MCA Syllabus

under

Non-Choice Based Credit System

for the students admitted in the sessions 2018-2019 and onwards.

DEPARTMENT OF COMPUTER SCIENCE & IT,
UNIVERSITY OF JAMMU

MCA COURSE STRUCTURE

Semester-Wise Distribution of Courses and Credits

Semester I

Course No.	Title	Credits	Contact hours per week L-T-P
MCA102	Problem Solving & Programming in C	4	4-0-0
MCA103	Computer Organization & Assembly Language	4	4-0-0
MCA107	Operating System Principles	4	4-0-0
MCA108	Discrete Mathematics	4	4-0-0
MCA190	Practicals*(based on C and Unix/Linux)*	6	0-0-10
Semester-I Total: -		22	16-0-10

Semester II

Course No.	Title	Credits	Contact hours per week L-T-P
MCA203	Data Structures using C-Language	4	4-0-0
MCA208	Database Management System	4	4-0-0
MCA209	Computer Architecture & Microprocessor	4	4-0-0
MCA212	Computer Networks	4	4-0-0
MCA213	Application Programming using Java	4	4-0-0
MCA290	Practicals *(based on Data Structures, Oracle and Java)*	6	0-0-10
Semester-II Total: -		26	20-0-10

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Semester III

Course No.	Title	Credits	Contact hours per week L-T-P
MCA310	Algorithm Design & Analysis	4	4-0-0
MCA311	Computer Graphics	4	4-0-0
MCA313	Web Technologies	4	4-0-0
MCA314	Optimization Techniques	4	4-0-0
MCA390	Practicals*(based on Computer Graphics and Web Technologies)*	6	0-0-10
Semester-III Total: -		22	16-0-10

Semester IV

Course No.	Title	Credits	Contact hours per week L-T-P
MCA420	Theory of Computation	4	4-0-0
MCA422	Numerical & Statistical Computing	4	4-0-0
MCA423	Software Engineering	4	4-0-0
MCA426	Management Information System	4	4-0-0
Elective-I MCA424 MCA425	*(any one of the following)* Python R	4	4-0-0
MCA490	Practicals *(based on* Numerical & Statistical *Methods and Python/R)*	6	0-0-10
Semester-IV Total: -		26	20-0-10

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Semester V

Course No.	Title	Credits	Contact hours per week L-T-P
MCA504	Artificial Intelligence	4	4-0-0
MCA511	Principles of Complier Design	4	4-0-0
MCA518	.NET Technology & C#	4	4-0-0
Elective-II MCA515 MCA516	*(any one of the following)* Image Processing Mobile Technologies	4	4-0-0
MCA590	Practicals*(based on .NET and Image Processing/Mobile Technologies)*	6	0-0-10
Semester-V Total:-		22	16-0-10

Semester VI

PSCADC601

Project work: 26 credits

The project in sixth semester shall carry 650 marks distributed as follows:

Project Component		**Marks**
Mid-Semester Presentation & Internal Evaluation		250
End-Semester Evaluation	Project Evaluation	250
	Project Viva-voce	150
Semester-VI Total: -		650

PASSING CRITERIA

The minimum number of marks required to pass each theory paper and practical paper from Semester-I to V shall be 40% (separately in the internal assessment and the university examination).
The minimum number of marks required to pass Project work in VI semester examination shall be 50%.
The candidate must pass the MCA examination within six years of the initial admission to the first semester of the course as a regular candidate.

ATTENDANCE REQUIREMENT

The minimum attendance requirement for a regular student to appear in a Semester Examination is 75% of the total number of lectures and seminars (as per syllabus) conducted in the semester. The Head of the Department may condone shortage in attendance of a student in a semester upto five attendances in each course.

A candidate who falls short of attendance in more than half the total number of courses in any semester shall have to apply for new admission/enrolment in that semester in order to earn fresh eligibility to appear in the examination.

A candidate who falls short of attendance in half or less than half the total number of courses in any semester and promoted to next semester after fulfilling the conditions as per MCA statues , shall have to repeat those courses alongwith the candidates of next academic session, the department will make arrangements of extra classes for such students.

