I SEMESTER

S.NO	CATEGORY	SUB.CODE	SUBJECT	L	T	P	C
1.	MC	MCA101	PROGRAMMING IN C AND UNIX	3	0	0	3
2.	MC	MCA102	DIGITAL LOGIC AND FUNDAMENTALS	3	0	0	3
3.	MC	MCA103	SOFTWARE ENGINEERING AND METHODOLOGY	3	0	0	3
4.	MC	MCA104	MICROPROCESSOR BASED SYSTEM DESIGN	3	0	0	3
5.	NC	MMA105	MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE	3	1	0	4
6.	MC	MCA1L1	LAB-I PROGRAMMING IN C LAB	0	0	6	2
7.	MC	MCA1L2	LAB-II MICROPROCESSOR LAB	0	0	6	2
Total Credits							20

II SEMESTER

S.NO	CATEGORY	SUB.CODE	SUBJECT	L	T	P	C
1.	MC	MCA201	OBJECT ORIENTED PROGRAMMING IN C++	3	0	0	3
2.	MC	MCA202	DATA STRUCTURES AND ALGORITHMS	3	1	0	4
3.	MC	MCA203	OPERATING SYSTEMS	3	0	0	3
4.	MC	MCA204	SYSTEM SOFTWARE	3	0	0	3
5.	NC	MMA205	STATISTICS	3	1	0	4
6.	MC	MCA2L1	LAB- III DATA STRUCTURES LAB	0	0	6	2
7.	MC	MCA2L2	LAB – IV OPERATING SYSTEM LAB	0	0	6	2
Total Credits							21

S.NO	CATEGORY	SUB.CODE	SUBJECT	L	T	P	C
1.	MC	MCA301	PROGRAMMING IN JAVA	3	1	0	4
2.	MC	MCA302	DESIGN ANALYSIS AND ALGORITHMS	3	1	0	4
3.	MC	MCA303	VISUAL PROGRAMMING	3	0	0	3
4.	NC	MCA304	FINANCIAL AND MANAGEMENT ACCOUNTING	4	0	0	4
5.	ME	MCA3E1	MAJOR ELECTIVE – I	3	0	0	3
6.	MC	MCA3L1	LAB – V JAVA LAB	0	0	4	2
7.	MC	MCA3L2	LAB – VI VISUAL PROGRAMMING LAB	0	0	4	2
Total Credits							22

III SEMESTER

IV SEMESTER

S.NO	CATEGORY	SUB.CODE	SUBJECT	L	T	P	C
1.	MC	MCA401	DATABASE TECHNOLOGY	3	1	0	4
2.	MC	MCA402	WEB TECHNOLOGY	3	1	0	4
3.	MC	MCA403	SOFTWARE PROJECT MANAGEMENT	3	1	0	4
4.	ME	MCA4E1	MAJOR ELECTIVE II	3	0	0	3
5.	NC	MCA4E2	NON MAJOR: ELECTIVE III	3	0	0	3
6.	MC	MCA4L1	LAB- VII WEB TECHNOLOGY LAB	0	0	6	2
7.	PC	MCA4L2	LAB – VIII SOFTWARE DEVELOPMENT LAB	0	0	6	2
8.	PR	MCA404	TERM PAPER	0	0	0	1
Total Credits							23

V SEMESTER

S.NO	CATEGORY	SUB.CODE	SUBJECT	L	T	P	C
1.	MC	MCA501	MULTIMEDIA SYSTEMS	3	1	0	4
2.	MC	MCA502	COMPUTER NETWORKS	3	1	0	4
3.	MC	MCA503	PROGRAMMING IN ASP .NET	3	1	0	4
4.	ME	MCA5E1	MAJOR ELECTIVE – IV	3	0	0	3
5.	NC	MCA5E2	NON MAJOR: ELECTIVE V	3	0	0	3
6.	MC	MCA5L1	LAB – IX ASP .NET LAB	0	0	6	2
7.	PR	MCA5P1	PROJECT PHASE – I	0	0	6	2
Total Credits							22

VI SEMESTER

S.NO	CATEGORY	SUB.CODE	SUBJECT	L	T	P	C
1.	MC	MCA6P2	PROJECT PHASE – II	0	0	24	12
Total Credits							12

TOTAL CREDITS FOR THE PROGRAMME: 120

CHOICES FOR CORE ELECTIVES

SUB.CODE	SUBJECT	L	T	P	C
PROGRAM ELECTIVE – I					
MCA3E11	COMPUTER GRAPHICS	3	0	0	3
MCA3E12	MOBILE COMMUNICATION	3	0	0	3
MCA3E13	COMPUTER ARCHITECTURE	3	0	0	3
PROGRAM ELECTIVE – II					
MCA4E21	NETWORK SECURITY	3	0	0	3
MCA4E22	IMAGE PROCESSING	3	0	0	3
MCA4E23	OBJECT ORIENTED ANALYSIS ANDDESIGN	3	0	0	3
PROGRAM ELECTIVE – IV					
MCA5E11	SOFTWARE TESTING	3	0	0	3
MCA5E12	AD HOC NETWORKS	3	0	0	3
MCA5E13	DATA MINING AND DATAWAREHOUSING	3	0	0	3

CHOICES FOR NON MAJOR ELECTIVES

SUB.CODE	SUBJECT	L	T	P	C
ELECTIVE – III					
MCA3E11	ADVERTISING AND SALES MANAGEMENT	3	0	0	3
MCA3E12	BPO MANAGEMENT	3	0	0	3
MCA3E13	CALL CENTRE MANAGEMENT – VOICE & NON VOICE	3	0	0	3
MCA3E14	CUSTOMER RELATIONSHIP MANAGEMENT	3	0	0	3
MCA3E15	ENTREPRENEURSHIP DEVELOPMENT	3	0	0	3
ELECTIVE – V					
MCA5E21	HUMAN RESOURSE MANAGEMENT	3	0	0	3
MCA5E22	LOGISTICS & SUPPLY CHAIN MANAGEMENT	3	0	0	3
MCA5E23	OFFICE MANAGEMENT	3	0	0	3
MCA5E24	PHOTOGRAPHY & VIDEOGRAPHY	3	0	0	3
MCA5E25	YOGA AND STRESS MANAGEMENT	3	0	0	3

SEMESTER- I

MCA101	PROGRAMMING IN C AND UNIX	L	T	P		C
	Total Contact Hours – 45	3	0	0		3
	Prerequisite – UG Level					
	Course Coordinator Name & Department:					

OBJECTIVES

- Understand the basic concepts of C programming. Practice the use of conditional and looping statements. Implement arrays, functions and pointers. Gain skills to handle strings and files.

