

**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING  
PUNJABI UNIVERSITY**

**SCHEME AND SYLLABI**

FOR

**MASTER OF TECHNOLOGY  
Computer Engineering**

**REGULAR**

**(SEMESTER SYSTEM)  
YEAR 2018-2020  
Batch 2018**

**PART TIME**

**(SEMESTER SYSTEM)  
YEAR 2018-2021  
Batch 2018**



**FACULTY OF ENGINEERING AND TECHNOLOGY  
PUNJABI UNIVERSITY, PATIALA**

### Scheme for Regular M. Tech. Computer Engineering

S.No.	Subject Title	Subject Code	Teaching				Sessional Awards	Theory Awards	Exam Hrs.	Total Marks
			L	T	P	Cr				
<b>SEMESTER – I</b>										
1.	Computer Network Technologies	MCE-101	3	1	0	4.0	50	50	3 hrs.	100
2.	Design Principles of Operating System	MCE-103	3	1	0	4.0	50	50	3 hrs.	100
3.	Research Methodology	MCE-106	3	1	0	4.0	50	50	3 hrs.	100
4.	Elective Course-I		3	1	0	4.0	50	50	3 hrs.	100
5.	Elective Course-II		3	1	0	4.0	50	50	3 hrs.	100
6.	Research Lab	MCE -150	0	0	4	2.0	100	--	--	100
7.	Audit Course – 1		2	0	0	2.0	50	--	--	50
		<b>Total Credits : 22</b>					<b>Total Marks :</b>			<b>650</b>
<b>SEMESTER – II</b>										
1	Advance Database Systems	MCE-105	3	1	0	4.0	50	50	3 hrs.	100
2	Software Engineering Concepts and Methodologies	MCE-104	3	1	0	4.0	50	50	3 hrs.	100
3	Advanced Data Structure And Applications	MCE-102	3	1	0	4.0	50	50	3 hrs.	100
4	Elective Course-III		3	1	0	4.0	50	50	3 hrs.	100
5	Elective Course-IV		3	1	0	4.0	50	50	3 hrs.	100
6	Self Study & Seminar	MCE-151	0	0	6	3.0	100	--	--	100
7	Open Elective *		3	0	0	--	--	--	--	--
		<b>Total Credits : 23</b>					<b>Total Marks :</b>			<b>600</b>
<b>SEMESTER – III</b>										
	Elective Course-V		3	1	0	4.0	50	50	3 hrs.	100
	Elective Course-VI		3	1	0	4.0	50	50	3 hrs.	100
	Major Project	MCE-152	0	0	6	3.0	100	--	--	100
		<b>Total Credits : 11</b>					<b>Total Marks :</b>			<b>300</b>
<b>SEMESTER – IV</b>										
	DISSERTATION	MCE-153	--	--	--	10	--	--	--	400
		<b>Total Credits : 10</b>					<b>Total Marks :</b>			<b>400</b>

**Total Credits : 68**

\* In addition to above mentioned subjects, there will be an optional 'Open Elective' course (non-compulsory). The student may opt any one 'Open Elective' subject from the list of Punjabi University approved open elective courses, offered by various University departments, with the consent of ACD/Head/Course Mentor of ME department. The list of Open Elective Subjects will be notified by the department to the students.

The Open elective course is optional and not mandatory. Students can opt for this course as an additional subject.

### Scheme for Part-Time M. Tech. Computer Engineering

S.No.	Subject Title	Subject Code	Teaching				Sessional Awards	Theory Awards	Exam Hrs.	Total Marks
			L	T	P	Cr				
<b>SEMESTER – I</b>										
1.	Core – I	MCE	3	1	0	4.0	50	50	3 hrs.	100
2.	Elective Course-I	MCE	3	1	0	4.0	50	50	3 hrs.	100
3.	Research Lab	MCE - 150	0	0	4	2	100	--	--	100
		<b>Total Credits : 10</b>					<b>Total Marks :</b>			<b>300</b>
<b>SEMESTER – II</b>										
1.	Core – II	MCE	3	1	0	4.0	50	50	3 hrs.	100
2.	Core – III	MCE	3	1	0	4.0	50	50	3 hrs.	100
3.	Elective Course-II	MCE	3	1	0	4.0	50	50	3 hrs.	100
4.	Audit Course – 1		2	0	0	2	50	--	--	350
		<b>Total Credits : 14</b>					<b>Total Marks :</b>			<b>350</b>
<b>SEMESTER – III</b>										
1.	Core – IV	MCE	3	1	0	4.0	50	50	3 hrs.	100
2.	Elective Course-III	MCE	3	1	0	4.0	50	50	3 hrs.	100
3.	Self Study & Seminar	MCE-151	0	0	6	3.0	100	--	--	100
4.	Open Elective *	--	--	--	--	--	--	--	--	--
		<b>Total Credits : 11</b>					<b>Total Marks :</b>			<b>300</b>
<b>SEMESTER – IV</b>										
1.	Core – V	MCE	3	1	0	4.0	50	50	3 hrs.	100
2.	Elective Course-IV	MCE	3	1	0	4.0	50	50	3 hrs.	100
3.	Elective Course-V	MCE	3	1	0	4.0	50	50	3 hrs.	100
		<b>Total Credits : 12</b>					<b>Total Marks :</b>			<b>300</b>
<b>SEMESTER – V</b>										
1.	Core – VI	MCE	3	1	0	4.0	50	50	3 hrs.	100
2.	Elective Course-VI	MCE	3	1	0	4.0	50	50	3 hrs.	100
3.	Major Project	MCE-152	0	0	6	3.0	100	--	--	100
		<b>Total Credits : 11</b>					<b>Total Marks :</b>			<b>300</b>
<b>SEMESTER – VI</b>										
1.	DISSERTATION	MCE-153	--	--	--	10	--	--	--	400
		<b>Total Credits : 10</b>					<b>Total Marks :</b>			<b>400</b>

**Total Credits : 68**

\* In addition to above mentioned subjects, there will be an optional 'Open Elective' course (non-compulsory). The student may opt any one 'Open Elective' subject from the list of Punjabi University approved open elective courses, offered by various University departments, with the consent of ACD/Head/Course Mentor of ME department. The list of Open Elective Subjects will be notified by the department to the students.

The Open elective course is optional and not mandatory. Students can opt for this course as an additional subject.

### **LIST OF CORE SUBJECTS**

MCE 101	COMPUTER NETWORK TECHNOLOGIES
MCE 102	ADVANCED DATA STRUCTURE AND APPLICATIONS
MCE 103	DESIGN PRINCIPLES OF OPERATING SYSTEM
MCE 104	SOFTWARE ENGINEERING CONCEPTS AND METHODOLOGIES
MCE 105	ADVANCED DATABASE SYSTEMS
MCE 106	RESEARCH METHODOLOGY

### **LIST OF ELECTIVES**

MCE 201	NETWORK SECURITY
MCE 202	DIGITAL IMAGE PROCESSING
MCE 203	OBJECT ORIENTED ANALYSIS AND DESIGN USING UML
MCE 204	CLOUD COMPUTING
MCE 205	MULTIMEDIA SYSTEMS
MCE 206	INTERNET OF THINGS
MCE 207	NATURAL LANGUAGE PROCESSING
MCE 208	SOFT COMPUTING
MCE 209	EMBEDDED SYSTEMS
MCE 210	WIRELESS AND MOBILE NETWORKING
MCE 211	PARALLEL AND DISTRIBUTED SYSTEMS
MCE 212	COMPUTER ANIMATIONS
MCE 213	E-COMMERCE
MCE 214	ADVANCED COMPUTER ARCHITECTURE
MCE 215	DATA WAREHOUSING & DATA MINING
MCE 216	ARTIFICIAL INTELLIGENCE AND ITS APPLICATIONS
MCE 217	BUSINESS INTELLIGENCE

### **SEMINAR AND MINOR PROJECT**

MCE 150	RESEARCH LAB
MCE 151	SELF STUDY & SEMINAR
MCE 152	MIJOR PROJECT

### **DISSERTATION**

MCE 153	DISSERTATION
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### **AUDIT COURSE - 1**

MME 301	ENGLISH FOR RESEARCH PAPER WRITING
MME 302	DISASTER MANAGEMENT
MME 303	VALUE EDUCATION
MME 304	STRESS MANAGEMENT BY YOGA

**\*LIST OF OPEN ELECTIVE COURSES**

(STUDENT CAN OPT ANY NUMBER OF COURSES FROM OPEN ELECTIVE LIST IN ANY SEMESTER)

1. MICRO ECONOMIC ANALYSIS (M.A. BUSINESS ECONOMICS)
- 2. QUANTITATIVE TECHNIQUES (M.A. BUSINESS ECONOMICS)**
3. THEORY AND PRACTICE OF WAR – I (M.A. DEFENCE & STRATEGIC STUDIES)
4. PROFESSIONAL PHOTOGRAPHY (B. TECH TV, FILM PRODUCTION AND MEDIA TECHNOLOGY)
5. EARLY HISTORY OF BUDDHISM (M.A. BUDDHIST STUDIES)
6. ORIGIN & DEVELOPMENT OF SIKHISM (M.A. BUDDHIST STUDIES)
7. PHILOSOPHICAL FOUNDATIONS OF EDUCATION (M.A. EDUCATION)
8. ENGLISH PHONETICS AND PHONOLOGY (M.A. ENGLISH)
9. ART AND CULTURAL HISTORY OF INDIA (M.A. FINE ARTS)
10. GROWTH & DEVELOPMENT OF PRINT MEDIA (M.A JOURNALISM AND MASS COMMUNICATION)
11. GURU NANAK DEV: METAPHYSICS & EPISTEMOLOGY (M.A. PHILOSOPHY)
12. INDIVIDUAL AND SOCIETY (M. A. SOCIAL WORK)
13. HUMAN GROWTH AND DEVELOPMENT (M. A. SOCIAL WORK)
14. WOMEN’S MOVEMENT IN INDIA (M.A. WOMEN'S STUDIES)
15. POSITIONAL ASTRONOMY (M.SC. ASTRONOMY & SPACE PHYSICS)

**\*\*Note regarding OPEN ELECTIVE:**

- (i) It is an over and above the basic requirements for M. Tech. CE degree
- (ii) In addition to above open elective subjects, student can opt any other subject offered by university departments with the consent of ACD of CE department.