SCHEME OF EVALUATION

Theory Courses

Each theory paper shall be of total 100 marks in case of 4 credit course and 50 marks in case of a 2 credit course. The distribution of marks is as follows:

Examination	**Weightage**
Written Examination *(at the end of each semester to be conducted by the university)*	80%
Internal Assessment	20%

Internal Assessment

For each course, there shall be two tests/assignments. The scheme of internal assessment is as follows:

Course	**Test/Assignment-I**	**Test/Assignment-II**	**Attendance**	**Total**
Four Credit Course	8 marks	7 marks	5 marks	20 marks
Two Credit Course	4 marks	3 marks	3 marks	10 marks

SCHEME FOR PAPER SETTING

For a course of 4 credits

The question paper will be divided into the following two sections. No question will be repeated in the question paper.

Section A
Total of 10 short answer questions (2 from each Unit) shall be set and the candidates are required to answer one question from each unit. Answer to a question should not exceed 50 words. Each question shall be of 7 marks.
(35 marks)

Section B
It will contain five long answer questions (one from each Unit). The candidates will be required to answer any three questions. Answer to each question should not exceed 800 words. Each question shall be of 15 marks.
(45 marks)

For a course of 2 credits

Section A
Total of 6 short answer questions (2 from each Unit) shall be set and the candidates are required to answer one question from each unit. Answer to a question should not exceed 50 words. Each question shall be of 6 marks.
(18 marks)

Section B
It will contain three long answer questions (one from each Unit). The candidates will be required to answer any two questions. Answer to each question should not exceed 800 words. Each question shall be of 11 marks.
(22 marks)

Practical Courses

Each practical course carries 150 marks distributed as follows:

Practicals				**Marks**
Internal Evaluation	I	Program Implementation & Viva-Voce	55 marks	75
	II	Practical File	10 marks	
	III	Attendance	10 marks	
External Evaluation				75
Total				150

Internal Evaluation

Guidelines for internal Assessment of practical courses

- Performance of the students will be evaluated based on a comprehensive system of continuous evaluation.
- For each practical course, students will be given regular assignments by the concerned practical teachers.
- The Implementation of assignments will be assessed & evaluated and viva-voce will be conducted atleast once in every fifteen days and then a set of further assignments may be given.
- Record of the Internal evaluation components I(Program Implementation & Viva-voce) shall be maintained regularly by the concerned teachers.
- At the end of the semester the Internal evaluation components II(Practical File) & III(Attendance) will be evaluated and consolidated with the record of components I to prepare the final award for Internal Practicals.

External Evaluation

The practical examination shall be conducted by external and internal examiners. The external examiner shall be the incharge of the practical examination and will decide the distribution of marks for various components of the examination in consultation with the internal examiner.

CRITERIA FOR PROMOTION OF A STUDENT TO NEXT HIGHER SEMESTER

Semester-I to Semester-II

The candidates shall be enrolled in second semester provided they secure pass marks in internal assessment in all the courses of first semester and who are otherwise found eligible under the MCA statutes.

Semester-II to Semester-III

The admission to third semester shall be open to only those candidates who secured pass marks in at least 12 credit's courses of first semester in the University examination and in the internal assessment in all courses of second semester.

Semester-III to Semester-IV

The candidates shall be enrolled in fourth semester provided they secure pass marks in internal assessment in all the courses of third semester and who are otherwise found eligible under the MCA statutes.

Semester-IV to Semester-V

The admission to fifth semester shall be open to only those candidates who secured pass marks in at least 12 credit's courses of third semester in the University examination and in the internal assessment in all courses of fourth semester.

Semester-V to Semester-VI

The candidates shall be enrolled in sixth semester provided they secure pass marks in internal assessment in all the courses of fifth semester and who are otherwise found eligible under the MCA statutes.