COURSE OUTCOMES (COs)

CO1	Remember the fundamentals basics of C
CO2	Understand the concept of structures and pointers
CO3	Analyze Dynamic storage allocation
CO4	Apply various Unix functions
CO5	Illustrate the file operations & shell programming
CO6	Analyze an real time application using C and UNIX Program

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L								
	CO2	H	L							H	
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					

4	Approval		Academic Council Meeting

UNIT – I INTRODUCTION **9**

Basic Elements of C – Data types – Operators – Control Statements – Branching – Looping, Nested Control Structures – Prototypes and Functions – Parameter passing methods – Recursion – Storage classes – Library Functions – Arrays – Passing arrays to functions – Multi – dimensional arrays – Strings operations – enumerated data types.

UNIT – II STRUCTURES **9**

Structures – user defined Data Types – Union – Nested Structure, Passing Structure to functions – Pointer concept – Declaration – accessing variable through pointer – initializing pointer variable – pointers and functions – pointers and arrays – example programs using pointers with function, arrays– command line arguments – self referential structures.

UNIT – III DYNAMIC MEMORY ALLOCATION **9**

Dynamic memory allocation –file handling – file pointer – high level file operations – opening and closing of file – creating, processing and updating on files – simple file handling programs.

UNIT – IV INTRODUCTION TO UNIX **9**

Introduction to Unix – Unix components – Unix files – file attributes and permission – standard I/O – redirection – pipes and filters – grep and stream editor – process and signal commands.

UNIT – V SHELL PROGRAMMING **9**

Shell programming – Shell variables – Control Structures – Arithmetic in Shell programming – Debugging Scripts – Structure of an AWK script – AWK control Structures – Functions in AWK – Executing AWK scripts with the shell.

TEXT BOOKS:

1. E.Balagurusamy , “Programming in ASNSI C” 4th Edition, Tata McGraw Hill, Delhi.
2. Behrouz A. Forouzan, Richard F. Gilberg , “Unix and shell Programming”
3. Das, Sumitabha, 2001, UNIX:THE ULTIMATE GUIDE, Tata McGraw Hill, Delhi

REFERENCE BOOKS:

1. Byron S Gottfried, “Schaum’s Outlines Programming with C”, 4th Edition, PHI, New Delhi, 2006.
2. J.R. Hanly and E.B. Koffman, “Problem solving and program design in C”, 4th Edition, Pearson Education India, Delhi, 2005.
3. B.A. Fozougar, R.Failberg, “Unix and shell programming”, Thomson, 2003

Course Coordinator **HOD**

MCA102	DIGITAL LOGIC AND FUNDAMENTALS	L	T	P	C
	Total Contact Hours – 45	3	0	0	3
	Prerequisite – UG Level				
	Course Coordinator Name & Department:				

COURSE OBJECTIVES:-

Understanding fundamental principles of digital electronics, semiconductor memories, A/D and D/A converters

COURSE OUTCOMES (COs)

CO1	Remember knowledge in conversion techniques in number systems
CO2	Comprehend the concept of Logic gates and Boolean algebra
CO3	Describe the different Combinational circuits.
CO4	Demonstrate the networks of combinatorial, digital logic elements
CO5	Illustrate concept of flip flops and design of counters
CO6	Analyze an real time application in Registers, Counters

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PS03
2	CO1	H	L								
	CO2	H	L								
	CO3	H	L						H		
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					
4	Approval	Academic Council Meeting								

UNIT I: NUMBER SYSTEMS **9**

Number systems – Conversion from one number to another – Compliments – Binary codes – Binary logic – Logic gates – Truth tables. Boolean Algebra – Axioms – Simplification of Boolean functions – Karnaugh Map method (up to 5 variables) – Tabulation method.

UNIT II: COMBINATIONAL CIRCUITS **9**

Adders – Sub tractors – Code Converter – Multilevel NAND and NOR circuits – Binary parallel Adder – Decimal Adder - Decoders – Encoders – Multiplexes – Demultiplexer – Design of circuits using Multiplexers/Decoders.

UNIT III: SEQUENTIAL CIRCUITS **9**

Flip Flops – RS, JK, D and T Flip Flops –Excitation Table - Registers – Shift Registers – Counters – Ripple Counters – Synchronous Counters – Design of Counters.

UNIT IV: MEMORY UNIT **9**

Basic memory structure-ROM- PROM- EPROM- EEPROM, RAM-Static and Dynamic RAM- Programmable Logic Devices- Programmable Logic Array- Field Programmable gate array

UNIT V: ACCUMULATOR **9**

Accumulator – Design of Accumulator – Computer configuration – Instruction and Data formats – Instruction sets – Timing and Control – Execution of instruction – Design of computer – Hardwired control –PLA Control and Microprogram control.

TEXT BOOKS:

1. M.M. Mano, “Digital Logic Computer Design”, Pearson Education.
2. AnandKumar, “Fundamentals of Digital Circuits”, Fourth edition
3. Thomas L.Floyd, “Digital Logic Fundamentals”, 11th Edition

REFERENCE BOOKS:

1. Givone, “Digital Principles Design”, Tata McGraw Hill, New Delhi. 2002.
2. ADMKNV. Rajaraman, “Fundamental of Computers, Third Edition”, PHI, New Delhi. 2002.
3. T.C. Bartee, “Computer Architecture and Logical Design”, Mc Graw Hill.1991

Course Coordinator **HOD**

MCA103	SOFTWARE ENGINEERING AND METHODOLOGY	L	T	P	C
	Total Contact Hours – 45	3	0	0	3
	Prerequisite – UG Level				
	Course Coordinator Name & Department:				

COURSE OBJECTIVES:-

To understand and practice the various fields such as analysis, design, development, testing of software engineering.

COURSE OUTCOMES (COs)

CO1	Remember different software models & its phases.
CO2	Understand the concept risk analysis and management
CO3	Describe the software requirements and arrive at an appropriate software design.
CO4	Demonstrate an real time application using software engineering principles
CO5	Illustrate the Software Testing tools
CO6	Analyze the quality assurance procedures and standards during software development.