**MCE-101**

**COMPUTER NETWORK TECHNOLOGIES**

**L T P Cr**  
**3- 1- 0 4.0**

**Maximum Marks: 50**  
**Minimum Pass Marks: 40%**

**Maximum Time: 3 Hrs.**  
**Lectures to be delivered: 45-55**

**Prerequisites:** Basics of basics of computer networks.

**Objectives:** Thorough understanding of Network Technologies.

**Instructions for paper-setter:** The question paper will consist of three sections A, B and C. Each section A and B will have five questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

**Instructions for candidates:** Candidates are required to attempt seven questions selecting three questions each from Each section A and B of the question paper and the entire section C.

**SECTION-A**

Data communication Techniques, Synchronous-Asynchronous Transmission, Digital Transmission, Transmission Media, Impairments, Data encoding Techniques  
Communication Networks: Circuit switching, Message switching, Packet Switching. X.25, LAN Technologies, Virtual Circuits  
Network Reference models – OSI and TCP/IP, Layered architecture

Data Link Layer: Design issue, framing, error control, flow control, HDLC, SDLC, data link layer in the Internet (SLIP, PPP)

Network Layer: Routing Algorithms, shortest path, distance vector routing, Link state routing, and multicast routing. Congestion control, traffic shaping, leaky bucket, token bucket, choke packets, load shedding, internetworking- connection oriented and connectionless, fragmentation, internet architecture and addressing, IP protocol, ICMP, APR, RARP, OSPF, BGP, CIDR, IPv6.

**SECTION - B**

Transport Layer: Transport Service, quality of service, connection management, addressing, flow control and buffering, multiplexing, Internet transport protocols- TCP and UDP

Session layer: Dialogue management, synchronization and remote procedure call.

Presentation layer: date representation, data compression, network security and cryptography

Application layer: SMTP and World Wide Web

**Reference Books:**

1. A. S. Tanenbaum, "Computer Networks", Pearson Education
2. W. Stallings, "Data and Computer Communications", PHI
3. J.F. Kurose, K.W. Ross, "Computer Networking: A Top-Down Approach featuring the Internet", Pearson Education
4. L.L. Peterson, B.S. Davie, "Computer Networks: A Systems Approach", Pearson Education

**MCE-102      ADVANCED DATA STRUCTURES AND APPLICATIONS**

**L T P Cr**  
**3- 1- 0 4.0**

**Maximum Marks: 50**

**Maximum Time: 3 Hrs.**

**Minimum Pass Marks: 40%**

**Lectures to be delivered: 45-55**

**Prerequisites:** Basics of Data Structures

**Objectives:** Thorough understanding of Data Structures

**Instructions for paper-setter:** The question paper will consist of three sections A, B and C. Each section A and B will have five questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

**Instructions for candidates:** Candidates are required to attempt seven questions selecting three questions each from sections A and B of the question paper and the entire section C.

**Section A**

**Complexity Analysis & Elementary Data Structures**

Asymptotic notations – Properties of big oh notation – asymptotic notation with several parameters – conditional asymptotic notation – amortized analysis – NP completeness – NP-hard – recurrence equations – solving recurrence equations  
Arrays, linked lists, trees and sparse matrices.

**Heap Structures**

Min-max heaps – D-heaps – Leftist heaps – Binomial heaps – Fibonacci heaps – Skew heaps

**Search Structures** Binary search trees – AVL trees – 2-3 trees – 2-3-4 trees – Red-black trees – Btrees.

**Section B**

**Graph Algorithms:**

Topological sort, minimum Spanning tree, single-source shortest paths, all-pairs shortest paths, bi-connected components, strongly connected components, cycles, articulation points, bridges.

**Applications**

Huffman coding – Garbage collection and compaction – Topological sort – Mincut maxflow algorithm – Activity networks – Set representation – Set union and find operations.

**Reference Books:**

1. E. Horowitz, S.Sahni and Dinesh Mehta, Fundamentals of Data structures in C++, Galgotia, 1999.
2. Adam Drozdex, Data Structures and algorithms in C++, Second Edition, Thomson learning – vikas publishing house, 2001.
3. G. Brassard and P. Bratley, Algorithmics: Theory and Practice, Printice –Hall, 1988.
4. Thomas H.Corman, Charles E.Leiserson, Ronald L. Rivest, "Introduction to Algorithms", PHI.

**MCE-103                      DESIGN PRINCIPLES OF OPERATING SYSTEM**

**L T P CR**

**3- 1- 0 4.0**

**Maximum Marks: 50**

**Maximum Time: 3 Hrs.**

**Minimum Pass Marks: 40%**

**Lectures to be delivered: 45-55**

**Prerequisites:** This course requires the prior knowledge of Computer fundamentals and data representation.

**Objectives:** The objective of the course is to overview the state of the art of Operating System fundamentals. The contents allow the reader to apply these concepts to a real operating system.

**Instructions for paper-setter:** The question paper will consist of three sections A, B and C. Each section A and B will have five questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

**Instructions for candidates:** Candidates are required to attempt seven questions selecting three questions each from sections A and B of the question paper and the entire section C.

**SECTION-A**

Introduction, Operating System components, OS system service, OS Structure: simple structure, layered approach, Microkernels, multiprogramming, time sharing, Real Time Systems, multithreading,

Process Management: Process concept, Process Scheduling, Context switch, CPU scheduling

Deadlocks:- Deadlock Characterization: Necessary conditions, Resource allocation Graph, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from deadlock

Inter-process Communication, Concurrent Processing and concurrency control, Memory management: Contiguous memory management, Paging Segmentation, virtual memory, Demand Paging and Page Replacement Algorithms

**SECTION – B**

File concept, File operations, File allocation methods, File Access methods and free space management, Operating System Security: Introduction, External & Operational security, Surveillance, Threat monitoring, Password protection, Auditing, Access control, H/W security

Distributed & Multiprocessor system: Introduction to Distributed Operating system: Features of distributed systems, Nodes of distributed system, Network Operating Systems: Remote Login, Remote File transfer, Distributed operating systems: Data Migration, Computation migration, Process migration, Design issues in Distributed operating systems Multiprocessor operating system organization,

Distributed file systems: Design issues in distributed file systems, transparency, Semantics of File Sharing, Fault Tolerance: Availability, Client and Server Node Failures

Case study of UNIX / LINUX: Introduction, kernel & shell, file system, shell programming

**Reference Books:**

1. Silberschatz and Galvin, "Operating System Concepts", Addison-Wesley publishing
2. A. S. Tanenbaum, "Modern Operating Systems", Pearson Education
3. H.M. Dietel, "An Introduction to Operating System", Pearson Education
4. William Stallings, "Operating Systems", Pearson Education

**MCE-104 SOFTWARE ENGINEERING CONCEPTS AND METHODOLOGIES**

**L T P Cr**  
**3- 1- 0 4.0**

**Maximum Marks: 50**

**Maximum Time: 3 Hrs.**

**Minimum Pass Marks: 40%**

**Lectures to be delivered: 45-55**

**Prerequisites:** Basics of System analysis and design.

**Objectives:** Thorough understanding of software Engineering concepts.

**Instructions for paper-setter:** The question paper will consist of three sections A, B and C. Each section A and B will have five questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

**Instructions for candidates:** Candidates are required to attempt seven questions selecting three questions each from sections A and B of the question paper and the entire section C.

**SECTION A**

**Principles and Motivations:** History; definitions; why engineered approach to software development; Software development process models from the points of view of technical development and project management: waterfall, rapid prototyping, incremental development, spiral models, Agile Software Development, Selection of appropriate development process.

**Software Development Methods:** Formal, semi-formal and informal methods; Requirements elicitation, requirements specification; Data, function, and event-based modeling; Some of the popular methodologies such as Yourdons SAD, SSADM etc

**Software Project Management:** Principles of software projects management; Organizational and team structure; Project planning; Project initiation and Project termination; Technical, quality, and management plans; Project control; Cost estimation methods: Function points and COCOMO

**SECTION B**

**Software Quality Management:** Quality control, quality assurance and quality standards with emphasis on ISO 9000; Functions of software QA organization does in a project; interactions with developers; Quality plans, quality assurance towards quality improvement; Role of independent verification & validation; Total quality management; SEI maturity model; Software metrics.

**CASE tools-classification, features, strengths and weaknesses; ICASE; CASE standards.**

**Configuration Management:** Need for configuration management; Configuration management functions and activities; Configuration management techniques; Examples and case studies.

**Software Testing Fundamentals:** Basic Terminology, Testing Techniques and strategies.  
Brief introduction to various standards related to Software Engineering.

**Recommended Books:**

1. Roger Pressman, Software Engineering - A Practitioners Approach, McGraw Hill(2009).
2. Ian Sommerville, Software Engineering, Addison-Wesley Publishing Company(2006).
3. James F. Peter, Software Engineering - An Engineering Approach, John Wiley & Sons(2006).