MCA - FIRST SEMESTER

Total Marks = 100 Theory Exam. = 80
No. of Credits = 4 Int. Assessment = 20
Duration of the Examination: 3 Hrs

COURSE NO: MCA102
COURSE TITLE: PROBLEM SOLVING & PROGRAMMING IN C

UNIT-I

Problem Soving & C Basics:
Steps for problem solving, Computer as a tool for problem solving. Program Design tools: Algorithm, Psuedocode and Flowchart Designing.
History of C, Characteristics of C, Introduction to GCC, compiling, linking and running a C – program , Using MAKE Utility.
C Program Structure, Data Types, Variables and Constants, Printing Out and Inputting Variables, Constants, Type-Casting, Operators and Expressions, Order of Precedence. 10 HOURS

UNIT-II

Control Statements & Arrays:
Conditional Statements, Program Loops and Iteration, Library functions. Syntax, semantic, linker, logical and runtime errors.
Single and Multi-dimensional Arrays, Strings, Basic String Handling Functions.
10 HOURS

UNIT-III

Functions & Further Data Types:
Functions, Passing Parameters, Recursion, Storage classes. Standard C Preprocessor Directives. Standard Formatted & unformatted I/O Functions;
Defining New Data Types, Structures, Unions, Enumerated Types, Bitwise Operators, Bit Fields.
10 HOURS

UNIT-IV

Pointers & Files:
Pointers: Pointers arithmetic, const and void pointers. Dynamic Memory Allocation, Pointers to Pointers, Pointer to array, Array of pointers, Command line input, Pointers to a Function.
Files Character and Line Based I/O, Formatted I/O, Block I/O, File Positioning.
10 HOURS

UNIT-V

File Accessibility & Graphics Programming:
File Accessibility and Directories (access, stat, chmod, chown …, chdir, chroot…), Process Control: (Running Linux Commands from C, fork(), the exec family, wait(), exit())
Graphics Programming: OpenGL Basics, OpenGL Utility Toolkit (GLUT), Defining window, Display mode, OpenGL Functions, Primitives (Points, Lines, Polygons) and Attributes, Simple graphics programs.
10 HOURS

SUGGESTED READINGS:

1. B. Kernighan and D. Ritchie, "The ANSI C Programming Language", PHI., 2000.
2. Behrouz A. Forouzan and Richard F. Gilberg, "Computer Science A Structured Programming Approach Using C", PHI, 3rd Ed., 2007.
3. Jeri R. Hanly and Elliot B. Koffman, "Problem Solving and Programming in C", Pearson, 5th Ed. 2007.
4. Yashwant Kanetkar, "Let us C", BPB Publications, 2002.
5. Edward Angel, "OpenGL- A primer", 3rd Ed. , Addison-Wesley 2007.
6. Kurt Wall, Mark Watson, and Mark Whitis, "Linux Programming Unleashed", SAMS.
7. Mark Mitchell, Jeffrey Oldham, and Alex Samuel, "Advanced Linux Programming",New Riders Publishing, 2001.
8. Edward Angel, "Interactive Computer Graphics", 5th Ed. , Addison-Wesley 2009

MCA - FIRST SEMESTER

Total Marks = 100 Theory Exam. = 80
No. of Credits = 4 Int. Assessment = 20
Duration of the Examination: 3 Hrs

COURSE NO: MCA103
COURSE TITLE: COMPUTER ORGANIZATION & ASSEMBLY LANGUAGE

UNIT - I

Binary Systems:
Overview of digital computers, Binary Numbers, Number systems, Number based Conversions, Integer & floating point representation using IEEE FORMAT, Rules of Floating point Arithmetic, parity, Error detection and correction methods using Hamming technique, ASCII code representation, Rules of addition/subtraction for r's, (r - 1)'s complements, BCD, excess – 3 codes.

10 HOURS

UNIT - II

Boolean Algebra & Logic Gates: Basic Theorems and functions, Boolean Expressions, Laws of Boolean Algebra, De – Morgan laws, simplification of Boolean Expressions using SOP, POS, K–map. Logic gates, AND, OR, NOT, NAND, XOR, NOR, XNOR Gates & their design.

10 HOURS

UNIT - III

Combinational Circuits: Introduction, Half & Full adders & subtractors, parallel adders and subtractors. Encoder, decoder, Multiplexer, De - Multiplexer, code converters.