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L								
	CO2	H	L								
	CO3	H	H							H	
	CO4	H	L								
	CO5	L	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					

4	Approval	Academic Council Meeting

UNIT –I INTRODUCTION **9**

Software Engineering paradigms - Waterfall life cycle Model, spiral Model, Prototype Model, 4th generation techniques – Planning – cost estimation – Organization structure – Software Project scheduling, Risk analysis and Management – Requirements and specification – Rapid prototyping.

UNIT –II SOFTWARE DESIGN **9**

Abstraction Modularity – Software architecture – cohesion, coupling – various design concepts and notation Real time and distributed system design – Documentation Data flow-oriented design – Jackson system development – Design for reuse – Programming Standards.

UNIT –III SOFTWARE METRICS **9**

Scope – Classification of Metrics – Measuring process and product attributes – Direct and indirect measures – Reliability – Software Quality Assurance – Standards.

UNIT –IV SOFTWARE TESTING AND MAINTENANCE **9**

Software Testing fundamentals – Software testing Strategies – Black Box Testing, white Box Testing, system testing – Testing tools – Test case Management – Software Maintenance organization Maintenance report – Types of Maintenance.

UNIT–V SOFTWARECONFIGURATION MANAGEMENT(SCM)&CASETOOLS **9**

Need for SCM – version control – SCM Process – Software configuration – taxonomy – Case repository – Features.

TEXT BOOK:

1.Roger. S. Pressman, “Software Engineering, & Practitioner Approach”. 5th edition,
2. Fairely, “Software Engineering Concepts” McGRaw Hill 1985.
3. Rajib Mall, ―Fundamentals of Software Engineering‖, Third Edition, PHI Learning PrivateLimited, 2009.

REFERENCE BOOKS:

1. Sommerville, I “Software Engineering”, 5th edition.
2. K.K.Agarwal & Yokesh singh “Software Engineering”, 2001.
3. Stevenson.C. “Software Engineering Productivity”,1995.
4. Reference:www.nptel.ac.in/http://tosem.acm.org

Course Coordinator **HOD**

MCA104	MICROPROCESSOR BASED SYSTEM DESIGN	L	T	P	C
	Total Contact Hours – 45	3	0	0	3
	Prerequisite – UG Level				
	Course Coordinator Name & Department:				

COURSE OBJECTIVES:-

To understand the architecture and programming of 8085 microprocessor. To introduce the interfacing of peripheral devices with 8085 microprocessor.

COURSE OUTCOMES (COs)

CO1	Knowledge in basic functions of a microprocessor
CO2	Understand the instruction sets
CO3	Describe the use of various general purpose interfacing devices.
CO4	Demonstrate the Programmable timer and Counter
CO5	Illustrate the various management of microprocessors
CO6	Analyze an real time application programs using different types of processor

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L								
	CO2	H	L								
	CO3	L	L						H		
	CO4	H	L								
	CO5	H	L								
	CO6	H	H								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					
4	Approval	Academic Council Meeting								

UNIT – I INTRODUCTION

Introduction to 8086 assembly language programming - Development steps - Construction - Writing programs and Development Tools.

UNIT-II 8086 BASED SYSTEM DESIGN

Standard program structures - simple programs - Jumps - While do - repeat - until - delay loops. Strings - Procedures -Macros - Instruction Descriptions Assembler Directives.

UNIT-III INTERRUPT HANDLING

8086 Microcomputer - Observing Bus Signals - minimum mode system - Trouble shooting - 8086 interrupts - Interrupts Applications - Programmable times / Counter Interrupt controller.

UNIT-IV INTERFACING CONCEPTS

Parallel Ports-Handshaking - Interfacing Digital Devices-Analog Interfacing - Industrial Control.

UNIT-V MEMORY MANAGEMENT

DMA - DRAMS - Cache Memories - Co-processors - EDA Tools - 80286, 80386 and 80486 Microprocessors.

TEXT BOOKS:

1. S.Ghoshal, “Microprocessor System Design”
2. David J.Comer “Microprocessor Based system design”- Ten International Edition.
3. Douglas V Hall: "Microprocessors and Interfacing - Programming and Hardware" – TMH-1999.

REFERENCE BOOKS:

1. Yu-Cheng Liu, Glen A. Gibson -"Microcomputer Systems: The 8086/ 8088 family", Prentice Hall of India Private limited, 2001.
2. "Microprocessor Data Hand Book", BPB Publications, Revised Edition 2000, compiled by A. K. Jain
3. Barry B. Brey, "Programming the 80286, 80386, 80486 and Pentium - Based Personal Computer", Prentice Hall of India Private Limited.
4. K. Udayakumar and B. S. Umashankar - "Advanced Microprocessors and IBM - PC Assembly Language Prograrnming"- TMH - 1998.

Course Coordinator **HOD**

MMA105	MATHEMATICS FOUNDATION OF COMPUTER SCIENCE	L	T	P	C
	Total Contact Hours – 60	3	1	0	4
	Prerequisite –Mathematics Studied in Under Graduate				
	Course Coordinator Name & Department:Mr.V.Nandakumar/Mathematics				

COURSE OBJECTIVES:-

Learners will be familiar with basic definitions. Learners will understand the basic theorems and its applications . To equip students with adequate knowledge of Mathematics to formulate problems and solve them analytically or numerically

COURSE OUTCOMES (COs)

CO1	Interpret the basics of Mathematical logic.
CO2	Understand the concept of set theory.
CO3	Estimate the algorithm and Solvable techniques for roots of the equations.
CO4	Compute the different types of Numerical Differentiation Problems
CO5	Analyze the techniques in Numerical Integration equations
CO6	.Inference: the real life applications for different types of relations and functions in Algebraic Structures.

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L						H	L	M
	CO2	H	L								
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
						✓				

4	Approval	Academic Council Meeting

UNIT I:
MATHEMATICAL LOGIC: **12**

Statement Calculus – Connectives – normal forms – predicate Calculus - Theory of inference for statement calculus – Predicate calculus including theory of inference.

UNIT II:
SET THEORY: **12**

Basic concepts of set theory – relations and ordering – functions – recursion.

