Computing** • Introduction • Environmental Concerns • Why Should You Go Green? • Environmental Impacts of IT • Approach to Greening IT	3
2	**Green Devices and Software** • Green Hardware: Life Cycle of a Device or Hardware • Design & Manufacturing • Packaging and Transportation • Use, Reuse, Recycle and Dispose • Green Software: Processor Power States • Energy-Saving Software Techniques • Computational Efficiency • Data Efficiency • Context Awareness • Idle Efficiency • Evaluating and Measuring Software Impact to Platform Power • Fluke NetDAQ® (Networked Data Acquisition Unit) • Software Tools	4
3	Green Data Centers & Communication • Data Centers and Associated Energy Challenges • Data Centre IT Infrastructure: Servers, Networking, Storage & IT Platform Innovation • Data Centre Facility Infrastructure: Implications for Energy Efficiency • Power System, Cooling, Facilities Infrastructure Management • IT Infrastructure Management: Server Power, Consolidation, Virtualization • Green Data Centre Metrics: PUE and DCiE • Power versus Energy Consumption	4
4	**Green Networking:** • Introduction:	5

	• Green Network Communications and Management • The Challenge of Next-Generation Networks • Benefits of Energy-Efficient Networks • Objectives of Green Networking • Core Components in Green-Networking Technology • Objectives of Green Network Protocols: • Energy-Optimizing Protocol Design • Bit Costs Associated with Network Communication Protocols • Objectives of Green Network Protocols • Green Network Protocols and Standards • Strategies to Reduce Carbon Emissions • Contributions from the EMAN Working Group • Contributions from Standardization Bodies • Context Detail to Drive Energy Efficiency	
5	**UNIT 5: REGULATING GREEN IT: Laws, Standards and Protocols** • The Regulatory Environment and IT Manufacturers: RoHS, REACh, WEEE • Nonregulatory Government Initiatives • Industry Associations and Standards Bodies • Green Building Standards • Social Movements and Greenpeace	3

Subject: Advanced Database Management (MCA-202-22)

Sr. No.	Chapter / Topic Details	No. of hours
1	**Relational Model** Introduction, Attributes and Domains, CODD's Rules, Relational Integrity: Domain, Referential Integrities, Enterprise Constraints, Database Design: Features of Good Relational Designs, Normalization, Atomic Domains and First Normal Form, Decomposition using Functional Dependencies, Algorithms for Decomposition, 2NF, 3NF, BCNF, Modelling Temporal Data.	5
2	**SQL AND PL/SQL SQL:** Characteristics and advantages, SQL Data Types and Literals, DDL, DML, DCL, TCL, SQL Operators. Tables - Creating, Modifying, Deleting, Views - Creating, Dropping, Updating using Views, Indexes.	7
3	SQL DML Queries - SELECT Query and clauses, Set Operations, Predicates and Joins, Set membership, Tuple Variables, Set comparison, Ordering of Tuples, Aggregate Functions, Nested Queries, Database Modification using SQL Insert, Update and Delete Queries. PL/SQL- Stored Procedures & Functions, Cursors, Triggers.	8
4	**Object Oriented Database** Limitations of Relational databases, the need of Object-oriented databases, Complex Data Types, Structured Types and Inheritance in SQL, Table Inheritance, Data types (arrays, multi-set etc) and structure in Object oriented databases using SQL, Object-Identity and Reference Types in SQL, ODL and OQL, Implementing O-R Features, Persistent Programming Languages, Object-Oriented versus Object-Relational, An Example of Object oriented and object relational database implementation.	5
5	**Database Transactions and Query Processing** Basic concept of a Transaction, Transaction Management, Properties of Transactions, Concept of Schedule, Serial Schedule, Serializability - Conflict and View, Cascaded Aborts, Recoverable and Non-recoverable Schedules, Concurrency Control - Need, Locking Methods, Deadlocks, Timestamping Methods, Recovery methods - Shadow-Paging and Log-Based Recovery, Checkpoints, Query Processing, Query Optimization, Performance Tuning.	6
6	**Parallel and Distributed Databases** Introduction to Database Architectures - Multi-user DBMS Architectures, Oracle Architecture. Parallel Databases Speedup and Scale up, Architectures of Parallel Databases. Distributed Databases - Architecture of Distributed Databases, Distributed Database Design, Distributed Data Storage, and Distributed Transaction - Basics, Failure modes, Commit Protocols,	6

	Concurrency Control in Distributed Database.	
7	**NoSQL Database** Introduction to NoSQL Database, Types and examples of NoSQL Database-Key value store, document store, graph, Performance, Structured verses unstructured data, Distributed Database Model, CAP theorem and BASE Properties, Comparative study of SQL and NoSQL, NoSQL Data Models, Case Study-unstructured data from social media. Introduction to Big Data, HADOOP: HDFS, MapReduce	**6**