10 HOURS

UNIT - IV

Sequential circuits & Memory organization:
Sequential circuits, Basic memory cell, Flip-flops and their types, triggering of flip flops, Registers and their types, bi-directional register.
Memory Hierarchy, Memory and its types, characteristics of memory, memory address map to CPU, cache memory.
I/O devices FD/HD disks, VDU; I/O organization, Modes of I/O transfer like DMA, programmed control, interrupts technique.

10 HOURS

UNIT - V

Microprocessor & Assembly Language:
Microcomputer organization, microprocessor organization, Instruction set, addressing modes, stack, subroutines and interrupts, memory organization and I/O interface.
Need and use of Assembly Language, Types of Assemblers (TASM and MASM), assembly Language programming structure, Instruction Sets (operands and opcodes), description of Registers, writing and executing simple assembly programs.

10HOURS

SUGGESTED READINGS:

1. Gear, C.W.: Computer Organization and Programming McGraw – Hill.
2. Tannenbaum, A.S.: Structured Computer Organization Prentice - Hall of India.
3. Mano, M.M.: Computer System Architecture, Prentice – Hall, of India.
4. Langholz, G., Grancioni, J. and Kandel, A.: Elements of Computer Organization, PHI.
5. Assembler Manual for the chosen machine.
6. Hayes: Computer Architecture and Organization, McGraw – Hill International Edition.
7. Sloan, M.E.: Computer Hardware and Organization, 2nd Edn, Galgotia publ. Pvt. Ltd.
8. Floyd: Digital Fundamentals, 3rd edn, Universal bookstall, and pvt.ltd
9. R. K Gaur: Digital Electronics and microprocessor - dhantpat Rai pub.
10. Peter Abel: Assembly language and Programming

MCA - FIRST SEMESTER

Total Marks = 100 Theory Exam. = 80
No. of Credits = 4 Int. Assessment = 20
Duration of the Examination: 3 Hrs

COURSE NO: MCA107
COURSE TITLE: OPERATING SYSTEM PRINCIPLES

UNIT-I

Introduction to Operating Systems: Evolution of operating systems, operating systems concepts, types of operating systems, different views of the operating system, operating system services, System calls, Types of system calls. Operating system Structure, Layered Approach, Microkernels, Virtual machines.

10 HOURS

UNIT – II

Process Management: Process concept, operation on processes, Inter-process communication, mutual exclusion, Process scheduling, Basic Concepts, Scheduling criteria, Scheduling algorithms,
Process Synchronization, Inter process Synchronization, Critical section Problem, Semaphores, Monitors, Message passing.
Deadlocks, System Model, Deadlock characterization, Deadlock prevention, Deadlock avoidance.

10 HOURS

UNIT – III

Memory Management: Memory management, swapping, contiguous memory allocation, relocation & protection, Memory management, Paging, Segmentation, Intel Pentium Segmentation, Intel Pentium Paging, Virtual memory, demand paging, performance of demand paging, Page replacement algorithms: FIFO, Optimal, LRU, Counting based page replacement.

10 HOURS

UNIT – IV

File & I/O Management: Files system structure, file system implementation, Directory Implementation.
Allocation Methods, contiguous allocation, Linked allocation, Indexed allocation Disk organization, disk space management, disk scheduling, Disk Management, RAID Structure.

10 HOURS

UNIT –V

Introduction to LINUX/UNIX: Various parts of operating system, kernel, important parts of kernel;
Files and Directories: pathname; Directory Tree; current working directory; relative pathname; referring to home directories; device files; File permissions; Pipes; tees; mount, init, Files, Directories, Processes Commands: pwd, mkdir, rmdir, ls, cat, more, mv, cp, rm, diff, wc, pwd, wc, who write, who am i, passwd, ps, kill, date, cal, man, gzip, df, chmod, mkdir, cd. Filters: pr, head, tail, cut, paste, sort, uniq, nl, tr. Regular Expression: grep; egrep; fgrep
Vi-Editor, adding and replacing text, commands in Command mode, deletion, navigation, pattern search, repeating commands, undoing last command.
Shell Programming, Shell Script, Logical Operators, If else Statement, Case structure, Looping.
10 HOURS

SUGGESTED READINGS:

1. Silberschartz, Galvin, Gagne: Operating System Concepts 8th edition, WSE wiley.
2. Andrew. S. Tanenbaum: Modern operating systems, Pearson Prentice Hall.
3. Milenkovic M: Operating system-concepts and design, McGraw hillinternatinal editions.
4. A S Godbole: Operating systems, tata McGraw hill.
5. Deitel H. M. : An Introduction to operating system, addison- Wesley publications.
6. Madnick & Donovan: Operating systems, mcgraw-hill book co.
7. Sumitabha Das- UNIX Concepts and Application, Tata McGraw Hill
8. Richard L. Petersen, The Complete Reference Linux, Tata McGraw Hill

MCA - FIRST SEMESTER

Total Marks = 100 Theory Exam. = 80
No. of Credits = 4 Int. Assessment = 20
Duration of the Examination: 3 Hrs

COURSE NO: MCA108
COURSE TITLE: DISCRETE MATHEMATICS

UNIT - I

Counting Techniques:
Basics of counting pigeon hole principles, permutation and combination, Recurrence Relations & their solution (Homogeneous & non-homogenous), Divide & Conquer Recurrences, Decision trees.

10 HOURS

UNIT - II

Posets, Hasse Diagram and Lattices:
Introduction, ordered set, Hasse diagram of partially, ordered set, isomorphic ordered set, well ordered set, properties of Lattices, and complemented lattices.
Introduction to fuzzy systems, fuzzy sets, equality of fuzzy sets, normal fuzzy sets, containment, support of a fuzzy set. Alpha-level sets. Basic operation of Fuzzy sets.

10 HOURS

UNIT - III

Graphs:
Introduction to Graphs; Incidence and degree; Handshaking Lemma; Isomorphism; Subgraphs and Union of graphs; connectedness; Walks, Paths and Circuits; Components; Connectedness Algorithm, shortest path Algorithms, Eulerian graph; Fleury's algorithms, Hamiltonian graph - Necessary conditions and sufficient conditions; Travelling saleman problem; Bipartite graphs; Directed Graphs, Binary relations, connectedness in directed Graph.

10 HOURS

UNIT - IV

Trees:
Properties of trees; Pendant vertices in a tree: Center of a tree; Rooted an binary trees; Spanning Trees – spanning tree algorithms; Fundamental circuits; Spanning trees of a weighted graph, cutsets and cut-Vertices; Fundamental cutsets; connectivity and separativity.

10 HOURS

UNIT - V

Planar graphs & Colouring:
Combinatorial and geometric dual; Kuratowski's graphs; Detection of planarity; Thickness and crossings.
Colorings: Vertex coloring, Chromatic number; Chromatic polynomial, The four colour problem, edge coloring, Coloring algorithms.

10 HOURS

SUGGESTED READINGS:

1. Harry, F.: Graph Theory: Addison - Wesley Publ. Camp.
2. Trembly, J.P. and Manohar, R.P.: Discrete Mathematical Structures with Applications to Computer Science, McGraw - Hill.
3. Deo, N.: Graph Theory with Applications to Engineering and Computer Science, Prentice-Hall Inc..
4. Krishnamurthy, V.: Combinatorics: Theory and Applications,Affiliated East-West Press Pvt. Ltd.
5. Doerr, A. and Levasseur, K.: Applied Discrete Structures of Computer Science, Galgotia Publications Ptv. Ltd.

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MCA - FIRST SEMESTER

Total Marks = 150
No. of Credits = 6

Daily Evaluation = 75 Marks
Final Practical Evaluation = 75 Marks

COURSE NO: MCA190
PRACTICALS

Practicals will be based on following Papers:

1. Problem Solving & Programming In C (MCA102)
2. Computer Organization & Assembly Language (MCA103)
3. Operating System Principles (MCA107)
4. Discrete Mathematics (MCA-108)

MCA - SECOND SEMESTER

Total Marks = 100 Theory Exam. = 80
No. of Credits = 4 Int. Assessment = 20
Duration of the Examination: 3 Hrs

COURSE NO: MCA203
COURSE TITLE: DATA STRUCTURES USING C-LANGUAGE

UNIT - I

Fundamental Notations:
Primitive and composite data types, self-referential structures, Algorithms, Types of data structures, Operations, Time and space complexity of algorithms, Asymptotic notation.