UNIT III:
ALGEBRAIC STRUCTURES: **12**

Semi groups – Monoids – grammars and languages – groups and subgroups- polish experiments and their compilation.

UNIT IV:
ROOTS OF EQUATIONS: **12**

Graphical Method – bisection Method – False position Method – Newton Raphson method – Secant method. Algebraic equations: Elimination – Gauss Jordan – LU Decomposition – Matrix Inverse – Gauss Seidel.

UNIT V:
NUMERICAL DIFFERENTIATION – INTEGRATION: **12**

Trapezoidal Rule – Simpson's Rule – Romberg Integration – Differential equations: Taylor's method – Euler's method – Runge Kutta $2^{nd\ and}$ 4^{th} order methods. Milne Predictor – corrector.

TEXT BOOK

1.Rudolf Lidl and Gunter Pilz, Applied Abstract Algebra, Spinger-Verlag, New York, 1984.

2.J.P.Tremblay and R. Manohar, Discrete Mathematical Structure with Applications to computer science, Tata McGraw Hill Edition – 1975.

3. Numerical Methods by A. Singaravelu. Meenakshi Publications 2000.

REFERENCE BOOK(S)

1.Williams E. Boyce and Richard C. Di Prima, Elementary differential equations and boundary value problems,John Wiley and sons, New York, 1967.
2. George F Simmons, Differential equations with applications and historical notes, Tata McGraw Hill, New Delhi, 1974

3. S.Wiitala, Discrete Mathematics- A Unified Approach, McGraw Hill Book Co.

Course Coordinator **HOD**

MCA1L1	LAB – I PROGRAMMING IN C LAB	L	T	P	C
	Total Contact Hours – 30	0	0	4	2
	Prerequisite – UG Level				
	Course Coordinator Name & Department:				

OBJECTIVES

- Understand the basic concepts of C programming. Practice the use of conditional and looping statements. Implement arrays, functions and pointers. Gain skills to handle strings and files.

COURSE OUTCOMES (COs)

CO1	Remember the effective use of C statements.
CO2	Understand the matrix operations.
CO3	Describe C features including arrays, structures, pointers and files.
CO4	Demonstrate to handle functions.
CO5	Illustrate the concept of database using structure and pointers.
CO6	Analyze a real time application by handling file operations.

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L								
	CO2	H	L								
	CO3	H	L							H	
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					
4	Approval	Academic Council Meeting								

S.NO	LIST OF PROGRAMS
1.	Determining whether the given number is prime or not
2.	Pascal's Triangle
3.	String Manipulation
4.	Matrix Multiplication
5.	Finding determinant of a Matrix
6.	Finding inverse of a Matrix
7.	Checking for Tautologies and Contradictions
8.	Euclidean's Algorithm for finding GCD
9.	Generating permutations
10.	Computing Combinations
11.	Creating database for telephone number and related operations. Use structures.
12.	Creating database for Web page addresses and related operations. Use pointers.
13.	File processing
14.	Finding roots of Quadratic equations

Course Coordinator **HOD**

MCA1L2	LAB – II MICROPROCESSOR LAB	L	T	P	C
	Total Contact Hours – 30	0	0	4	2
	Prerequisite – UG Level				
	Course Coordinator Name & Department:				

COURSE OBJECTIVES:-

Learners will be familiar with Using 8086 Microprocessor Kit/MASM software.

COURSE OUTCOMES (COs)

CO1	Remember simple programs using 8086 microprocessor kit
CO2	Understand programs using instruction set
CO3	Describe sorting & searching programs
CO4	Demonstrate the concept of functions
CO5	Illustrate strings using 8086 microprocessors
CO6	Analyze real time application programs using 8086 processor development tools

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L								
	CO2	L	L								
	CO3	H	L						H		
	CO4	H	H								
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					
4	Approval	Academic Council Meeting								

S.NO	LIST OF PROGRAMS(Using 8086 Microprocessor Kit/MASM software)
1.	Multiple addition/subtraction of signed numbers
2.	Computing LCM
3.	Computing GCD of N numbers
4.	Insertion Sort
5.	Selection Sort.
6.	Linear Search.
6.	Matrix Multiplication
8.	Computing Factorial.
9.	Computing NCR.
10.	Computing Fibonacci Series.
11.	Finding Memory Size.
12.	Clearing Screen
13.	Moving String of Characters on CRT
14.	Checking Password.
15.	Displaying Command Line parameter

Course Coordinator **HOD**

SEMESTER II

MCA201	OBJECT ORIENTED PROGRAMMING IN C++	L	T	P	C
	Total Contact Hours – 45	3	0	0	3
	Prerequisite – UG Level				
	Course Coordinator Name & Department:				

COURSE OBJECTIVES:-

Learners will be familiar with the basic programming in C++ concepts and to demonstrate the differences between traditional imperative design and object-oriented design.

COURSE OUTCOMES (COs)

CO1	Remember program using class object concepts
CO2	Comprehend OOPs concepts inheritance and polymorphism
CO3	Describe to handle functions, constructors and destructor.
CO4	Demonstrate the use problem-solving techniques.
CO5	Illustrate generic classes using template concepts.
CO6	Analyze real time application using C++

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L								
	CO2	H	L								
	CO3	H	L							H	
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					

4	Approval	Academic Council Meeting

UNIT I : INTRODUCTION **9**

Introduction about OOPS – Data types – Operators – Control Statements – Looping, Branching – Functions. Pointers.

UNIT II : CLASSES AND OBJECTS **9**

Classes and Objects – Nested or Inner Classes – Constructors – Destructors – Inline functions – Friends functions – This Operators

UNIT III : INHERITANCE **9**

Inheritance – Single – Multiple – Multilevel – Hybrid – Hierarchical

UNIT IV : POLYMORPHISMS **9**

Polymorphisms – Overloading – Functions – Operators – Virtual Functions – Pure Virtual Functions.

UNIT V : TEMPLATES AND FILE HANDLING **9**

Exception Handling - Templates – Functions template and Class templates – Files.

TEXT BOOKS:

1. Herbert Schildt ,C++ "The Complete Reference ", III Edition , 1999.
2. Brett D.Mclaughlin,Gray Police,Dave West "Head First Object Oriented Analysis And Design" First Edition.
3. D. Ravichandran, "Programming in C++" D. Ravichandran Tala McGraw Hill 2002.