Reference Books

1. R. Ramakrishnan, J. Gehrke, Database Management Systems, McGraw Hill
2. A. Silberschatz, H. Korth, S. Sudarshan, Database system concepts, 5/e, McGraw Hill
3. Connally T., Begg C., "Database Systems", 3rd Edition, Pearson Education, 2002, ISBN 81-7808- 861-4

Subject: Object Oriented Programming (MSC-201-19)

Sr. No.	Chapter / Topic Details	No. of hours
1	**Introduction to Object Oriented programming, Characteristics** Advantages of object Oriented programming over procedural.	4
3	**Introduction to C++, Extension of C** New, delete operator, Data types, constants, references, Variable, Inline functions, default parameters, Static members.	5
4	**Introduction to C++ Classes** Members data, Functions, Scope resolution operator, Encapsulation, Access specifier, Constructor, destructor, copy constructor, This pointer.	7
5	**Overloading** Function Overloading, Operator Overloading, and Canonical form.	6
6	**Inheritance** Base class, derived class, Constructor / destructor calling sequences, Access specifier in sequence, Virtual Class, Abstract class.	6
7	**Polymorphism Stream Class, File Input/output**	5
8	**Exception Handling.**	4

Reference Books:

- Complete Reference C++
- Object oriented programming C++ - Robert Lefore
- C++ - Yashwant Kanitkar
- Object oriented programming language C++ - Balguruswami

Subject: CTIT(MCA-204-22)

Sr. No.	Chapter / Topic Details	No. of hours
I	**Cyber Security** • IT Act 2008 o Provisions in Indian Laws in dealing with Cyber Crimes and its critical analysis o Information Technology Act, 2000. o Penalties Under IT Act o Offences Under IT Act o Offences Related With Digital Signature and Electronic Signature Under IT Act o Statutory Provisions o Establishment of Authorities under IT Act and their functions, powers, etc o Controller o Certifying Authorities o Cyber Regulation Appellate Tribunal o Adjudicating officer • Intellectual Property Rights and & Digital Copy Right o Objects of copyright o Requirement and Meaning of copyright o Copyright as bundle of rights o Framing o Linking & infringement o Information Technology act related to copyright and Acts which are not infringement of Music & copyright infringement o Moral rights and internet prospective on intellectual property rights o Domain name Disputes	4
2	**Types of Cyber Crimes:** • Unauthorized Access • Packet Sniffing • Malicious Codes including Trojans, Viruses, Logic Bombs, etc. • Phishing and its variants • Web Spoofing and E-mail Spoofing • Cyber Stalking • Web defacement • Financial crimes, ATM and Card Crimes, etc. • Spamming • Commercial espionage and Commercial Extortion online	4

	- Software and Hardware Piracy - Money Laundering - Fraud & Cheating - Other Cyber Crimes - Hacking Techniques - Password Cracking - Insecure Network connections - Malicious Code - Spoofing - Hijacked session attacks - Polymorphism - Steganography - Reversing stenographic process - Counter or anti forensics - Cloaking Techniques (Data Hide and Seek), - Renaming and Manipulating File System, - Data Hiding on NTFS with Alternate data Stream - Cryptography	
3	Computer Security Network Security - Firewall - Intrusion Detection and Prevention System - Honeypots - Anti-Malware software. - Network based Intrusion detection Systems. - Network based Intrusion Prevention Systems. - Host based Intrusion prevention Systems. - Security Information Management. - System Integrity Validation.	**4**
4	Blockchain Introduction - Basic ideas behind block chain - How it is changing the landscape of digitalization - Introduction to cryptographic concepts required, - Hashing, public key cryptosystems, - Private vs public blockchain and use cases, Hash Puzzles, - Introduction to Bitcoin Blockchain and scripts, - Use cases of Bitcoin Blockchain scripting language in micropayment, escrow etc, - Downside of Bitcoin – mining.	**4**

5	**Alternative Crypto currencies** - Ethereum and Smart contracts, - The real need for mining – consensus –Byzantine Generals Problem, - Consensus as a distributed coordination, problem - Private or permissioned blockchains - Introduction to Hyperledger Permissioned Blockchain and use cases – Hyperledger, Corda, - Uses of Blockchain in E-Governance, Land Registration, Medical Information Systems, and others	5
6	**Introduction to IOT** Definition & Characteristics, History, Market share in different domains, IoT framework Recent IOT applications IoT enabling technologies, WSN, SCADA, Cloud computing, Big data analytics communication technologies, Embedded systems • **IoT Key technologies** Structural aspects of the IoT, IoT Environment characteristics Scalability, Interoperability, Security& privacy, openness Communication technologies - Zigbee, NFC, RFID, Z-Wave, IEEE 802.15.4, HART, Connectivity technologies - Bluetooth.	4
7	**Sensors Network** Definition of the term Sensing, types of sensors, sensor classes based on types (analog, digital) based on data types (scalar , vector) Transducer, Actuators, Types of sensors (light, sound, temperature, pressure , chemical) , Types of actuators, examples and working, RFID principles and components, wireless sensors Network, M2M communication	4
8	**IoT privacy & security issues** Vulnerabilities of IoT, Security requirement, Threats, Use cases IoT security, Layered attack Model, Identity establishment, Access Control, Integrity, Non-repudiation and availability, Security model for IoT	4