**MCE-105**

**ADVANCED DATABASE SYSTEMS**

**L T P CR**  
**3- 1- 0 4.0**

**Maximum Marks: 50**

**Maximum Time: 3 Hrs.**

**Minimum Pass Marks: 40%**

**Lectures to be delivered: 45-55**

**Prerequisites:** Database fundamentals

**Objectives:** Thorough understanding of Databases.

**Instructions for paper-setter:** The question paper will consist of three sections A, B and C. Each section A and B will have five questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

**Instructions for candidates:** Candidates are required to attempt seven questions selecting three questions each from sections A and B of the question paper and the entire section C.

**SECTION – A**

**Introduction:** Database System Concepts and Architecture, Data Independence, Data Models, SQL: DDL, DML, DCL, Database Integrity, Normalization: 1NF, 2NF, 3NF, BCNF, 4NF, 5NF.

**Advanced Transaction Processing and Concurrency Control:**

Transaction Concepts, Concurrency Control: Locking Methods, Time-stamping Methods, Optimistic Methods for Concurrency Control, Concurrency Control in Distributed Systems.

**Object Oriented and Object Relational Databases:**

Object Oriented Concepts with respect to Database Systems, OODBMS, OORDBMS, ORDBMS Design, Mapping of classes to relations, OORDBMS Query Language (representation of objects by create type, encapsulation of operations, inheritance, storing data about objects, retrieving, updating and query object tables).

**Parallel Databases:** Parallel Databases, Distributed Databases, Difference between them, Architecture of Distributed Databases, Architecture of Parallel Databases.

**SECTION – B**

**Distributed Databases:** Fragmentation, Replication and Allocation for distributed databases, Intra-query parallelism, Inter-query parallelism, Intra-operation parallelism, Inter-operation parallelism.

**Backup and Recovery Techniques:**

Backup and Recovery Concepts, Types of Database Failures, Types of Database Recovery, Recovery Techniques: Deferred Update, Immediate Update, Shadow Paging, Checkpoints, Buffer Management, Recovery Control in Distributed Systems.

**Introduction to PL/SQL: procedure, trigger and cursor.**

**XML and Internet Databases:**

Structured, Semi Structured, and Unstructured Data, XML Hierarchical Data Model, XML Documents, DTD, XML Schema, XML Querying: XPath, XQuery.

**Emerging Database Technologies:**

Introduction to Mobile Databases, Main Memory Databases, Deductive Database Systems and brief overview of Datalog, Temporal Databases and brief introduction to TSQL, Multimedia Databases brief overview of respective query language and Spatial and Multidimensional Databases,.

**Brief Introduction to Data Warehouse, Data Mining and OLAP**

**Reference Books:**

- |   |   |
|---|---|
| Ramez Elmasri, Shamkant                               | Fundamentals of Database Systems, Fifth Edition, Pearson Education, 2007. |
| 1. Navathe  |   |
| 2. C.J. Date  | An Introduction to Database Systems, Eighth Edition, Pearson Education.   |
| 3. Alexis Leon, Mathews Leon                          | Database Management Systems, Leon Press.                                  |
| 4. S. K. Singh  | Database Systems Concepts, Design and Applications, Pearson Education.    |
| 5. Raghu Ramakrishnan, Johannes Gehrke                | Database Management Systems, Tata McGraw-Hill.                            |
| 6. Abraham Silberschatz, Henry F. Korth, S. Sudarshan | Database System Concepts, Tata McGraw-Hill.                               |
| 7. Thomas Conolly, Carolyn Begg                       | Database Systems”, Pearson Education                                      |

**MCE-106**

**RESEARCH METHODOLOGY**

**L T P CR**  
**3- 1- 0 4.0**

**Maximum Marks: 50**  
**Minimum Pass Marks: 40%**

**Maximum Time: 3 Hrs.**  
**Lectures to be delivered: 45-55**

**Instructions for paper-setter:** The question paper will consist of three sections A, B and C. Each section A and B will have five questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

**Instructions for candidates:** Candidates are required to attempt seven questions selecting three questions each from sections A and B of the question paper and the entire section C.

**SECTION-A**

Introduction to Research Methodology: meaning, objectives, types, significance. Research Process, Problems faced in India.

Research Problem: formulation, preparation and presentation of research proposal. Research funding.

Research Design: features, types, experimental designs. Types of sample designs.

Data Collection: primary and secondary data, validation. Processing and Analysis of data: processing operations and problems, types of analysis, use of statistical measures in analysis.

**SECTION-B**

Sampling: fundamentals, distributions, sampling theory, sample size determination. Testing of Hypothesis: procedure, parametric tests –z-test, t-test, chi-square test, F-test. Analysis of variance.

Interpretation: meaning, need, technique, precaution. Presentation: Report Writing, Oral presentation. Use of software for statistical analysis: SPSS, Minitab.

**REFERENCES:**

1. “Research Methodology: Methods and Techniques” by C.R. Kothari.
2. “Research Methodology: An Introduction” by Wayne Goddard, Stuart Melville.
3. “Research Design: Qualitative, Quantitative, and Mixed Methods Approaches” by John W. Creswell.
4. “Research Methods, Design, and Analysis” by Larry B. Christensen, R. Burke Johnson and Lisa A. Turner.
5. “Statistical Methods for Research Workers” by R. A. Fisher.

**MCE-201**

**NETWORK SECURITY**

**L T P CR**  
**3- 1- 0 4.0**

**Maximum Marks: 50**  
**Minimum Pass Marks: 40%**

**Maximum Time: 3 Hrs.**  
**Lectures to be delivered: 45-55**

**Prerequisites:** Fundamentals of computer Networks

**Objectives:** Thorough understanding of the basics of computer networks and protocols.

**Instructions for paper-setter:** The question paper will consist of three sections A, B and C. Each section A and B will have five questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

**Instructions for candidates:** Candidates are required to attempt seven questions selecting three questions each from sections A and B of the question paper and the entire section C.

**SECTION-A**

Principles of Security, Basic Cryptographic techniques, Classification of attacks, Virus, Worm, Trojan Horse, Spam etc.

Symmetric Key Cryptography : Algorithm types and modes, Cryptographic Algorithms  
Asymmetric Key Cryptographic Algorithms, Digital Signature.

**SECTION -B**

Digital Envelope, Message Authentication Code, Message Digest

Public-Key Infrastructure (PKI) Authentication: Classifications, Mutual authentication Algorithms, Kerberos

Security in layers and domains: IPsec, Secure Socket Layer (SSL), E-mail Security, Electronic transactions

**REFERENCE BOOKS :**

1. Cryptography and Network Security : Atul Kahate , TMH
2. Cryptography and Network Security : Principles & Practices : William Stallings, 4th Edition Pearson & Printice Hall
3. Network Security : Kaufman , Perlman, Speciner, Pearson Education

**MCE-202**

**DIGITAL IMAGE PROCESSING**

**L T P CR**  
**3- 1- 0 4.0**

**Maximum Marks: 50**  
**Minimum Pass Marks: 40%**

**Maximum Time: 3 Hrs.**  
**Lectures to be delivered: 45-55**

**Prerequisites:** Fundamentals of computer graphics and Signal Processing

**Instructions for paper-setter:** The question paper will consist of three sections A, B and C. Each section A and B will have five questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

**Instructions for candidates:** Candidates are required to attempt seven questions selecting three questions each from sections A and B of the question paper and the entire section C.

**SECTION-A**

Introduction and Digital Image Fundamentals: Digital Image representation, Read and display image in C language, Fundamental steps in Image processing, Elements of digital Image processing, Sampling and quantization, some basic relationships like neighbor's connectivity, distance measure between pixels. Image Enhancement methods: Point Operations, Histogram processing, Spatial Domain, Enhancement by point processing, Spatial filters: low pass filters, High pass filter, Median, Max Min, Mean, Alpha-trim, High-boost filter, Laplacian, Gradient filters.

Image Transforms: Discrete Fourier transform, some properties of two-dimensional Fourier transform, Fast Fourier transform, Inverse FFT, Implementation algorithm of FFT, Introduction to Walsh and Haar Transform. Frequency domain filtering algorithms: Lowpass filtering, Highpass, Homomorphic filtering, Color image processing.

Image Restoration: Image Degradation model, Noise Models, Restoration in spatial domain: Mean filter, Order statistic filter, adaptive filter, Inverse filtering, Wiener filter, Constrained least square restoration.

**SECTION-B**

Image Compression: Coding Inter-pixel and Psycho visual redundancy, Image Compression models, Error free compression: Huffman, Arithmetic, Runlength, Lossy Compression: Block Transform Coding based on DCT, Introduction to still Image Compression standard.

Image Segmentation: Detection of discontinuities, Edge linking and boundary detection, Thresholding, Region Orientation Segmentation.

Representation and Description: Representation schemes like chain coding, Boundary Descriptors: Fourier, Statistical moments.

Recognition and Interpretation: Elements of Image Analysis, Pattern and pattern classes, Decision Theoretic methods: minimum distance classifier.

Brief Introduction to :Digital Watermarking. Morphological image processing: erosion, Dilation, opening, closing, Hit-or-Miss Transformation.

**Reference Books:**

1. Rafael C. Gonzalez & Richard E. Woods, "Digital Image Processing", AWL.
2. Annadurai, "Fundamentals of digital image processing", Pearson Education.
3. A.K. Jain, "Fundamentals of Digital Image Processing", Pearson Education.
4. W. K. Pratt, "Digital Image Processing".
5. Ramesh Jain, Brian G. Schunck, "Machine Vision", TMH.