REFERENCE BOOKS

1. Schaum's Outlines , "Programming with C++" , II edition, Tata McGraw Hill 2002.
2. BjaPN Stroustrup, "The C++ Programming language" Third Edition, Addison Wesley , 2000
3. https://www.whoishostingthis.com
4. Problem solving with C++: The Object of Programming, 4th Edition, Walter Savitch, Pearson Education.

Course Coordinator **HOD**

MCA202	DATA STRUTCURES AND ALGORITHMS	L	T	P	C
	Total Contact Hours – 60	3	1	0	4
	Prerequisite – UG Level				
	Course Coordinator Name & Department:				

COURSE OBJECTIVES:-

Learners will be familiar with basic data structure and algorithm analysis. Learners will understand the applications of data structure & able to apply the problem solving techniques using data structure.

COURSE OUTCOMES (COs)

CO1	Remember the fundamental data structure
CO2	Understand the concept of algorithmic design and implementation
CO3	Describe suitable data structure for developing a real time application
CO4	Demonstrate the algorithm for its complexity and performance
CO5	Illustrate data structures and algorithms on which file structures and data bases are based
CO6	Analyze an real time application using a suitable data structure

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	H								
	CO2	H	L								
	CO3	H	L								
	CO4	L	H								H
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					

4	Approval	Academic Council Meeting

UNIT-I INTRODUCTION **12**

Introduction - Lists - Stacks - Queues - Linear data structure, Array and Linked lists - Implementation – Applications

UNIT-II TREES **12**

Preliminaries- Binary Trees-The Search tree-ADT-Binary search Trees- AVL Trees-Sets and maps in the standard Library.

UNIT-III SORTING **12**

Sorting - Insertion sort - Quick sort - Merge sort - Heap sort - Sorting on several keys - External sorting.

UNIT – IV GRAPHS **12**

Graphs representation - Traversal - Topological tables and files - Sorting - Applications - Representation - Making techniques - Files - Sequential - Index sequential - Random access organization - implementation.

UNIT-V : ALGORITHM ANALYSIS AND DESIGN **12**

Algorithms - Time and space complexity - Sorting - Design techniques - Knapsack - Traveling salesman - Graph coloring - Squeezing.

TEXT BOOKS:

1. Kruse R. L.. Leung BP Tondo C. L., "Data Structures and program design in C", PHI. 1995.
2. Granville Barnett and luca dell tongo "Data structures and Alogorithms", First edition
3. Horowitz, Sahni, S. Rajsekaran, "Computer Algorithms", Galgotia, 2000.

REFERENCES:

1. Bills Horowitz, Sahni & Dinesh Mehta "Fundamental of data structuresin C++", Galgotia, 1999.
2. Tanenbaum A. S.Langram Y., Augestein M.J. "Data structures using C", PHI, 1992.
3. Jean, Paul tremblay, Paul. G Sorenson, "An introduction to data structures with application", Tata McGraw Hill, 1995.
4. https:www.geeksforgeeks.org/datastructure

Course Coordinator **HOD**

MCA203	OPERATING SYSTEMS	L	T	P	C
	Total Contact Hours – 45	3	0	0	3
	Prerequisite – UG Level				
	Course Coordinator Name & Department:				

COURSE OBJECTIVES:-

Learners having knowledge in basics of any computer system can understand the functions of system with the help of an operating system. The purpose of this course is providing a clear understanding of the concepts that underlie operating systems

COURSE OUTCOMES (COs)

CO1	Remember the fundamental concepts to gain knowledge about an operating system and the role it plays
CO2	Comprehend the high-level structure of operating systems, applications, andthe relationship between the process and its management.
CO3	Describe the behaviour of the different process scheduling and recovery from the deadlock
CO4	Demonstrate memory management and learn about different techniques to manage
CO5	Illustrate the concept of Virtual memory and file systems
CO6	Analyze different types of I/O system and ensuring security and authentication

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L								
	CO2	H	L								
	CO3	H	L						H		
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					

4	Approval	Academic Council Meeting

UNIT –I INTRODUCTION **9**

Multiprogramming – Time Sharing – Distributed system – Real Time systems – I/O structure – Dual Mode operation – Hardware protection – General System architecture – OS services – system calls – System programs – system design and implementation.

UNIT –II PROCESS MANAGEMENT **9**

Process concept – Concurrent process – Scheduling concept – CPU Scheduling algorithms –Multiple Processor scheduling.

UNIT –III PROCESS SYNCHRONIZATION **9**

Critical section – Synchronization hardware – semaphores Classical Problems of synchronization – Inter – process communication – Deadlock – Characterization, Prevention, Avoidance, and Detection.

UNIT –IV STORAGE MANAGEMENT **9**

Swapping, Single and Multiple Partition allocation – Paging – Segmentation – Paged Segmentation Virtual Memory – Demand Paging – Page replacement algorithm- Thrashing – Secondary storage Management Disk structure – Free Space Management – Allocation methods – Disk scheduling – Performance and reliability improvements – storage hierarchy.

UNIT –V FILES AND PROTECTION **9**

File system organization, File operations – Access Methods – Consistency semantics-Directory structure organization – File Protection – Implementation issues – Security – Encryption – Case Study – UNIX and Windows NT – Introduction to distributed OS design.

TEXT BOOKS:

1. Silberschatz and Galvin , “Operating System Concepts”, 4th Edition Addison Wesley Publishing co, 1995.
2. Milankovic . M “Operating System Concepts and Design”, 2nd Edition, McGraw Hill, 1992.
3. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, ―Operating System Concepts‖, 9th Edition, John Wiley and Sons Inc., 2012.

REFERENCE BOOKS:

1. Deital , “An Introduction to Operating System”, Addison Wesley Publishing Co.,1985.
   Gray Nutt, “Operating System”, A. Modern Perspective – 2000
2. Ramaz Elmasri, A. Gil Carrick, David Levine, ―Operating Systems – A Spiral Approach‖, Tata McGraw Hill Edition, 2010.
3. Achyut S.Godbole, Atul Kahate, ―Operating Systems‖, McGraw Hill Education, 2016.
4. Andrew S. Tanenbaum, ―Modern Operating Systems‖, Second Edition, Pearson Education, 2004.

