

M.C.A.
SYLLABUS - 2017

SCHOOLS OF EXCELLENCE
with
CHOICE BASED CREDIT SYSTEM (CBCS)

SCHOOL OF COMPUTING SCIENCES

St. JOSEPH'S COLLEGE (Autonomous)

Special Heritage Status Awarded by UGC

Accredited at "A" Grade (3rd cycle) by NAAC

College with Potential for Excellence Conferred by UGC

DBT-STAR & DST-FIST Sponsored College

TIRUCHIRAPPALLI - 620 002, INDIA

MASTER OF COMPUTER APPLICATIONS (MCA)

COURSE PATTERN - 2017 SET

Sem.	Code	Course	Hrs	Crs
I	17PCA1101	Unix and C Programming	6	5
	17PCA1102	Mathematical Foundations	6	5
	17PCA1103	Organisational Behaviour	6	4
	17PCA1104	Digital Computer Fundamentals	6	5
	17PCA1105	Software Lab–I(C Programming)	3	2
	17PCA1106	Software Lab–II (Multimedia)	3	2
	17PCA1107	<i>Self-paced Learning (Fundamentals of IT)</i>	-	2
		Total for Semester I		30
II	17PCA2108	Object Oriented Concepts and C++	4	3
	17PCA2109	Operating Systems	4	3
	17PCA2110	Probability and Statistics	4	4
	17PCA2111	Software Lab–III(C++)	3	2
	17PCA2112	Software Lab–IV(Unix and Shell Programming)	3	2
	17PCA2201A	Core Elective I: Python OR	4	4
	17PCA2201B	Core Elective I: Computer Simulation		
	17PSS2401	IDC: Soft Skills	4	4
	17PCA2401	IDC (WS): Data Analysis using R Language	4	4
	16PMA2401	IDC (WS): MATLAB		
	16SCS2401	IDC (WS): Pervasive and Adhoc Network		
	Total for Semester II		30	26
III	17SCS3101	Programming in Java	4	3
	17SCS3102	Database Systems	4	3
	17SCS3103	Design and Analysis of Algorithms	4	3
	17PCA3113	Software Lab – V (JAVA)	3	2
	17PCA3114	Software Lab–VI (RDBMS)	3	2
	17PCA3202A	Core Elective II: Computer Organization and Architecture (OR)	4	4
	17PCA3202B	Core Elective II: ERP		
	17PCA3402	IDC (BS): Web Design	4	4
	17PCA3115	Online Course - I: Quantitative Aptitude*	4	2
		Total for Semester III		30

Sem.	Code	Course	Hrs	Crs
IV	17PCA4116	Programming Smart Devices	5	4
	17PCA4117	Accounting and Financial Management	5	4
	17PCA4118	Graph and Automata Theory	5	4
	17PCA4119	Computer Networks and Security	5	3
	17PCA4120	Software Lab–VII(XML & Android)	3	2
	17PCA4121	Software Lab–VIII(PHP & MySQL)	3	2
	17PCA4203A	Core Elective III: Data Mining Techniques OR	4	4
	17PCA4203B	Core Elective III: Information Storage and Management		
	17PCA4122	Domain Study**	-	2
	Total for Semester IV		30	25
V	17PCA5123	Distributed Technologies	4	3
	17PCA5124	Software Engineering	4	3
	17PCA5125	Big data and Cloud Computing	4	3
	17PCA5126	Operations Research	4	3
	17PCA5127	Compiler Design	4	3
	17PCA5128	Software Lab–IX(Distributed Programming)	3	2
	17PCA5129	Software Lab–X (R Programming)	3	2
	17PCA5130	Comprehensive Examination	-	2
	17PCA5131	Mini Project**	-	3
	17PCA5132	Online Course - II: Interview Preparation & Managerial Skills	4	2
		Total for Semester V		30
VI	17PCA6133	Project	30	20
	Total for Semester VI		30	20
I – V	17PCW6501	Community Service Work (SHEPHERD) and Gender Studies		5
	Total for all Semesters		180	150

‘UNIX’ AND ‘C’

Assurance of Learning:

- To develop good understanding of the structure of UNIX operating system.
- To develop programming skills using ‘C’ language
- To know the special features of ‘C’ language for programming.

Unit – I: (12 hours)

Structure of UNIX - UNIX file system - Types of users, files and permission - Structure of Password file - Directories and Path name - Basic directory Commands - standard I/O files - redirecting standard I/O files - Pipelines and filters.