**MCE-203 OBJECT ORIENTED ANALYSIS AND DESIGN USING UML**

**L T P CR**  
**3- 1- 0 4.0**

**Maximum Marks: 50**

**Minimum Pass Marks: 40%**

**Maximum Time: 3 Hrs.**

**Lectures to be delivered: 45-55**

**Prerequisites:** Fundamentals of object oriented programming

**Instructions for paper-setter:** The question paper will consist of three sections A, B and C. Each section A and B will have five questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

**Instructions for candidates:** Candidates are required to attempt seven questions selecting three questions each from sections A and B of the question paper and the entire section C.

**SECTION A**

Introduction to Object: Object Orientation, Development, Modeling, Object Modeling technique.

Object modeling: Objects and classes, Links and Association, Generalization and inheritance, Grouping constructs, Aggregation, Abstract Classes, Generalization as extension and restriction, Multiple inheritance, Meta data, Candidate keys, Constraints.

Dynamic modeling: Events and states, Nesting, Concurrency, Advanced Dynamic Modeling concepts

Functional modeling: Functional Models, Data flow diagrams, Specifying operations, Constraints, Relation of Functional model to Object and Dynamic Models.

Design Methodology, Analysis: Object modeling, Dynamic modeling, Functional modeling, Adding operations, Iterating Analysis.

System design: Subsystems Concurrency, Allocation to processor and tasks, Management of data stores, Handling Global Resources, Handling boundary Conditions, Setting Trade-off priorities.

Object Design: Overview, Combining the three models, Designing Algorithms, Design Optimization, Implementation of Control, Adjustment of Inheritance, Design of Associations, Object Representation, Physical Packaging, Document Design Decision.

Comparison of methodologies: Structured Analysis/Structured Design, Jackson Structured Development.

Implementation: Using Programming Language, Database System, outside Computer. Programming Style: Object Oriented Style, Reusability, Extensibility, Robustness, Programming- in-the-large.

**SECTION B**

UML: Basics, Emergence of UML, Types of Diagrams.

Use Case: Actors, Use Case Diagram, Relationships between Use Cases.

Classes: Class Diagram, Classes, Objects, Attributes, Operations, Methods, Interfaces, Constraints, Generalization, Specialization, Association, Aggregation.

Behavioral Diagrams: Activity Diagram, Collaboration Diagram, Sequence Diagram, Statechart

Diagram. Implementation Diagrams: Component Diagram, Deployment Diagram

**References Books:**

1. Rambaugh, "Object Oriented Modeling and Design", Pearson Education, 2002
2. Bernd Oestereich, "Developing Software With UML", Pearson Education.
3. BOOCH, "Object Oriented Analysis and Design", Addison Wesley
4. Pierre-Alain Muller, "Instant UML", Shroff Publishers, 2000
5. Booch, Rumbaugh, Jacobson, "The Unified Modeling Language User Guide", Addison Wesley, 1999
6. Booch, Rumbaugh, Jacobson, "The Unified Modeling Language Reference Manual", Addison Wesley, 1999
7. Rebecca Wirfs-Brock, "Design Object Oriented Software", PHI

**MCE-204**

**CLOUD COMPUTING**

**L T P CR**  
**3- 1- 0 4.0**

**Maximum Marks: 50**

**Minimum Pass Marks: 40%**

**Maximum Time: 3 Hrs.**

**Lectures to be delivered: 45-55**

**Instructions for paper-setter:** The question paper will consist of three sections A, B and C. Each section A and B will have five questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

**Instructions for candidates:** Candidates are required to attempt seven questions selecting three questions each from sections A and B of the question paper and the entire section C.

#### **Section-A**

**Overview of Computing Paradigm-** Recent trends in Computing: Grid Computing, Cluster Computing, Distributed Computing, Utility Computing, Cloud computing; Evolution of cloud computing Business driver for adopting cloud computing

**Cloud Computing Architecture-** Cloud computing stack: Comparison with traditional computing architecture (client/server), Services provided at various levels, How Cloud Computing Works, Role of Networks in Cloud computing, protocols used, Role of Web services; Service Models (XaaS), Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS), Deployment Models: Public cloud, Private cloud, Hybrid cloud, Community cloud

**Service Management in Cloud Computing:** Service Level Agreements (SLAs), Billing and Accounting, Comparing Scaling Hardware: Traditional vs. Cloud, Economics of scaling: Benefitting Enormously, Managing Data: Looking at Data, Scalability & Cloud Services, Database & Data Stores in Cloud, Large Scale Data Processing.

**Cloud Security-** Infrastructure Security, Network level security, Host level security, Application level security, Data security and Storage, Data privacy and security Issues, Jurisdictional issues raised by Data location, Identity & Access Management, Access Control, Trust, Reputation, Risk Authentication in cloud computing, Client access in cloud, Cloud contracting Model, Commercial and business considerations

#### **Section-B**

**Introduction to Big Data-** Distributed file system–Big Data and its importance, Four Vs, Drivers for Big data, Big data analytics, Big data applications. Algorithms using map reduce.

**Introduction to Hadoop and Hadoop Architecture:** Data – Apache Hadoop & Hadoop EcoSystem, Moving Data in and out of Hadoop – Understanding inputs and outputs of MapReduce -, Data Serialization

**NoSQL-** What is it?, Where It is Used Types of NoSQL databases, Why NoSQL?, Advantages of NoSQL, Use of NoSQL in Industry, SQL vs NoSQL, NewSQL

**Data Base for the Modern Web-** Introduction to MongoDB key features, Core Server tools, MongoDB through the JavaScript's Shell, Creating and Querying through Indexes, Document-Oriented, principles of schema design, Constructing queries on Databases, collections and Documents , MongoDB Query Language.

#### **Recommended Books**

1. *Cloud Computing Bible*, Barrie Sosinsky, Wiley-India, 2010
2. *Cloud Computing: Principles and Paradigms*, Editors: Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, Wiley, 2011
3. *Cloud Computing: Principles, Systems and Applications*, Editors: Nikos Antonopoulos, Lee Gillam, Springer, 2012
4. *Cloud Security: A Comprehensive Guide to Secure Cloud Computing*, Ronald L. Krutz, Russell Dean Vines, Wiley-India, 2010
5. Boris lublinsky, Kevin t. Smith, AlexeyYakubovich, "Professional Hadoop Solutions", Wiley, ISBN: 9788126551071, 2015.
6. Chris Eaton,Dirk derooset al. , "Understanding Big data ", McGraw Hill, 2012.
7. BIG Data and Analytics , Sima Acharya, Subhashini Chhellaappan, Willey

**MCE-205**

**MULTIMEDIA SYSTEMS**

**L T P CR**

**3- 1- 0 4.0**

**Maximum Marks: 50**

**Minimum Pass Marks: 40%**

**Maximum Time: 3 Hrs.**

**Lectures to be delivered: 45-55**

**Prerequisites:** Fundamentals of computer graphics and image processing

**Instructions for paper-setter:** The question paper will consist of three sections A, B and C. Each section A and B will have five questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

**Instructions for candidates:** Candidates are required to attempt seven questions selecting three questions each from sections A and B of the question paper and the entire section C.

#### **SECTION – A**

**Introduction:** Introduction to Multimedia, Introduction to Hypermedia and Hyper Text, Multimedia Systems and Desirable Features, Applications, Trends in Multimedia

**Multimedia Technology:** Multimedia software development tools, Multimedia Authoring Tools, Multimedia Standards for Document Architecture, SGML, ODA, Multimedia Standards for Document interchange, MHEG.

**Storage Media :** Magnetic and Optical Media, RAID and its levels, Compact Disc and its standards, DVD and its standards,

**Image,Graphics and Video:** Graphic/Image File Formats, Graphic/Image Data, Colour in Image and Video, Basics of Video ,Types of Video Signals, Analog Video, Digital Video, TV standards

#### **SECTION – B**

**Video Compression:** Basics of Information theory, Classifying Compression Algorithms: Lossless, Lossless/Perceptual Compression Algorithms: Entropy Encoding, Run-length Encoding, Huffman Coding, Huffman Coding of Images, Adaptive Huffman Coding, Arithmetic Coding, Lempel-Ziv-Welch (LZW) Algorithm, Source Coding Techniques, Differential Encoding, Scalar Quantization; Lloyd Max, Vector Quantization, Frequency Domain Methods, JPEG Compression, Video Compression; H. 261 Compression, Intra Frame Coding, Inter-frame (P-frame) Coding, MPEG Video Compression, The H.261 and MPEG Video Bit stream.

**Audio Compression:** Introduction to MIDI, Audio Compression, Psychoacoustics, Perceptual Audio Coder, Simple Audio Compression Methods; PCM, DPCM, MPEG-1 Audio Compression, ADPCM speech coder, Vocoders: LPC, CELP.

Multimedia System architecture, Components, Quality of service.

#### **Reference Books**

1. Li, Drew , Multimedia Computing, Pearson Education, Latest Edition ,
2. Ralf Steinmetz and Klara Nahrstedt, Multimedia Computing Communications and Applications By Pearson Educations
3. Prabhat K. Andleigh, Kran Thakkar, Multimedia System Design, PHI, Latest Edition
4. Fred Halsall Multimedia Communications, Pearson Education, Latest Edition

**MCE-206**

**INTERNET OF THINGS**

**L T P CR**  
**3- 1- 0 4.0**

**Maximum Marks: 50**  
**Minimum Pass Marks: 40%**

**Maximum Time: 3 Hrs.**  
**Lectures to be delivered: 45-55**

**Instructions for paper-setter:** The question paper will consist of three sections A, B and C. Each section A and B will have five questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

**Instructions for candidates:** Candidates are required to attempt seven questions selecting three questions each from sections A and B of the question paper and the entire section C.