Course Coordinator **HOD**

MCA204	SYSTEMS SOFTWARE	L	T	P	C
	Total Contact Hours – 45	3	0	0	3
	Prerequisite – UG Level				
	Course Coordinator Name & Department:				

COURSE OBJECTIVES:-

Learners having knowledge in basics of any computer system can understand the functions of system with the help of an system software. The purpose of this course is providing a clear understanding of the concepts that underlie system software

COURSE OUTCOMES (COs)

CO1	Remember the fundamental concepts to gain knowledge of computing and mathematics appropriate to the discipline
CO2	Comprehend the to analyze a problem, and define the computing requirements
CO3	Describe the problem, and identify and define the computing requirements appropriate to its solution
CO4	Demonstrate design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
CO5	Illustrate the function effectively on teams to accomplish a common goal
CO6	Analyze the professional, ethical, legal, security and social issues and responsibilities

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L								
	CO2	H	L								
	CO3	H	L						H		
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					
4	Approval	Academic Council Meeting								

UNIT-I INTRODUCTION **9**

Basic concepts – Machine Structure – Typical architectures.

UNIT-II ASSEMBLERS **9**

Functions – Machine dependent and Machine independent assembler features – Design and Implementation – Examples.

UNIT-III LOADERS AND LINKERS **9**

Functions – Machine dependent and Machine independent loaders features – Linkage editors – Dynamic linking – Boot –strap loaders – Implementation – Examples.

UNIT-IV MACRO PROCESSOR **9**

Functions – Features – Recursive macro expansion – General purpose macro processors – Macro processing within language translators – Implementation – Examples.

UNIT-V COMPILERS AND UTILITIES **9**

Introduction to compilers – Different phase of a compiler – simple one pass compiler – Code optimization techniques – System software tools – Text editors – Interactive debugging systems.

Text Books:

1. John J.Donovan, "Systems Programming", Tata McGraw Hill Edition, 1991.
2. Let and L.Beck, "System Software – An Introduction to system programming", 3rd edition,Addison – Wesley, 1999.
3. Dhamdhere D.M: Introduction to System Software. Tata Mc Graw Hill Pub. Co., 1986

Reference Books:-

1. D.M.Dharndhere, "System Programming and Operating Systems", Tata Mc Graw Hill Company, 1993.
2. A.U.Aho, Ravi Sethi and J.D. Ullman, "Compilers Principles, Techniques and Tools" Addison – Welsley, 1988.
3. Bharat T.M. Chandrasekar, "System Software Made easy", 1999.
4. A.U.Aho, Ravi Sethi and J.D. Ullman, "Principles of Compiler design", Addison Wesley, 1988.

Course Coordinator **HOD**

MMA205	STATISTICS	L	T	P	C
	Total Contact Hours – 60	3	1	0	4
	Prerequisite –Mathematics Studied in Under Graduate				
	Course Coordinator Name & Department:Mr.V.Nandakumar/Mathematics				

COURSE OBJECTIVES:-

Learners will be familiar with basic definitions. Learners will understand the basic theorems and its applications. To equip students with adequate knowledge of Mathematics to formulate problems and solve them analytically or numerically.

COURSE OUTCOMES (COs)

CO1	**Interpret** the knowledge in a Statistics background
CO2	**Understand** the detailed concept of Exponential distribution
CO3	**Estimate** the concepts of least squares – Regression lines.
CO4	**Analyze** the design of experiments
CO5	**Solve** the small & Large sample tests problems
CO6	**Inference** the real life applications for ANOVA CRD – RBD – LSD.

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	**COs/Pos**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	PSO1	PSO2	PSO3
2	CO1	H	L								
	CO2	H	L								
	CO3	H	L						H	L	M
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
									✓	

4	Approval	Academic Council Meeting

UNIT I: INTROUCTION **12**

Random Experiments – Probability – Baye's theorem – Random variables – Expectation – Variance – Chebychev's Inequality.

UNIT II: DISTRIBUTION **12**

Bivariate distribution – conditional and marginal Distributions – Standard Distributions: Binomial, geometric – Poisson- uniform- Normal –Exponential distribution.

UNIT III: CORRELATION & REGRESSION **12**

Introduction to correlation – Measures of Fitting of curves using method of least squares – Regression lines.

UNIT IV: TESTING OF HYPOTHESIS **12**

Sampling techniques – tests of hypotheses- small & Large sample tests – t test - Chi square test – F test.

UNIT V: ANALYSIS OF VARIENCE **12**

ANOVA – introduction – one way and two way methods – Design of experiments – CRD – RBD – LSD.

TEXT BOOKS:

1. Probability and statistics with reliability, Queueing and computer Science Applications –Trivedi K.S- Prentice Hall India 1994.
2. Johnson, R.A., Miller, I and Freund J., "Miller and Freunds Probability and Statistics for Engineers", Pearson Education, Asia, 8th Edition, 2015.
3. Milton. J. S. and Arnold. J.C., "Introduction to Probability and Statistics", Tata McGraw Hill, 4th Edition, 2007.

REFERENCE BOOKS:

1. Mood A.M , "Introduction to mathematical statistics", Graybill F. and Boes – Mcgraw hill 1974
2. Arnoid Allen, "Probability, Statistics and Queueing theory with computer science applications", 1978.
3. A.Singaravelu ,"Computer oriented statistical methods", - A.R Publications
4. Basinab A.P, "Elements of Probability and statistics", TMH 1993.

Course Coordinator **HOD**

MCA2L1	DATA STRUTCURES LAB	L	T	P	C
	Total Contact Hours – 30	0	0	4	2
	Prerequisite – UG Level				
	Course Coordinator Name & Department:				

COURSE OBJECTIVES:-

Learners will be familiar with the basic programming in C++ concepts and to gain knowledge to create real time application.

COURSE OUTCOMES (COs)

CO1	Remember the fundamental of data structure
CO2	Comprehend Single and multi dimensional array data structure
CO3	Describe the programs for Stack and Queue Operations
CO4	Demonstrate and implement the expressions for real time applications
CO5	Illustrate the Linked list operations.
CO6	Analyze the use of different searching and sorting methods for real time applications.