Subject: Digital **Marketing (MCA-205-22)**

SR.NO	Chapter/Topic details	No of Hours
1	**Marketing Concepts** • Basics of Marketing, What is Digital Marketing? • Why Digital Marketing? • Google SERP, Crawler, Indexing, Ranking **Email Marketing** • What is Email marketing? • Email Marketing Strategies	2
2	**Introduction of Websites** • Domain Hosting • Website Google Analytics	4
3	**Search Engine Optimization** • What is SEO? • Website Optimization **SEO Content Writing** • What is Content Writing? • What is ContentMarketing? **On Page SEO** • Keyword Research, • Website Content • Image Optimization Header / Footer tags	6
4	**Social Media Marketing (SMM)** **& Social Media Optimization** **(SMO)** • Introduction to Social Media, Advantages Over Online Marketing, Social Media Strategy. Understanding Web and Mobile Marketing perspective. B to C Perspective, B to B Perspective • Face book Business Understanding of Facebook Marketing, Types of Facebook Advertising, Creating first ad on Facebook, Setting Campaign and optimization, Facebook Power Editor, Facebook Video Marketing, Facebook App & Shopping Marketing, Facebook ad library, Traffic and Leads Generation.	8

	• Twitter Advertising: Twitter Advertising, Types of Twitter Advertising, Creating first ad on Twitter Setting Campaign and optimization, Create conversion code, Twitter App Advertising, Twitter Video Advertising Leads & Traffic Advertising Increase followers, Twitter Marketing, Strategy and Planning, Tracking and Conversion. • YouTube Marketing: YouTube Marketing Strategy, Find Video Ideas with Competitor Analysis, Find Video Ideas with Keyword Research, Find Video Ideas with Keyword Research, YouTube Account Setup (Create business account with personal account), YouTube Account Optimization, YouTube Banner, YouTube Channel Tags , YouTube SEO ,Enable Custom Thumbnails, Manage Multiple YouTube Accounts , YouTube Monetization, YouTube Ads,	

Suggested Reference Books:

1. Digital Marketing, Prof. Seema Gupta, McGraw Hill Publications.
2. E- Marketing by Judy Strauss, Adel Ansary, Raymond Frost, Prentice Hall.
3. Social Media Marketing All-In-One for Dummies, Jan Zimmerman and Deborah.
4. Google AdWords for Beginners: A Do-It-Yourself Guide to PPC Advertising, Cory Rabazinsky.
5. Email Persuasion: Captivate and Engage Your Audience, Build
   Authority and Generate More Sales with Email Marketing, Ian Brodie

Subject: Advanced Computer Networks (MCA-206-22)

Semester	Third	Teaching Hrs = 60	
Subject Code	MCA-206-22		
Subject Name	Advanced Computer Network		
Teaching Scheme		**Examination Scheme**			
Teaching Hrs/Week	Practice/Assignment Hrs/Week	Total Hrs	External Exam	Internal Exam	Total Marks	Credits
4	**2**	**6**	**60**	**40**	**100**	**4**

Course Outcomes (COs)
After learning this course student will be able to,
  ∗ Understand the design of modern computer networks and protocols, including the Internet.
  ∗ Understand the workings of at least one actual TCP/IP protocol stack
  ∗ Learn to apply this understanding in modifying it or implementing additional protocols
  ∗ Identify and discuss the concepts underlying IPv6 protocol, and their main characteristics and functionality

Sr. No.	Chapter / Topic Details	No. of hours
1	**Introduction to Computer Networks** Types of Networks - PAN, LAN, MAN, WAN etc. Network Topologies - BUS, STAR, RING, MESH, TREE & Hybrid. Network Devices - NICs, Repeaters, HUBs, Switches, Bridges, Routers, Gateways, Modems. Type of Transmission Media - Guided Media - Coaxial Cables, UTP and STP cables, Fiber Optic Cables. Unguided Media - Wireless Media - Radio Waves, Micro Waves and Infrared.	**4**
2	**Networking Models** Centralized, De-centralized, Peer-to-Peer, Client-Server Model. Terminal Server, The Internet- Usages, advantages and disadvantages. IEEE Standards - 802 Standards. Ethernet, Fast Ethernet & Gigabit Ethernet, 10Base2, 10Base5 Media Standards, Ethernet Frames. IEEE 1394 Fire wire.	4