10 HOURS

UNIT – II

Linear Data Structures:
Arrays, Linked lists, Stacks, Queues, operations and their complexities, Implementations, Applications.

10 HOURS

UNIT – III

Non-Linear Data Structures:
Trees, Binary Trees, Traversing binary trees, Threaded binary trees, Binary search trees, heaps, Graphs, Traversing graphs.

10 HOURS

UNIT – IV

Indexing Structures:
ISAM, m-way trees, B – trees, B+ – trees, Hashing techniques for direct access, collision in hashing, collision resolution.

10 HOURS

UNIT – V

Sorting:
Internal and External sorts, Bubble sort, Insertion sort, Selection sort, Shell sort, Quick sort, Radix sort, Merge sort, Types of merging.

10 HOURS

SUGGESTED READINGS:

1. G. A. V. Pai, Data Structures and Algorithms: Concepts, Techniques and Applications, Tata Mcgraw Hill, 2008.
2. Ellis Horowitz, Sartaj Sahni and Susan Anderson-Freed, Fundamentals of Data Structures in C, Universities Press, 2008
3. J. P.Tremblay & P. G. Sorenson, Introduction to Data Structures with Applications, TMH, 2007.
4. Seymour Lipschutz, Theory and Problems of Data Structures, Sehaum's Outline Series in Computers Tata McGraw-Hill, 2006
5. A. M. Tannenbaum & M..J. Augenstein and Y. Langsam, Data Structures with C, PHI, 2006.

MCA - SECOND SEMESTER

Total Marks = 100 Theory Exam. = 80
No. of Credits = 4 Int. Assessment = 20
Duration of the Examination: 3 Hrs

COURSE NO: MCA208
COURSE TITLE: DATABASE MANAGEMENT SYSTEM

UNIT - I

Database Management System Concepts:
File based system, Need of Database Management System, Components of DBMS, Data independence, Three level architectural of Database, Centralized and client server architecture for DBMS, Introduction to hierarchical and network data models, Conventional file organizations, Inverted files.

10 HOURS

UNIT - II

Relational Data Model:
Relational data models, Entity relationship model, Conversion of ER diagrams to Relational Database Design, Joins, Relational algebra and relational calculus concepts, Queries using relational algebra and calculus.

10 HOURS

UNIT – III

Normalisation and Concurrency Control :
Concept of keys, Functional dependencies, Inference rules, Covers, Closure, Equivalence of functional dependencies, Multivalued dependencies, Theory of normalization, Normal forms (1st to 5th). 10 HOURS

UNIT – IV

Transaction processing, Deadlocks, Concurrency control, Locking techniques, Timestamp ordering, Recovery management, Recovery techniques, Distributed Database Concepts.

10 HOURS

UNIT - V

SQL :
SQL query processing, Table creation and management, Inbuilt functions, Data integrity constraints, Views, Joins, Operators, Privileges, roles and security policies.

10 HOURS

SUGGESTED READINGS:

1. BipinC.Desai: An Introduction to Database Systems, West-publishing company.
2. Elmasri, Navathe, Somayajulu, Gupta: Fundamentals of DatabaseSystems, Pearson Education.
3. Date, C.J.: An Introduction to Database Systems Addison Wesley Pearson Education.
4. Narayan S Umanath, Richard W Scamell : Data Modelling and Database Design, Thomson Course Technology India Edition.
5. R.A. Parida, Vinod Sharma: The power of Oracle 9i, Firewall Media Publications.
6. DeshPande: SQL/PL for Oracle 8 & 8i.

MCA - SECOND SEMESTER

Total Marks = 100 Theory Exam. = 80
No. of Credits = 4 Int. Assessment = 20
Duration of the Examination: 3 Hrs

COURSE NO: MCA209
COURSE TITLE: COMPUTER ARCHITECTURE & MICROPROCESSOR

UNIT – I

Digital Electronics:
Semi-conductor, p-type, n-type formation, pn junction & its characteristics, Bipolar and MOSFET transistors as current controlled and voltage controlled Switch, Basic design for AND, OR, NOT, NAND, NOR using RTL, DTL, TTL, MOS Technology, Tristate logic

10 HOURS

UNIT – II

Sequential Circuits & Computer Arithmetic:
Sequential circuits: Sequence generator, counters, A/D & D/A converters.
Computer Arithmetic: Flowchart, Hardware design & algorithm for signed magnitude & 2's complement form for addition, subtraction, multiplication & division methods, floating point arithmetic.