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L								
	CO2	H	L								
	CO3	H	L								H
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					
4	Approval	Academic Council Meeting								

S.NO	LIST OF PROGRAMS
1.	Implementation of Single Dimensional Arrays.
2.	Implementation of Multi Dimensional Arrays.
3.	Implementation of Stack (Using Arrays)
4.	Implementation of Stack (Using Pointers)
5.	Implementation of Queue (Using Arrays)
6.	Implementation of Queue (Using Pointers)
7.	Implementation of Circular Queue (using Arrays and Pointers)
8.	Infix to Postfix Expression Conversion
9.	Evaluation of Postfix Expressions
10.	Singly Linked List
11.	Doubly Linked List
12.	Circular Linked List
13.	Binary Tree Traversals (Preorder, Inorder, Postorder)
14.	Depth First Search
15.	Breadth First Search

Course Coordinator **HOD**

MCA2L2	OPERATING SYSTEMS LAB	L	T	P	C
	Total Contact Hours – 30	0	0	4	2
	Prerequisite – UG Level				
	Course Coordinator Name & Department:				

COURSE OBJECTIVES:-

Learners will gain knowledge to implement process management, CPU scheduling and IPC

COURSE OUTCOMES (COs)

CO1	Implement Inter Process Communication (IPC)
CO2	Develop program to implement wait & signal using Semaphores
CO3	Simulate Deadlock detection
CO4	Implement process scheduling algorithms
CO5	Simulate Producer – Consumer problem with limited buffers
CO6	Create an application to simulate various operating system concepts

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	P O3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L								
	CO2	H	L								
	CO3	H	L						H		
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					
4	Approval	Academic Council Meeting								

S.NO	LIST OF PROGRAMS
1.	Inter Process Communication (IPC) using Message Queues.
2.	IPC Using Pipes
3.	Implementation of wait and Signal using counting Semaphores
4.	Atomic Counter update problem
5.	IPC Using Pipes
6.	Implementation of wait and Signal using counting Semaphores
7.	Atomic Counter update problem
8.	Signaling processes
9.	Deadlock detection (for process passing messages)
10.	Process scheduling FCFS
11.	Process Scheduling: Least Frequency used.
12.	Process Scheduling: Round Robin
13.	Producer – Consumer problem with limited buffers

Course Coordinator **HOD**

SEMESTER III

MCA301	**PROGRAMMING IN JAVA**	**L**	**T**	**P**	**C**
	Total Contact Hours – 60	3	1	0	4
	Prerequisite – UG Level				
	Course Coordinator Name & Department:				

COURSE OBJECTIVES:-

Learners will be familiar with the basic programming in JAVA concepts and the ability to write a computer program to solve specified problems

COURSE OUTCOMES (COs)

CO1	Remember the basic concepts of object-oriented programming
CO2	Understand knowledge to develop a program using classes and objects
CO3	Describe Java SDK environment to create, debug and run simple Java programs
CO4	Demonstrate the programming concept to create packages
CO5	Illustrate Java streams & file operations
CO6	Analyze an real time application using AWT controls

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L								
	CO2	H	L								
	CO3	H	L								
	CO4	H	L							H	
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					
4	Approval	Academic Council Meeting								

UNIT-I INTRODUCTION **12**

Java features – Benefits – Applications – Data types – Expressions – Conditional and iteration executions – References – Arrays – Garbage Collection - Run time environment.

UNIT-II JAVA OBJECT MODEL **12**

Classes – Variables - Methods – Constructors – Access specifies – Inheritance – interface – Packages – Strings – Dynamic binding.

UNIT-III EXCEPTIONS AND THREADS **12**

Exceptions and Errors – Exception classes – Run time Exception – Uncompact Exception – Finally Block – User Defined Exception – Creating Threads – Controlling Threads – Multithreading – Thread Properties – Thread groups.

UNIT-IV JAVA I/O **12**

Java streams – File class – Serialization – Applets.

UNIT-V AWT **12**

AWT controls – Panel – Layout Managers – Event Handling – Event Listener – Dialog box – Menus – Graphics context.

TEXT BOOKS:

1. Java 2: "The Complete Reference", 3rd Edition – TMGH – 1999 P.Naughton and H.Schildt.
2. "Java Secrets" IDG Book World.
3. Cay S. Horstmann and Gary Cornell, "Core Java: Volume I – Fundamentals", Eighth Edition, Sun Microsystems Press, 2008.

REFERENCE BOOKS:

1. Joseph. L. Weber- "Using Java 2-EEE "-Prentice Hall of India – 1998.
2. Patrick Henry Winston & Sundar Narsimbhan "Onto Java "- Addison Wesley – 1996
3. Daniel Groner, K. C. Hoipson-"Java Language API Super Bible" – Waite Grocey Press 1996.
4. K. Arnold and J. Gosling, "The JAVA programming language", Third edition, Pearson Education, 2000.

Course Coordinator **HOD**

MCA302	DESIGN ANALYSIS OF ALGORITHMS	L	T	P	C
	Total Contact Hours – 60	3	1	0	4
	Prerequisite – UG Level				
	Course Coordinator Name & Department:				

COURSE OBJECTIVES:-

Learners will understand asymptotic notations. Gain knowledge in Divide and Conquer method, Dynamic programming, Back tracking & Branch and Bound problem and able to apply for real time applications.

COURSE OUTCOMES (COs)

CO1	Remember the basic concepts of time and space complexity
CO2	Understand the concepts of Divide and Conquer method for Sorting
CO3	Describe shortest path problem using Dynamic programming
CO4	Demonstrate Ability to solve 8 queens problem and graph coloring using backtracking
CO5	Illustrate the Handle Travelling Salesman problem using Branch and Bound method
CO6	Analyze real time application by applying these methods and finding it performance and complexity

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L								
	CO2	H	L								
	CO3	H	L								
	CO4	H	L								H
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					
4	Approval	Academic Council Meeting								

UNIT I: INTRODUCTION **12**

Fundamentals of algorithmic problem solving – Important problem types – Fundamentals of the analysis of algorithm efficiency – analysis frame work – Asymptotic notations – Mathematical analysis for recursive and non-recursive algorithms.

UNIT II: DIVIDE AND CONQUER METHOD AND GREEDY METHOD **12**

Divide and conquer methodology – Merge sort – Quick sort – Binary search – Binary tree traversal – Strassen's matrix multiplication – Greedy method – Prim's algorithm – Kruskal's algorithm – Dijkstra's algorithm.

UNIT III: DYNAMIC PROGRAMMING **12**

Single source shortest paths – Multi stage graphs – 0/1Knapsack problem – String editing.