Unit – II: (12 hours)

Data Types - Variables - Operators - Control structures - Looping structures - Arrays –Strings.

Unit – III: (12 hours)

Functions - Built-in-functions - Types of functions - Scope of Variables - Call by value and Call by reference.

Unit – IV: (12 hours)

Pointers-Pointer and Arrays-Array of Pointers-Pointer as Function Arguments-Functions returning pointers-Pointer to Functions-Pointer and structures.

Unit – V: (12 hours)

Structure - Union- Files - Sequential Files - Random Access Files – Command Line Arguments.

Books for Study

1. Rebecca Thomas, Jean Yates, “A User Guide to the UNIX System”, Osborne McGraw-Hill, USA, Second Edition, 1985.

2. E.Balagurusamy, “Programming in ANSI C”, Tata McGraw Hill, New Delhi, Seventh Edition, 2016. (Unit II, III, IV, V)

Books for Reference

1. Sumitabha Das, “Unix Concepts and Applications”, Tata McGraw Hill, New Delhi, Fourth Edition, 2006.
2. Byron Gottfried, “Programming with C”, Schaum’s Outline Series, Tata McGraw Hill Edition, New Delhi, 1991.
3. Brian W. Kernighan, Dennis M. Ritchie, “The C Programming Language”, Prentice Hall of India Pvt. Ltd., New Delhi, 1989.
4. T. Jeyapooan, “A First Course in Programming with C”, Vikas Publishing House Pvt. Ltd., First Edition, 2002.

Sem. I
17PCA1102

Hours/Week: 4
Credits: 3

MATHEMATICAL FOUNDATIONS

Assurance of Learning

- * To give the fundamental ideas of Mathematical Logic
- * To Study the basic concepts in Set Theory, Ideas of Lattices and Boolean algebra
- * To give the basics of Numerical Methods in solving

Unit–I: (12 hours)

Mathematical Logic: Statements and Notation - Connectives – Statement Formulas and Truth Tables - Tautologies - Equivalence of Formulas – Duality Law. Tautological implications - Theory of inference - validity using truth tables-Rules of Inference.

Unit–II: (12 hours)

Basic concepts of Set Theory : Inclusion and Equality of sets - Power set -Operations on Sets - Venn Diagrams - Cartesian Products. Relations and Ordering - Binary & Equivalence relations - Partial Ordering. Functions Composition of functions, inverse functions, Binary & n-ary operations.

Unit–III: (12 hours)

Lattices as Partially ordered sets - Hasse diagrams - Properties of Lattices Distributive & Modular inequalities-Special lattices -Complete, Bounded, Complemented &Distributive lattices. Properties of Boolean Algebra.

Unit–IV: (12 hours)

Solution of polynomial equations: Birge-Vieta and Root squaring methods. System of linear algebraic equations: Gauss - elimination, Gauss - Jordan, Triangularization, Jacobi, Gauss-Seidal iterative methods.

Unit–V: (12 hours)

Interpolation: Lagrange’s and Newton’s interpolation –interpolating polynomials using finite difference. Numerical integration: Trapezoidal, Simpson’s rules and Romberg integration.

Note: Stress on solving Numerical Problems in Units IV and V

Books for Study

Units I, II, III

1. J.P.Tremblay & R.Manohar, “Discrete Mathematical Structures with Applications to Computer Science”, McGraw-Hill International Edition,2008.

Units IV, V

2. M.K.Jain, S.R.K.Iyengar & R.K. Jain, “Numerical Methods for Scientific and Engineering Computation”, Wiley Eastern Limited, New Delhi, 2003.

Books for Reference

1. Bernard Kolman & Robert C. Busy by, “Discrete Mathematical Structures for Computer Science”, Prentice Hall of India, New Delhi, 1987.
2. S.S. Sastry, “Introductory Methods of Numerical Analysis”, Prentice Hall of India, New Delhi,2005.

ORGANISATONAL BEHAVIOUR

Assurance of Learning

- * To familiarize the students to understand the basic concepts of organizational Structure and its behavior.
- * To equip the student in building the perceptual interpretation.
- * To acquire knowledge and capability to develop communication skills.
- * To impart the knowledge about Organizational Structure.

Unit – I: (12 hours)

NATURE OF ORGANIZATION – features – types – goals. NATURE OF ORGANIZATIONAL BEHAVIOR – Nature of OB – Role of OB – Foundations of OB.