**SECTION A**

**Introduction & Concepts:** Introduction to Internet of Things, Physical Design of IOT, Logical Design of IOT, IOT Enabling Technologies, IOT Levels.

**M2M to IoT:** The Vision-Introduction, From M2M to IoT, M2M towards IoT-the global context, A use case example, Differing Characteristics. A Market Perspective- Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies.

**M2M and IoT Technology Fundamentals:** Devices and gateways, Local and wide area networking, Data management, Business processes in IoT, Everything as a Service(XaaS), M2M and IoT Analytics, Knowledge Management

**IoT Architecture:** State of the Art - Introduction, State of the art

**IoT Reference Architecture:** Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views.

**SECTION B**

**Domain Specific IOTs:** Home Automation, Cities, Environment, Energy, Retail, Logistics, Agriculture, Industry, Health & Life Style.

**Industrial Automation:** Service-oriented architecture-based device integration, SOCRADES: realizing the enterprise integrated Web of Things, IMC-AESOP: from the Web of Things to the Cloud of Things

**IOT Physical Devices & Endpoints:** What is an IOT Device, Exemplary Device, Board, Linux on Raspberry Pi, Interfaces, and Programming & IOT Devices.

**References:**

1. Vijay Madiseti, Arshdeep Bahga, "Internet of Things A Hands-On- Approach", 2014
2. Adrian McEwen, "Designing the Internet of Things", Wiley Publishers, 2013
3. Daniel Kellmerit, "The Silent Intelligence: The Internet of Things". 2013

**MCE-207**

**NATURAL LANGUAGE PROCESSING**

**L T P CR**  
**3- 1- 0 4.0**

**Maximum Marks: 50**  
**Minimum Pass Marks: 40%**

**Maximum Time: 3 Hrs.**  
**Lectures to be delivered: 45-55**

**Objectives:** To describe the techniques and algorithms used in processing (text and speech) natural languages.

**Instructions for paper-setter:** The question paper will consist of three sections A, B and C. Each section A and B will have five questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

**Instructions for candidates:** Candidates are required to attempt seven questions selecting three questions each from sections A and B of the question paper and the entire section C.

**SECTION-A**

**Introduction:** Natural Languages, Application of Natural Language Understanding, Different levels of language analysis  
Regular Expressions, Finite state automata, Morphological analysis: Inflectional and derivational morphology, Finite state morphological parsing.

**Probabilistic Theory:** Introduction to probability, conditional probability, Bayes' rule and its application.

**N Grams:** Introduction, Importance, Unsmoothed N-grams, Normalizing, Maximum Likelihood Estimation, Smoothing and different methods of smoothing. Entropy and Perplexity.

**POS Tagging:** Introduction, Word Classes, Rule Based POS, Stochastic POS, Markov assumption, Markov chain, HMM Tagging, Issues of Ambiguity, Multiple tags, Multiple words and unknown words.

**SECTION B**

**Parsing:** Introduction, Top down parsing, Bottom up parsing, Problems with top down and bottom up parsing, The Earley algorithm.

**Feature and Unification:** Introduction, Feature Structures, Unification of Feature Structures.  
**Semantics:** Introduction, Semantical Analysis, Lexical Semantics.

**Word Sense Disambiguation:** Selectional Restriction based Disambiguation, Robust WSD - Machine learning approaches and dictionary based approaches.

**Machine Translation:** Introduction, Different methods of MT.

**Speech Processing:** Issues in Speech Recognition, The Sound Structure of Language, Signal processing, Speech Recognition, Prosody and Intonation.

**Reference Books:**

1. D. Jurafsky and J. Martin, "Speech and Language Processing", Pearson Education
2. James Allen, "Natural Language Understanding", Pearson Education.
3. Bharati A., Chaitanya V and Sangal R, "Natural Language processing: A Paninian Perspective", Prentice Hall of India.

**MCE-208**

**SOFT COMPUTING**

**L T P CR**  
**3- 1- 0 4.0**

**Maximum Marks: 50**

**Minimum Pass Marks: 40%**

**Maximum Time: 3 Hrs.**

**Lectures to be delivered: 45-55**

**Prerequisites:** To get basic knowledge of different soft computing techniques. Different problem solving techniques and their implementations and applications are explained. Intelligent systems and learning techniques are introduced.

**Instructions for paper-setter:** The question paper will consist of three sections A, B and C. Each section A and B will have five questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

**Instructions for candidates:** Candidates are required to attempt seven questions selecting three questions each from sections A and B of the question paper and the entire section C.

#### **SECTION – A**

**FUZZY SET THEORY :** Introduction to Neuro – Fuzzy and Soft Computing, Fuzzy Sets, Basic Definition and Terminology .Set-theoretic Operations, Member Function Formulation and Parameterization, Fuzzy Rules and Fuzzy Reasoning. Extension Principle and Fuzzy Relations, Fuzzy If-Then Rules, Fuzzy Reasoning, Fuzzy Inference Systems.

**OPTIMIZATION :** Derivative-based Optimization Descent Methods, The Method of Steepest Descent – Classical Newton’s Method, Step Size Determination ,Derivative-free Optimization. Genetic Algorithms – Simulated Annealing – Random Search – Downhill Simplex Search.

#### **SECTION – B**

**NEURAL NETWORKS:** Supervised Learning Neural Networks Perceptrons : Adaline, Backpropagation Multilayer Perceptrons , Radial Basis Function Networks ,Unsupervised Learning Neural Networks , Competitive Learning Networks , Kohonen Self-Organizing Networks ,Learning Vector Quantization , Hebbian Learning.

**NEURO FUZZY MODELING:** Adaptive Neuro-Fuzzy Inference Systems Architecture, Hybrid Learning Algorithm, Learning Methods that Cross-fertilize ANFIS and RBFN – Coactive Neuro Fuzzy Modeling , Framework Neuron Functions for Adaptive Networks, Neuro Fuzzy Spectrum. Introduction to Genetic Algorithm.

#### **References Book:**

1. Timothy J.Ross, “Fuzzy Logic with Engineering Applications”, McGraw-Hil.
2. Davis E.Goldberg, “Genetic Algorithms: Search, Optimization and Machine Learning”, Addison Wesley, N.Y..
3. S. Rajasekaran and G.A.V.Pai, “Neural Networks, Fuzzy Logic and Genetic Algorithms”, PHI.
4. James Freeman A. and David Skapura M, “Neural Networks - Algorithms, Applications & Programming Techniques” Addison Wesley.
5. Yegnanarayana B , “Artificial Neural Networks”, Prentice Hall of India Private Ltd., New Delhi.

**MCE-209**

**EMBEDDED SYSTEMS**

**L T P CR**

**3- 1- 0 4.0**

**Maximum Marks: 50**

**Maximum Time: 3 Hrs.**

**Minimum Pass Marks: 40%**

**Lectures to be delivered: 45-55**

**Objectives:** Students will learn about programming paradigms used in parallel computation, about the organization of parallel systems, and about the application of programs and systems to solve interesting problems

**Instructions for paper-setter:** The question paper will consist of three sections A, B and C. Each section A and B will have five questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

**Instructions for candidates:** Candidates are required to attempt seven questions selecting three questions each from sections A and B of the question paper and the entire section C.

**SECTION – A**

Introduction to embedded systems definition and Classification, Overview of Processors and hardware units in an embedded system, Software embedded into the system.

Embedded Systems – Embedded Systems on a Chip (SoC) and the use of VLSI designed circuits  
Examples of embedded systems: characteristics and requirements, Applications, software issues and architecture.

Interrupt synchronization: General features of interrupts, Interrupt vectors and priorities, External interrupt design approach, Interrupt polling.

Definitions of process, tasks and threads, ISRs and tasks by their characteristics, Operating System Services Goals, Kernel, Process Management, Memory Management, File System Organization and Implementation.

**SECTION – B**

Real time operating systems: RTOS Task scheduling models - Handling of task scheduling and latency and deadlines as performance metrics, Round Robin Scheduling, Time Slicing, Rate Monotonics, Preemptive Scheduling, Introduction to Vx Works.

Inter process communication and synchronization, Shared data problem, Use of Semaphore(s), Inter Process Communications using Signals, Semaphore, Message Queues, Mailboxes, Pipes, Remote Procedure Calls (RPCs).

I/O Devices - Synchronous and Asynchronous Communications from Serial Devices, Communication Devices - UART and HDLC - Parallel Port Devices, USB and advanced I/O Serial high speed buses- ISA, PCI, PCI-X and cPCI.

**REFERENCES BOOKS:**

1. Steve Heath, Embedded Systems Design, Second Edition-2003, Newnes,
2. David E.Simon, An Embedded Software Primer, Pearson Education Asia, First Indian Reprint
3. Wayne Wolf, Computers as Components; Principles of Embedded Computing System Design – Harcourt India, Morgan Kaufman Publishers, First Indian Reprint 2001
4. Frank Vahid and Tony Givargis, Embedded Systems Design – A unified Hardware /Software Introduction, John Wiley, 2002

**MCE-210**

**WIRELESS AND MOBILE NETWORKING**

**L T P CR**  
**3- 1- 0 4.0**

**Maximum Marks: 50**

**Maximum Time: 3 Hrs.**

**Minimum Pass Marks: 40%**

**Lectures to be delivered: 45-55**

**Pre-requisites:** Fundamentals of Computers & Electronics Engineering.

**Objectives:** To acquaint the students with the fundamental concepts of wireless communication and digital cellular standards which are helpful in understanding the state-of-the-art technology in mobile communications and wireless networking.