10 HOURS

UNIT – III

Memory & Register Organization:
Memory: 2D/3D Static RAM, Static and Dynamic Memory, Types of ROM, associative memory and interleaved memory, Random access, Sequential access, direct access, virtual memory, cache memory.
Register transfer logic and micro-operation.

10 HOURS

UNIT – IV

Microprocessor & Control Design:
Internal structure of MPU, ALU & Micro-programmed control unit. Instruction format, Bit Slices, I/O interface adapter (Serial and Parallel), Memory read, Memory write, Memory map and I/O map, Interrupts and its types.

10 HOURS

UNIT – V

Parallel Processing and VHDL:
Classification of parallel machines, pipeline processing, Vector processing, multiprocessor system architecture-multiport memory, crossbar switch, timeshared common-bus, dual-bus, Bus arbitration.
VHDL: Introduction, Need and importance of VHDL, characteristics, basic components of VHDL.

10 HOURS

SUGGESTED READINGS:

1. Malvino, A.P., Leach, D.P.: Digital Principles and Applications,Tata McGraw-Hill.
2. Millman and Halkias: Integrated Electronics, McGraw-Hill.
3. Strangio, C.E.: Digital Electronics – Fundamental Concepts and sons.
4. Khambata, J.: Microprocessor and Microcomputer, John Wiley and Applications, PHI.
5. Liu, Y.Gibson, G.A.: Microcomputer Systems: The 8086/808¸ Family, PHI 2nd Edn..
6. Alexandridis Nikitas, A.: Microprocessor System Design Concepts, Galgotia Publications.
7. Stone, S.: Introduction to Computer Architecture, Galgotia Publications,2nd Edn.
8. Mano, M.M.: Computer System Architecture, Prentice-Hall.
9. Volnei A. Pedroni: Circuit design with VHDL.

MCA - SECOND SEMESTER

Total Marks = 100 Theory Exam. = 80
No. of Credits = 4 Int. Assessment = 20
Duration of the Examination: 3 Hrs

COURSE NO: PSPCATC212
TITLE: COMPUTER NETWORKS

Unit I Fundamentals of Communication

Fundamentals of Communication, Modulation, Data Encoding, OSI reference model,
TCP/IP model, network standardization, Inter-networking
Physical layer, Switching Technique, Transmission media, Co-axial, Twisted Pair and Fiber Optic Cables, Transmission Impairments, Electromagnetic Spectrum, Communication, Radio waves, Microwaves, Satellites, GSM, CDMA.

10 HOURS

Unit II Data Transmission and Media access Concepts

Data Link layer, Design issues, Frame, Error detection and correction, Flow Control, Elementary Data link protocols, Character-oriented and Bit-oriented Protocols, Sliding window protocols.
Channel allocation methods, TDM, FDM, ALOHA, Carrier sense Multiple access protocols, Collision free protocols, IEEE standard 802 for LANS, Ethernet, Token Bus, Token ring.

10 HOURS

Unit III Network Establishment Concepts

Network Layer, Store and Forward Packet Switching, Connectionless and Connection-oriented services, Virtual Circuit, Routing Algorithms, Shortest path, Flooding, Link State, Distant vector, Hierarchical, Broadcast and Multicast Routing. OSPF, BGP, Congestion, Congestion control algorithms.

10 HOURS

Unit IV Internet Protocols

TCP/TP Protocol, IP Addresses, Classes of IP Addresses, Subnets, IPv6, Network layer in the Internet, Internet Control Protocols, ARP, RARP, BOOTP, DHCP, Transport Layer, Protocol Stack, TCP and UDP, Transport Services Primitives, Sockets, Socket Programming concept.