3	**Wireless Networks** Working of Wireless Networks, Wi-Fi Devices, Wireless Standards like 802.11a/b/g/n, Modes of operations - Peer to Peer and Ad hoc mode. Advantages and disadvantages of Wireless Networks. Wireless Security -WEP, 802.1x, WAP, WTLS, WPA1 and WPA2. 802.15 Bluetooth and Wi-Max.	4
4	**The OSI Model** OSI Reference Model, Function of each layer. TCP/IP model. Function of each layer. Working of TCP and IP protocol. IP Packet Header, ICMP and IGMP protocols. ARP Protocol, UDP protocol.	4
5	**Network Protocols** IPX, Netbeui, AppleTalk Protocols. IP addressing, IPv4 and IPv6 Comparison. IPv4 Classes - A, B, C, D and E. Subnetting, Subnet Masking, DHCP, Working of DHCP, Configuring DHCP Server in Windows Server 2008, Windows Server 2012 and Linux. Advantages and disadvantages of DHCP Server. TCP and UDP Ports. TCP and UDP Communication, Application Layer Protocols - NetBIOS over TCP, WINS, SMB/CIFS, Telnet, SSH, SNMP, WWW and HTTP, HTTPS, IPP, NNTP, FTP, FTP commands, NTP, RIP, Name Resolution - DNS, DNS Zones, Primary and secondary DNS, DDNS, Network tools - ipconfig, ifconfig, ping, Traceroute, nslookup, LDAP, NAT, PAT, Email Service - working of email service, Mail protocols - SMTP, POP3 and IMAP	10
6	**Switching Methods** Switching Methods- Circuit Switching, Packet Switching and Message Switching, Types of Internet connections - PSTN, DSL, Satellite, ISDN, X.25, Frame Relay, ATM, SONET, RAS, RDC, SLIP and PPP protocols, PPPoE	6
7	**VPN, Authentication Protocols, firewall and Proxies** VPN - Types of VPN- Site to Site VPN and Remote VPN, VPN Tunneling, Types of VPN Tunneling, Tunneling Protocols - IPSec, PPTP and L2TP, Advantages and disadvantages of VPN. Authentication Protocols - CHAP, MSCHAP, PAP, Kerberos, RADIUS, EAP, SSL and TLS. Firewall - Functions of Firewall, Types of Firewalls - Packet Filtering Firewall, Application-Level Gateway, Circuit Level Gateway, Hardware firewalls, Software Firewalls, Personal Firewalls, Advantages and	10

	Disadvantages of Firewalls. Proxy Server - Functions of Proxy Server, Types of Proxy Server - Forward Proxy, Reverse Proxy, Transparent Proxy, DNS Proxy, Uses of Proxy Server, Advantages and Disadvantages of Proxy Servers. IDS - NIDS and HIDS, Honeypots. Security threats - Denial of Service, Man in the Middle, Malware, Virus, WORM, Logic Bombs, Trojan Horse, Spyware. Wireless threats	
8	**Network Management** Network Documentation, Cable Diagrams, Network Diagrams, Hardware Configuration. Change Management. Network Monitoring - Logs, Sys logs, Event Viewer, Protocol Analyzer, Port Scanners, Vulnerability Scanners. Performance Optimization - Caching Data, Traffic Control, QoS. Fault Management - Fault Tolerance - Power, Link, Storage. RAID - RAID1 and RAID5 Clustering and Load Balancing. Disaster Recovery Plan - Backup and Restore - Types of Backups, Hot and Cold Spares. Configuration Management, Password Lists.	8
9	**Virtualization and Cloud Computing** What is Virtualization? Advantages and Disadvantages of Virtualization, Implementation of VMM- Type 0, Type1 and Type2 Hypervisors. Virtualization Architectures - Hardware Virtualization, Desktop Virtualization, Presentation &amp Application Virtualization. Server Virtualization - Its advantages and disadvantages. Storage Virtualization. Cloud Computing - Characteristics of Cloud Computing, Service Models - IaaS, PaaS & SaaS. Cloud Clients. Deployment Models -Private, Public, Hybrid Clouds. Advantages and Disadvantages of Cloud Computing.	10
	Total	**35**

Reference Books:
1) Computer Networks - Andrew S. Tanenbaum 4e
2) Network Essential Notes - GSW MCSE Study Notes
3) Internetworking Technology Handbook - CISCO System
4) Introduction to Networking and Data Communications - Eugene Blanchard
5) Computer Networks and Internets with Internet Applications - Douglas E. Comer
6) Firewalls and Internet Security - William R. Cheswick
7) Computer Networking, Addison-Wesley, J. F. Kurose, K. W. Ross.
8) Data Networks, 2nd edition or later - W. Stallings,
9) Data and Computer Communications, Prentice Hall, Sixth Edition.