**Instructions for paper-setter:** The question paper will consist of three sections A, B and C. Each section A and B will have five questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

**Instructions for candidates:** Candidates are required to attempt seven questions selecting three questions each from sections A and B of the question paper and the entire section C.

**SECTION-A**

Wireless Transmission: Introduction, Frequencies for radio transmission, Overview of signals and antennas, signal propagation, Multiplexing techniques: TDM, FDM, CDM & SDM, Analog and Digital Modulation techniques, Spread spectrum: Direct sequence, Frequency Hopping. Introduction to Mobile Communication, Cellular concept, Frequency reuse.

Digital Cellular Mobile Systems: Introduction, GSM digital cellular standard: GSM services, GSM architecture, GSM Radio aspects, Security aspects, Handover, Call flow sequence in GSM, Evolutionary directions.

**SECTION - B**

CDMA digital cellular standard: Services, Radio aspects, Security aspects, Traffic channels, Key features of IS-95 CDMA system, Evolutionary directions

Mobile Data Communications: Overview of circuit switched and packet switched data services on cellular networks, Wireless local area networks: Introduction, IEEE 802.11 wireless LAN, Support of mobility on the internet: Mobile IP.

**Reference Books:**

1. Jochen Schiller, "Mobile Communications", Pearson Education
2. Raj Pandya, "Mobile and Personal Communication-System and Services", PHI
3. W. Stallings, "Wireless Communications and Network", Pearson Education

**MCE-211**

**PARALLEL AND DISTRIBUTED SYSTEMS**

**L T P CR**

**3- 1- 0 4.0**

**Maximum Marks: 50**

**Maximum Time: 3 Hrs.**

**Minimum Pass Marks: 40%**

**Lectures to be delivered: 45-55**

**Objectives:** Students will learn about programming paradigms used in parallel computation, about the organization of parallel systems, and about the application of programs and systems to solve interesting problems

**Instructions for paper-setter:** The question paper will consist of three sections A, B and C. Each section A and B will have five questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

**Instructions for candidates:** Candidates are required to attempt seven questions selecting three questions each from sections A and B of the question paper and the entire section C.

**SECTION – A**

**Fundamental Issues:** Need for Parallel Computing, Scope of Parallel Computing, Issues in Parallel Computing, Parallelism in uniprocessor system, Architectural-classification.

**Applications of parallel processing,** Multiprocessors, Multicomputers and Multithreading.

**Introduction:** Synchronous - vector/array, SIMD, Systolic, VLIWs.

**Hardware taxonomy:** Flynn's classifications, Handler's classifications.

Basic issues of parallel computing: delay, concurrency, communication topology, load balancing and scaling.

**SECTION – B**

**Parallel Processors:** Taxonomy and topology - shared memory multiprocessors, distributed memory networks. Processor organization - Static and dynamic interconnections.

**Performance Metrics:** Granularity, Scalability, Load Balancing, speedups and Efficiency.

**Introduction to PRAM** and its models, Parallelism approaches: data parallelism and control parallelism.

**Parallel Programming:** Shared memory programming, distributed memory programming, object oriented programming, functional and dataflow programming.

**Reference Books:**

1. Kai, Hwang and Briggs, Parallel Architecture and Computing, Tata McGraw Hill Co.
2. M. J. Quinn. Parallel Computing: Theory and Practice, McGraw Hill, New York, 1994. F.T. Leighton, Introduction to Parallel Algorithms and Architectures: Arrays, Trees, Hypercubes, Morgan Kaufmann Publishers, San Mateo, California
3. Joseph Ja Ja, An Introduction to Parallel algorithms, Addison Wesley

**MCE-212**

**COMPUTER ANIMATIONS**

**L T P CR**

**3- 1- 0 4.0**

**Maximum Marks: 50**

**Minimum Pass Marks: 40%**

**Maximum Time: 3 Hrs.**

**Lectures to be delivered: 45-55**

**Objectives:** Students will learn about programming paradigms used in parallel computation, about the organization of parallel systems, and about the application of programs and systems to solve interesting problems

**Instructions for paper-setter:** The question paper will consist of three sections A, B and C. Each section A and B will have five questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

**Instructions for candidates:** Candidates are required to attempt seven questions selecting three questions each from sections A and B of the question paper and the entire section C.

**SECTION – A**

**Introduction to Multimedia Elements:** Text, graphics, audio, video and motion graphics.

**Introduction Animation:** Its definition, Principles of Animation, early examples of Animation, Animation by Computer.

**History of Animation:** Stop Motion Photo Animation, Zoetrope, Thaumatrope, Cel and Paper Animation, early Disney's Cel Animation Processes.

**Applications of Animation:** in TV Graphics, Scientific Visualization, Simulation, Architecture, Medical and Film industry.

**SECTION – B**

**Types of Animation:** Animation Techniques, File formats for Animation, Cel Animation, Stop Motion Animation, 2-D Animation, 3-D Animation.

**Keyframe Animation:** Creating Keyframes, Auto Keyframes, Move & Scale Keyframe on the timeline, Animating with constraints & simple controllers, animation Modifiers & complex controllers, function curves in the track view, motion mixer.

**Multimedia presentation and authoring:** Overview, multimedia authoring metaphor, multimedia production, presentation and automatic authoring, Design paradigms and user interface, overview of tools like adobe premiere, director, flash and Dreamweaver.

**Reference Books:**

1. NewRiders, "3dsmax7 Fundamentals", BPB, 2005.
2. Isaac Kerlow, "The Art of 3D Computer Animation and Effects", 4th edition, Wiley, 2009
3. The Encyclopedia of Animation Techniques, Richard Taylor, 1996 (India)
4. Rick Parent "Computer Animation: Algorithms and Techniques", 3rd edition, Morgan Kaufmann.
5. A Banerji & A M Gosh, "Multimedia Technologies", Tata Mc Graw Hill

**MCE 213**

**E-COMMERCE**

**L T P CR**

**3- 1- 0 4.0**

**Maximum Marks: 50**

**Maximum Time: 3 Hrs.**

**Minimum Pass Marks: 40%**

**Lectures to be delivered: 45-55**

**Objectives:** This course offers a good understanding of electronic transactions via Internet

**Instructions for paper-setter:** The question paper will consist of three sections A, B and C. Each section A and B will have five questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

**Instructions for candidates:** Candidates are required to attempt seven questions selecting three questions each from sections A and B of the question paper and the entire section C.

#### **Section - A**

Overview of e-Business: E-business infrastructure, business design for e-Business, challenge traditional definitions of value, value in terms of customer experience, major business trends.

E-Business Architecture: E-Business architecture design issues, self-diagnosis as a first step of e-Business design, issues of application integration, integrating application clusters into E-Business architecture, aligning the E-Business design with application integration.

Supply Chain Management: Supply chain networks, overview of supply chain models and modeling systems. Understanding supply chain through process mapping and process flow chart. Introduction to e-SCM, e-SCM fusion.

Customer Relationship Management: Need of CRM, architecture of CRM, challenges in CRM implementation, e-CRM evolution, multi channel CRM, CRM in B2B model.

#### **Section - B**

Enterprise Resource Planning: Need of ERP solution, ERP usage in the real world, Future of ERP applications, A ERP Case Study. Business Process Re-engineering: Continuous process improvement model, business process re-engineering (BPR), break-through re-engineering model. Knowledge Management Applications: What are knowledge management applications, elements of business intelligence applications, knowledge management in the real world, data warehousing, online analytical processing (OLAP).

Translating e-business into action: The overall process – translating e-business into action, basic phases of e-Blueprint planning, e-business project planning checklist, key elements of a business case.

#### **Reference Books:**

1. S Sadagopan, "ERP A Managerial Perspective", TMH
2. Alexis Leon, "ERP Demystified", TMH
3. Stanley A. Brown, "Customer Relationship Management – A strategic imperative in the world of e-business"
4. Jagdish N. Seth, Atul Parvatiyar, and G. Shainesh, "Customer Relationship Management", TMH
5. Sunil Chopra, Peter Meindl, "Supply Chain Management", PHI.
6. Ravi Kalakota, Marcia Robinson, "e-Business – Roadmap for Success", Pearson ed.

**MCE-214**

**ADVANCED COMPUTER ARCHITECTURE**

**L T P CR**

**3- 1- 0 4.0**

**Maximum Marks: 50**

**Minimum Pass Marks: 40%**

**Maximum Time: 3 Hrs.**

**Lectures to be delivered: 45-55**

**Objectives:** This Course offers a good understanding of the various functional units of a computer system and prepares a student towards designing a basic computer system. Finally the student will be introduced to the area of advanced computer architectures.

**Instructions for paper-setter:** The question paper will consist of three sections A, B and C. Each section A and B will have five questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

**Instructions for candidates:** Candidates are required to attempt seven questions selecting three questions each from sections A and B of the question paper and the entire section C.