10 HOURS

Unit V Network Application

Application layer, Name service (DNS) Domain Hierarchy, Name servers, Name resolutions, Traditional applications, Telnet, FTP, SMTP, MIME, World wide web-HTTP, HTTP Methods.
Network security-Cryptographic Algorithms, DES, AES, RSA, Key exchange methods.

10 HOURS

SUGGESTED READINGS:

1. Andrew S.Tanenbaum, "Computer Networks", 5 e, 2003, Pearson Education Asia.
2. Behrouz A. Forouzan, "Data Communications and Networking", 4e, 2004,Tata McGraw Hills.
3. William Stallings. "Data and Computer Communication", 7e, 2003, Pearson Education Asia.
4. Prakash C. Gupta, Data Communications and Computer Networks, PHI
5. Michael A. Miller, "Data and Network Communications", 2e, Delmar Thomson Learning.
6. James F. Kurose and Keith W. Ross, "Compter Networking", 3e, Pearson Education.
7. William A. Shay, Understanding Data Communications and Networks, 2e, Thomson Asia Pvt. Ltd.
8. Peter Norton and Dave Kearns, "Complete Guide to Networking", ie,Techmedia India Ltd.
9. Douglas E. Comer, Internenetworking with TCP/IP Vol I & II, 3e, PHI

MCA - SECOND SEMESTER

Total Marks = 100 Theory Exam. = 80
No. of Credits = 4 Int. Assessment = 20
Duration of the Examination: 3 Hrs

COURSE NO: MCA213
TITLE: APPLICATION PROGRAMMING USING JAVA

UNIT –I Java Language Basics

Features, Object Oriented concepts, Java Virtual Machine Concepts, Primitive Data Type And Variables, Java Keywords, Java Operators, Expressions, Control Statements and Arrays.
Class and Objects, Static methods, Constructors, Method Overloading

10 HOURS

UNIT –II Inheritance, Packages and Interfaces

Inheritance, Access Control, Method Overriding, Garbage Collection, Abstract Classes, Polymorphism
Packages, Interfaces, Exceptions Handling, Types of Exceptions, Writing Exception Subclasses, Multithreading, Synchronization in Java

10 HOURS

UNIT –III I/O, Files & Applets Programming

I/O in Java, Byte Stream Classes, Character Stream Classes, Reading and Writing to Console, Reading and Writing Files, The Transient and Volatile Modifiers, The String and String Buffer Class.
The Applet Class, An Applet Skeleton, Adding images & sound, Passing parameters to an applet.

10 HOURS

UNIT –IV AWT & Networking

AWT Components, Building User Interface with AWT, Handling Events, Event Delegation Model (Events, Listeners, interfaces, Anonymous Classes). Layouts and Layout Manager, Introduction to Swing Components

Networking: InetAddress class, URL class, TCP sockets, UDP sockets.

10 HOURS

UNIT – V Database Connectivity

JDBC Overview, JDBC implementation, Connection class, Statements, Types of statement objects (Statement, PreparedStatement and CallableStatement), Types of resultset, ResultSetMetadata, Catching Database Results, Handling database Queries, JDBC and AWT.

10 HOURS

SUGGESTED READINGS:

1) Herbert Schildt – "Java2 The Complete Reference" , Tata Mcgraw Hill.
2) K. Arnold and J. Gosling, "The JAVA programming language", Third edition, Pearson Education, 2000.
3) E. Balagurusamy - " Programming with JAVA", Tata McGraw Hill.
4) Dietel & Dietel – "Java How to Program" , Pearson Education.
5) Steven Holzner – "Java2 Black Book" , Dreamtech Press.
6) George Reese - Database Programming with JDBC and Java, 2nd Edition, O'Reilly.
7) Bruce Eckel – "Thinking in Java", Prentice Hall.

MCA - SECOND SEMESTER

Total Marks = 150
No. of Credits = 6

Daily Evaluation = 75 Marks
Final Practical Evaluation = 75 Marks

COURSE NO: MCA290
PRACTICALS

Practicals will be based on following Papers:

1. Data Structures Using C-Language (MCA203)
2. Database Management System (MCA208)
3. Computer Architecture & Microprocessor (MCA209)
4. Computer Networks (MCA212)
5. Application Programming using Java (MCA213)