Unit – II: (12 hours)

NATURE OF HUMAN BEHAVIOR: Nature and causes of individual differences – models of man. PERCEPTION: concept – process – perceptual selectivity and distortion – Developing perceptual skills. ATTITUDES: Concept – Theories – Formation factors – measurements – Attitude change.

Unit – III: (12 hours)

MOTIVATION: Definition – Motivation & Behavior – Theories – approaches – incentives. INTERPERSONAL BEHAVIOR: Transactional analysis – Ego states – life scripts – life positions – transactions – stroking – Psychological games – Benefits of TA.

Unit – IV: (12 hours)

GROUP DYNAMICS: Concepts & features of group – types of groups – group behavior – group decision making – committee – task group – inter group behavior. LEADERSHIP: Definitions – types – importance theories – styles. COMMUNICATION: Basics of communication – Communication network – Factors affecting communication – Business writing – Office management – Presentation strategies.

Unit – V:**(12 hours)**

ORGANIZATION THEORY: Classical organizational theory – neoclassical organization theory – DESIGNING OF ORGANIZATIONAL STRUCTURE: need – planning and process – Departmentation Span of management – delegation of authorities – centralization & decentralization – FORMS OF ORGANIZATIONAL STRUCTURES: line and staff – functional – divisional – project – matrix – free form.

Book for study

1. Prasad LM, “Organisational Behavior”, Sultan Chand and Sons, 2014.

Books for Reference

1. SS Khanka, “Organisational Behavior”, S. Chand Ltd.,
2. K. Aswathappa, “Organisational Behavior”, Himalaya Publishing house

Sem. I**17PCA1105****Hours/Week: 4****Credits: 3****DIGITAL COMPUTER FUNDAMENTALS****Assurance of Learning**

- * To learn and understand the Fundamentals of Digital Computer Concepts.
- * To inculcate the basic knowledge of Digital Logic and Data-Processing Circuits.
- * To impart the students with Registers, counters, A/D and D/A converters and semiconductor memories.

Unit–I:**(12 hours)**

Digital Logic: The Basic Gates-NOT, OR, AND - Universal Logic Gates-NOR, NAND - AND-OR-Invert Gates. Combinational Logic Circuits: Boolean Laws and Theorems - Sum-of-Products Method - Truth Table to Karnaugh Map - Pairs, Quads, and Octets - Karnaugh Simplifications - Don't-care Conditions - Product-of-sums Method - Product-of-sums Simplification.

Unit–II: (12 hours)

Data-Processing Circuits: Multiplexers - Demultiplexers - 1-of-16 Decoder - BCD-to-decimal Decoders - Seven-segment Decoders - Encoders - Exclusive-OR Gates. Number Systems and Codes: Binary Number System - Binary-to-decimal Conversion - Decimal-to-binary Conversion- Octal Numbers - Hexadecimal Numbers - The ASCII Code - The Excess-3 Code - The Gray Code.

Unit–III: (12 hours)

Arithmetic Circuits: Binary Addition - Binary Subtraction - Unsigned Binary Numbers - Sign-magnitude Numbers - 2's Complement Representation - 2's Complement Arithmetic- Arithmetic Building Blocks - The Adder-subtractor - Arithmetic Logic Unit - Binary Multiplication and Division. Flip-Flops: *RS* FLIP-FLOPs - Gated FLIP-FLOPs - Edge-triggered *RS* FLIP-FLOPs - Edge-triggered *D* FLIP-FLOPs - Edge-triggered *JK* FLIP-FLOPs - *JK* Master-slave FLIP-FLOPs.

Unit–IV: (12 hours)

Registers: Types of Registers - Serial In-serial Out - Serial In-parallel Out - Parallel In-serial Out - Parallel In-parallel Out - Universal Shift Register - Applications of Shift Registers. Counters: Asynchronous Counters - Decoding Gates - Synchronous Counters.

Unit–V: (12 hours)

Memory: Basic Terms and Ideas - Magnetic Memory - Optical Memory - Memory Addressing - ROMs, PROMs, and EPROMs - RAMs – Virtual Memory – Cache Memory.

Books for Study

1. Donald P. Leach and Albert Paul Malvino, “Digital Principles and Application”, Seventh Edition, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2011.