**SECTION-A**

Parallel computer models: Multiprocessors and multicomputers, Multivector and SIMD computers, Architectural development tracks Program and network properties :Conditions of parallelism, Data and resource dependences, Hardware and software parallelism, Program partitioning and scheduling, Grain size and latency, Program flow mechanisms,Control flow versus data flow,Data flow architecture, Demand driven mechanisms, Comparisons of flow mechanisms.  
System Interconnect Architectures: Network properties and routing, Static interconnection networks, Dynamic interconnection Networks, Multiprocessor system interconnects, Hierarchical bus systems, Crossbar switch and multiport memory, Multistage and combining network. Processors and Memory Hierarchy : Advanced processor technology, Instruction-set Architectures, CISC Scalar Processors, RISC Scalar Processors, Superscalar Processors, VLIW Architectures, Vector and Symbolic processors  
Memory Technology :Hierarchical memory technology, Inclusion, Coherence and Locality, Memory capacity planning, Virtual Memory Technology.

**SECTION-B**

Backplane Bus System: Backplane bus specification, Addressing and timing protocols, Arbitration transaction and interrupt, Cache addressing models, Direct mapping and associative caches. Pipelining :Linear pipeline processor, Nonlinear pipeline processor, Instruction pipeline design, Mechanisms for instruction pipelining, Dynamic instruction scheduling, Branch handling techniques, Arithmetic Pipeline Design, Computer arithmetic principles, Static arithmetic pipeline, Multifunctional arithmetic pipelines.

Vector Processing Principles: Vector instruction types, Vector-access memory schemes. Synchronous Parallel Processing: SIMD Architecture and Programming Principles, SIMD Parallel Algorithms, SIMD Computers and Performance Enhancement.

**REFERENCES:**

1. **Kai Hwang**, “*Advanced computer architecture*”; TMH, 2000.
2. **J.P.Hayes**, “*computer Architecture and organization*”, MGH, 1998.
3. **M.J Flynn**, “*Computer Architecture, Pipelined and Parallel Processor Design*”, Narosa Pb.
4. **D.A.Patterson, J.L.Hennessy**, “*Computer Architecture:A quantitative approach*”, Morgan Kauffmann, 2002.
6. **Hwang and Briggs**, “ *Computer Architecture and Parallel Processing*”; MGH

**MCE-215**

**DATA WAREHOUSING AND DATA MINING**

**L T P CR**  
**3- 1- 0 4.0**

**Maximum Marks: 50**

**Maximum Time: 3 Hrs.**

**Minimum Pass Marks: 40%**

**Lectures to be delivered: 45-55**

**Instructions for paper-setter:** The question paper will consist of three sections A, B and C. Each section A and B will have five questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

**Instructions for candidates:** Candidates are required to attempt seven questions selecting three questions each from sections A and B of the question paper and the entire section C.

**SECTION A**

Need for strategic information, Decision support system, Knowledge discovery & decision making, need for data warehouse, definitions of Data warehousing and data mining, common characteristics of Data warehouse, Data Marts, Metadata, Operational versus analytical databases, trends and planning of Data warehousing.

Multidimensional data model, Data cubes, Schemas for Multidimensional Database: stars, snowflakes and fact constellations. Data warehouse process & architecture, OLTP vs. OLAP, ROLAP vs. MOLAP types of OLAP, servers, 3 – Tier data warehouse architecture, distributed and virtual data warehouses, data warehouse manager.

**SECTION B**

Data mining definition & task, KDD versus data mining, data mining techniques, tools and applications. Data mining query languages, data specification, specifying knowledge, hierarchy specification, pattern presentation & visualization specification. Data mining techniques: Association rules, Clustering techniques, Decision tree knowledge discovery through neural

Networks & Genetic Algorithm, Rough Sets, Support Vector Machines and Fuzzy techniques. Mining Complex data objects, Spatial databases, Multimedia databases, Time series and Sequence data; mining Text Data bases and mining Word Wide Web.

**Reference Books**

1. Alex Berson, Stephen J. Smith, "Data Warehousing, Data Mining, & OLAP", Tata McGraw- Hill, 2004.
2. Data Mining – Concepts & Techniques; Jiawei Han & Micheline Kamber – 2001, Morgan Kaufmann.
3. Building the Data Warehouses; W.H. Longman, C. Klelly, John Wiley & Sons.
4. Data Mining Intorductory and Advanced Topics, Dunham, Pearson Education.

**MCE-216    ARTIFICIAL INTELLIGENCE AND ITS APPLICATIONS**

**L T P CR**  
**3- 1- 0 4.0**

**Maximum Marks: 50**

**Maximum Time: 3 Hrs.**

**Minimum Pass Marks: 40%**

**Lectures to be delivered: 45-55**

**Instructions for paper-setter:** The question paper will consist of three sections A, B and C. Each section A and B will have five questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

**Instructions for candidates:** Candidates are required to attempt seven questions selecting three questions each from sections A and B of the question paper and the entire section C.

**SECTION A**

Introduction to AI: Definitions, Historical foundations, Basic Elements of AI, Characteristics of intelligent algorithm, AI application Areas

**Problem solving:** State space search; Production systems, search space control: depth-first, breadth-first search, heuristic search - Hill climbing, best-first search, branch and bound. Problem Reduction, Constraint Satisfaction End, Means-End Analysis

**Handling uncertainty:** Non-Monotonic Reasoning, Probabilistic reasoning, use of certainty factors, Fuzzy logic.

**Knowledge Based Systems:** Proportional Logic, FOPL, Clausal Form, Resolution & Unification. Knowledge representation, acquisition, organisation & Manipulation, Semantic nets, Frames, Conceptual Dependency, Scripts & CYC.

**SECTION B**

Machine Learning. Concept of learning, Concept creation, learning automation, supervised and Unsupervised Learning, learning tasks & learning strategies, single layer & multiplayer Perceptions, Back propagation, learning by inductions, Competitive Learning, Hebbian Coincidence Learning, Attractor Networks Samuel's checkers algorithm. Hopfield nets, Adaptive resonance theory

**Expert Systems:** Need and justification for expert systems, Basic Components & architecture of Expert systems, ES-Shells, Representing & Using Domain Knowledge, Knowledge acquisition in expert Systems. Case studies: MYCIN, RI.

**Reference Books:**

1. Rich and K. Knight, "Artificial Intelligence", Tata McGraw Hill.
2. George F. Luger, "Artificial Intelligence – Structures and Strategies for Complex Problem Solving", Pearson Education.
3. Russell & Norvig, "Artificial Intelligence 'a Modern Approach", Pearson Education.
4. Dan W. Patterson, "Introduction to Artificial Intelligence and Expert Systems", PHI.
5. E. Charniak and D. McDermott, "Introduction to Artificial Intelligence", Addison-Wesley Publishing Company.
6. Nils J. Nilson, "Principles of Artificial Intelligence", Narosa Publishing Co.

**MCE-217**

## **Business Intelligence**

**L T P CR**

**3- 1- 0 4.0**

**Maximum Marks: 50**

**Minimum Pass Marks: 40%**

**Maximum Time: 3 Hrs.**

**Lectures to be delivered: 45-55**

**Instructions for paper-setter:** The question paper will consist of three sections A, B and C. Each section A and B will have five questions from the respective sections of the syllabus (05 marks each). Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

**Instructions for candidates:** Candidates are required to attempt seven questions selecting three questions each from sections A and B of the question paper and the entire section C.

### **SECTION A**

Introduction to Business Intelligence

Introduction to digital data and its types – structured, semi-structured and unstructured, Introduction to OLTP and OLAP (MOLAP, ROLAP, HOLAP), BI Definitions & Concepts, BI Framework, Data Warehousing concepts and its role in BI, BI Infrastructure Components – BI Process, BI Technology, BI Roles & Responsibilities, Business Applications of BI, BI best practices.

Basics of Data Integration (Extraction Transformation Loading)

Concepts of data integration, needs and advantages of using data integration, introduction to common data integration approaches, Meta data - types and sources, Introduction to data quality, data profiling concepts and applications, introduction to ETL using Kettle.

### **SECTION B**

Introduction to Multi-Dimensional Data Modeling

Introduction to data and dimension modeling, multidimensional data model, ER Modeling vs. multi dimensional modeling, concepts of dimensions, facts, cubes, attribute, hierarchies, star and snowflake schema, introduction to business metrics and KPIs, creating cubes using Microsoft Excel.

Basics of Enterprise Reporting

A typical enterprise, Malcolm Baldrige - quality performance framework, balanced scorecard, enterprise dashboard, balanced scorecard vs. enterprise dashboard, enterprise reporting using MS Access / MS Excel, best practices in the design of enterprise dashboards.

### **RECOMMENDED BOOKS:**

- 1 R.N. Prasad and Seema Acharya, Fundamentals of Business Analytics, Wiley India Ltd.
- 2 Mike Biere, Business Intelligence for the Enterprise, Prentice Hall Professional.
- 3 Teo Lachev, Applied Microsoft Analysis Services 2005: And Microsoft Business Intelligence Platform, Prologika Press.
- 4 David Taniar, Progressive methods in data warehousing and business intelligence: concepts and competitive analytics, Idea Group Inc (IGI).
- 5 Data warehousing: the ultimate guide to building corporate business intelligence, Birkhäuser.
- 6 Mark Humphries, Michael W. Hawkins, Michelle C. Dy, Data warehousing: architecture and implementation, Prentice Hall Professional.

**MCE-150**

**RESEARCH LAB**

**L T P CR**

**0- 0- 4 2**

**Maximum Marks: 100**

**Maximum Time: 3 Hrs.**

**Minimum Pass Marks: 50%**

**Objectives:**

**Students must gain knowledge about how to use tools like MS EXCEL, MS WORD, LATEX etc. in research paper writing. Students must gain some knowledge about any one of the tools like MATLAB, SPSS, OPNET, NS2 etc. according to chosen research area.**

**MCE-151**

**SELF STUDY & SEMINAR**

**L T P CR**

**0- 0- 6 3**

**Maximum Marks: 100**

**Maximum Time: 3 Hrs.**

**Minimum Pass Marks: 50%**

**Objectives: Problem identification for research work, Literature survey to identify research gaps for research work, Finalize title of research work and to develop research paper writing skills.**

Each student will be required to identify a research problem and perform survey literature on the same. The title and objectives for the research work will be chosen by the student in consultation with the Supervisor(s). Each student will be required to show his progress weekly to His/her supervisor. Each student has to give at least two midterm seminars to the concerned supervisor or to the committee constituted by the Head/Coordinator. At the end, student must have a sufficient knowledge about the existing techniques in the research area on which he/she want to work and will be required to submit the Seminar Report and present a talk to an audience of Faculty/Students to defend a title in front of the **Evaluation Committee**. Each student must publish a paper on the research area.

The final evaluation will be done jointly by the internal Examiners Committee appointed having Faculty Advisor as one of its members.

**MAJOR PROJECT**

**L T P CR**

**0- 0- 6 3**

**Objectives: Develop some of the existing techniques using some simulation tool and to develop research paper writing skills.**

Each student will be required to implement some of the existing techniques related to the research title chosen under MINOR PROJECT. Each student will be required to show his progress weekly to His/her supervisor and has to give at least two midterm seminars to the concerned supervisor or to the committee constituted by the Head/Coordinator. At the end, student must have a sufficient knowledge and must show simulation results of existing techniques in the chosen research area and will be required to submit the Seminar Report and present a talk to an audience of Faculty/Students in open defense in front of the **Project Evaluation Committee**. Each student must publish a paper on the research area.

The final evaluation will be done jointly by the internal Examiners Committee appointed having Faculty Advisor as one of its members.



## MME 301 ENGLISH FOR RESEARCH PAPER WRITING

L - T - P - Cr.  
2 - 0 - 0 - 2.0

**Maximum Marks: 50 (Internal)**

**Minimum Pass Marks: 40%**

**Lectures to be delivered: 24-30**

The objective of this course is to acquaint students to the skills of writing a good research paper.

At the end of this course, the student should be able to: (1) understand that how to improve your writing skills and level of readability, (2) learn about what to write in each section, (3) understand the skills needed when writing a Title, (4) ensure the good quality of paper at very first-time submission.

### SECTION A

Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness

Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticising, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts. Introduction

Review of the Literature, Methods, Results, Discussion, Conclusions, The Final Check.

### SECTION B

Key skills needed when writing a Title, key skills needed, when writing an Abstract, key skills are needed when writing an Introduction, skills needed when writing a Review of the Literature

Skills are needed when writing the Methods, skills needed when writing the Results, skills are needed when writing the Discussion, skills are needed when writing the Conclusions

Useful phrases, how to ensure paper is as good as it could possibly be the first- time submission

### REFERENCES:

1. Goldbort R (2006) Writing for Science, Yale University Press (available on Google Books)
2. Day R (2006) How to Write and Publish a Scientific Paper, Cambridge University Press
3. Highman N (1998), Handbook of Writing for the Mathematical Sciences, SIAM. Highman's book.
4. Adrian Wallwork, English for Writing Research Papers, Springer New York Dordrecht Heidelberg London

### MARKS DISTRIBUTION:

MST - I	:	15
MST - II	:	15
ATTENDANCE	:	10
CONTINUOUS ASSESSMENT	:	10

**MINIMUM PASS Marks: 50% in Internal Examination**

### MME 302 DISASTER MANAGEMENT

L - T - P - Cr.  
2 - 0 - 0 - 2.0

**Maximum Marks: 50 (Internal)**  
**Minimum Pass Marks: 40%**

**Lectures to be delivered: 24-30**

The objective of this course is to acquaint students with the strengths and weaknesses of disaster management approaches.

At the end of this course, the student should be able to: (1) learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response, (2) critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives, (3) develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations, (4) planning and programming in different countries, particularly their home country or the countries they work in

#### SECTION A

**Introduction:** Disaster: Definition, Factors and Significance; Difference Between Hazard And Disaster; Natural And Manmade Disasters: Difference, Nature, Types And Magnitude.

**Repercussions Of Disasters And Hazards:** Economic Damage, Loss of Human and Animal Life, Destruction of Ecosystem.

**Natural Disasters:** Earthquakes, Volcanisms, Cyclones, Tsunamis, Floods, Droughts And Famines, Landslides And Avalanches, Man-made disaster: Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks And Spills, Outbreaks of Disease And Epidemics, War And Conflicts.

**Disaster Prone Areas in India:** Study of Seismic Zones; Areas Prone to Floods and Droughts, Landslides and Avalanches; Areas Prone to Cyclonic and Coastal Hazards with Special Reference to Tsunami; Post-Disaster Diseases and Epidemics

#### SECTION B

**Disaster Preparedness and Management:** Preparedness: Monitoring of Phenomena Triggering a Disaster or Hazard; Evaluation of Risk: Application of Remote Sensing, Data from Meteorological and other agencies, Media Reports: Governmental and Community Preparedness.

**Risk Assessment:** Disaster Risk: Concept and Elements, Disaster Risk Reduction, Global and National Disaster risk situation. Techniques of risk assessment, Global Co-Operation in risk Assessment and Warning, People's Participation in risk assessment. Strategies for Survival.

**Disaster Mitigation:** Meaning, Concept and Strategies of Disaster Mitigation, Emerging Trends in Mitigation. Structural Mitigation and Non-Structural Mitigation, Programs of Disaster Mitigation in India.

#### REFERENCES:

1. R. Nishith, Singh A.K, "Disaster Management in India: Perspectives, issues and strategies, New Royal book Company.
2. Sahni, Pardeep Et.Al. (Eds.), Disaster Mitigation Experiences and Reflections, Prentice Hall of India, New Delhi.
3. Goel S. L., Disaster Administration and Management Text and Case Studies, Deep & Deep Publication Pvt. Ltd., New Delhi.

#### MARKS DISTRIBUTION:

MST - I	:	15
MST - II	:	15
ATTENDANCE	:	10
CONTINUOUS ASSESSMENT	:	10

**MINIMUM PASS Marks: 50% in Internal Examination**

### MME 303 VALUE EDUCATION

L - T - P - Cr.

2 - 0 - 0 - 2.0

**Maximum Marks: 50 (Internal)**

**Minimum Pass Marks: 40%**

**Lectures to be delivered: 24-30**

The objective of this course is to imbibe good values in students. The course aims at inculcating knowledge of self-development, highlight the importance of Human values and developing the overall personality of students. At the end of this course, the student should be able to: (1) understand value of education and self- development, (2) let the students know about the importance of character.

#### SECTION A

Values and self-development –Social values and individual attitudes. Work ethics, Indian vision of humanism. Moral and non- moral valuation. Standards and principles. Value judgements.

Importance of cultivation of values. Sense of duty. Devotion, Self-reliance. Confidence, Concentration. Truthfulness, Cleanliness. Honesty, Humanity. Power of faith, National Unity. Patriotism. Love for nature, Discipline.

#### SECTION B

Personality and Behavior Development - Soul and Scientific attitude. Positive Thinking. Integrity and discipline. Punctuality, Love and Kindness. Avoid fault Thinking. Free from anger, Dignity of labour. Universal brotherhood and religious tolerance. True friendship. Happiness Vs suffering, love for truth. Aware of self-destructive habits. Association and Cooperation. Doing best for saving nature.

Character and Competence –Holy books vs Blind faith. Self-management and Good health. Science of reincarnation. Equality, Nonviolence, Humility, Role of Women. All religions and same message. Mind your Mind, Self-control. Honesty, Studying effectively

#### REFERENCES:

1 Chakroborty, S.K., Values and Ethics for organizations Theory and practice, Oxford University Press, New Delhi

#### MARKS DISTRIBUTION:

MST - I	:	15
MST - II	:	15
ATTENDANCE	:	10
CONTINUOUS ASSESSMENT	:	10

**MINIMUM PASS Marks: 50% in Internal Examination**

**MME 304 STRESS MANAGEMENT BY YOGA**

**L - T - P - Cr.**

**2 - 0 - 0 - 2.0**

**Maximum Marks: 50 (Internal)**

**Minimum Pass Marks: 40%**

**Lectures to be delivered: 24-30**

The objective of this course is to achieve overall health of body and mind and to overcome stress in students. At the end of this course, the student should be able to: (1) develop healthy mind in a healthy body thus improving social health also, (2) Improve efficiency.

**SECTION A**

Definitions of Eight parts of yog. (Ashtanga)

Yam and Niyam.

Do`s and Don`t`s in life.

- i) Ahinsa, satya, astheya, bramhacharya and aparigraha
- ii) Shaucha, santosh, tapa, swadhyay, ishwarpranidhan

**SECTION B**

Asan and Pranayam

- i) Various yog poses and their benefits for mind & body
- ii) Regularization of breathing techniques and its effects

Types of pranayam

**REFERENCES:**

- 1. ‘Yogic Asanas for Group Tarining-Part-I’ : Janardan Swami Yogabhyasi Mandal, Nagpur
- 2. “Rajayoga or conquering the Internal Nature” by Swami Vivekananda, Advaita Ashrama (Publication Department), Kolkata

**MARKS DISTRIBUTION:**

MST - I	:	15
MST - II	:	15
ATTENDANCE	:	10
CONTINUOUS ASSESSMENT	:	10

**MINIMUM PASS Marks: 50% in Internal Examination**