Books for Reference

1. Thomas C. Bartee, “Digital Computer Fundamentals”, McGraw-Hill International Edition, New Delhi, 1985.
2. Morris Mano and Michael D Ciletti, “Digital Design”, 4th Edition, Pearson publications, 2008.

Sem. I
17PCA1105

Hours/Week: 3
Credits: 2

SOFTWARE LAB–I(C PROGRAMMING)

1. Usage of UNIX Commands
2. Simple problems using Operators
3. Control structures (if-else, switch-case)
4. Looping structures (for, while, do-while)
5. Sorting and Searching using one dimensional array
6. Matrix operations.
7. Recursion - Factorial, GCD, Adding two numbers
8. String Manipulation using pointers
9. Pointers and Structures.
10. Structure, nested structure, structure array
11. File Handling (Text file, Sequential and Random)

Sem. I
17PCA1106

Hours/Week: 3
Credits: 2

SOFTWARE LAB–II (UNIX AND SHELL PROGRAMMING)

1. Use of Basic UNIX Shell Commands: ls, mkdir, rmdir, cd, cat, touch, file, wc, sort, cut, grep
2. Commands related to inode, I/O redirection and piping, process control commands, mails.
3. Shell Programming: Shell script exercises based on following:
 - (i) Interactive shell scripts
 - (ii) Positional parameters
 - (iii) Arithmetic
 - (iv) if-then-fi, if-then- else-fi, nested if-else (v) Logical operators (vi) else + if equals elif, case structure (vii) while, until, for loops, use of break
4. Write a shell script to create a file.
 - (i) Input a page profile to yourself, copy it into other existing file;
 - (ii) Start printing file at certain line

- (iii) Print all the difference between two file, copy the two files.
- (iv) Print lines matching certain word pattern.
- 5. Write shell script for-
 - (i) Showing the count of users logged in,
 - (ii) Printing Column list of files in your home directory
- 6. Write a shell script to print files names in a directory showing date of creation & serial number of the file.
- 7. Write a shell script to count lines, words and characters in its input
- 8. Write a shell script to compute gcd lcm & of two numbers. Use the basic function to find gcd & LCM of N numbers.
- 9. Write a shell script to find whether a given number is prime. Take a large number such as 15 digits or higher and use a proper algorithm.
- 10. Write a shell script to sum series such as sine, cosine etc.

Sem. I
17PCA1107

Credits: 2

Self Paced Learning
FUNDAMENTALS OF I.T.

Assurance of learning

* To impart the knowledge about various facets of Information Technology.

Unit – I:

Information Technology - Meaning - Need - Components Role of IT - IT in manufacturing, IT in mobile computing, IT in public sector, IT in defense, IT in media, IT in publication, IT and internet. Emerging trends in IT - E-Commerce, IT and supply chain management, IT and SIS, Electronic Data Interchange (EDI).

Unit – II:

Emerging Trends of Information Technology: Mobile Communication, Bluetooth, Global Positioning System (GPS), Infrared Communication, Smart Card, Blue Laser Disc, Nano Technology, DNA Computing, Quantum Computer, Holographic Memory.

Unit – III:

Internet: Introduction, Relays, Repeaters, Bridges, Routers, Gateways.
Internetworking: How networks differ, concatenated virtual circuits, connectionless internetworking, tunneling, internetwork Routing, fragmentation, Firewalls, internet architecture.

Unit – IV:

Multimedia: Definition - Building blocks of multimedia - Multimedia System - Applications - Virtual Reality. Internet Tools: Introduction - Web Browser - Electronic Mail - Search Engines - Instant Messaging.

Unit – V:

Computer in Business: Computers in Office Automation - Computers in Transaction Processing - Computers as Information Tools for Management Control - Computers in Engineering - Business on the Internet. Software Packages: Introduction to Word Processing - Microsoft Word - Desktop Publishing - Database Management Systems- Electronic Spreadsheets.

Books for Study

Unit I, II, III, IV

1. ITL Education Solution Ltd, “Introduction to Information Technology”, Dorling Kindersley (India) Pvt. Ltd, New Delhi.

Unit V:

2. Leon, “Introduction to computers”, Vikas Publishing House Pvt. Ltd., New Delhi, 2006. (CH 10 and CH 13)

Books for Reference

1. Efraim Turban et al, “Introduction to Information Technology”, Wiley India Pvt. Ltd., New Delhi.
2. Srinivasa Vallaban SV, (2005), Computers in Business, Sultan Chand and Sons, New Delhi.