UNIT IV: BACKTRACKING **12**

Backtracking – 8-Queens problem – Hamiltonian circuit problem – Subset sum problem – Graph coloring

UNIT V: BRANCH AND BOUND AND NP-HARD, COMPLETE PROBLEMS **12**

Branch and bound – General method – Traveling salesman problem - P & NP problems – NP-complete problems – Approximation algorithms for NP-hard problems

Text Book:

1. Ellis Horowitz, Sartaj Sahni and S. Rajasekaran "Fundamentals of computer Algorithms" Universities Press 2nd Edition 2007.
2. Anany Levitin, Introduction to the Design and Analysis of Algorithms, Third Edition, Pearson Education, 2012.
3. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, Computer Algorithms/ C++, Second Edition, Universities Press, 2007.

Reference Book:

1. Thomas H.Cormen, Charles E.Leiserson, Ronald L.Rivest, "Introduction to algorithms" Prentice Hall 1990.
2. Harsh Bhasin, Algorithms Design and Analysis, Oxford university press, 2016.
3. S. Sridhar, Design and Analysis of Algorithms, Oxford university press, 2014.
4. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, Data Structures and Algorithms, Pearson Education, Reprint 2006.

Course Coordinator **HOD**

MCA303	VISUAL PROGRAMMING	L	T	P	C
	Total Contact Hours – 45	3	0	0	3
	Prerequisite – UG Level				
	Course Coordinator Name & Department:				

COURSE OBJECTIVES:-

Learners will understand about visual programming and how to use concept in visual programming.

COURSE OUTCOMES (COs)

CO1	Remember the programming control structures of sequence, selection and iteration using Visual Basic.
CO2	Understand, Create and manipulate variables.
CO3	Create sub procedures and functions using Visual Basic
CO4	Describe the Use string manipulation
CO5	Demonstrate sequential files in Visual Basic.
CO6	Analyze and Write syntactically correct statements using local and global variables, sub procedures, forms, and Windows Environment calls.

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L								
	CO2	H	L								
	CO3	H	L							H	
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					
4	Approval	Academic Council Meeting								

UNIT I INTRODUCTION **9**

Customizing a form – writing simple programs – toolbox creating controls – name property – command button – access key – image control – textboxes – labels – message boxes – grid – editing tools – variables – data types – strings – numbers.

UNIT II FUNCTION AND PROCEDURES **9**

Displaying information – determinate loops – indeterminate loops – conditionals – build in functions – functions and procedures.

UNIT III ARRAYS AND RECORDS **9**

List - arrays – sorting and searching – records – control arrays – combo boxes – grid control – projects with multiple forms – do events and sub main – error trapping.

UNIT IV OBJECTS IN VISUAL BASIC **9**

VB objects – dialog boxes – common control – menus – MDI forms – testing debugging and optimization – work with graphics.

UNIT-V FILE HANDLING **9**

Monitoring mouse activity – file handling – file system controls – file system objects – COM/OLE – automation – DLL services – OLE drag and drop.

TEXTBOOKS:

1. Graycornell-"Visual Basic 6.0 from the Ground up"- Tate Mc GrawHill-1999
2. Noeljerke- "Visual Basic 6.0"Complete Reference) Tate Mc GrawHill-1999
3. B. Siler and J. Spotts, 2001, Special Editor using Visual Basic 6, PHI, New Delhi.

REFERENCE BOOKS:

1. Evangels Petroutsos, Kevin Hough-"Visual Basic Developer's Hand Book," BPB Publication, 1998.
2. Lowell Mauro," Visual Basic 6 Tech Media 1998
3. John Haring Ton, Mark Spank," Visual Basic Interactive Course ", Tech Media, 1997.
4. Visual Basic 2008 For Dummies

Course Coordinator **HOD**

MCA304	FINANCIAL AND MANAGEMENT ACCOUNTING	L	T	P	C
	Total Contact Hours – 60	3	1	0	4
	Prerequisite course – UG Level				
	Course Coordinator Name &Department:-Dr.S.Kamaraj/Commerce & Economics				

COURSE OBJECTIVES:-

- To understand the basic principles of double entry system and preparation of balance sheet.

COURSE OUTCOMES (COs)

CO1	Recall the principle of Accounting, Trial balance, Financial Statement
CO2	Report the Marginal Costing, Cost Volume profit ,Budgeting
CO3	Operate the Capital Investment, ARR Method,
CO4	Determine the Net Present Value Method, Discount cash flow method
CO5	Predict Making of Break even analysis and Budget forecasting
CO6	Compare the Trading ,Profit &loss account, Balance sheet

Mapping of Course Outcomes with Program outcomes (POs) (1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	M								
	CO2			H		H					
	CO3	H		M							
	CO4						H	M			
	CO5				H						
	CO6			H							

3	Category	Humanities & SocialStudies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship(PR)
						√				

4	Approval	Academic Council Meeting

UNIT I: FINAL ACCOUNTS **12**

Principles of Accounting: Principles of double entry -Assets and Liabilities - Accounting records and systems - Trial balance and preparation of financial statements - Trading, Manufacturing, Profit and Loss accounts, Balance Sheet including adjustments(Simple problems only).

UNIT II:RATIO ANALYSIS **12**

Analysis and Interpreting Accounts and Financial Statements: Ratio analysis - Use of ratios in interpreting the final accounts (trading accounts and loss a/c and balance sheet) - final accounts to ratios as well as ratios to final accounts.

UNIT III: MARGINAL COSTING **12**

Break-even analysis and Marginal Costing: Meaning of variable cost and fixed cost - Cost-Volume-Profit analysis – calculation of breakeven point, Profit planning, sales planning and otherdecision – making analysis involving break - even analysis - Computer Accounting and algorithm.(differential cost analysis to be omitted)

UNIT IV: BUDGET FORECASTING **12**

Budget/Forecasting: preparation of and Characteristics of functional budgets, Production, sales, Purchases, cash and flexible budgets.

UNIT V : CAPITAL BUDGETING **12**

Project Appraisal: Method of capital investment decision making: Payback method , ARR method - Discounted cash flows - Net Present values - Internal rate of return - Sensitivity analysis - Cost of capital.

TEXT BOOKS

1. Shukla M.C. & T.S. Grewal, 1991, Advanced Accounts, S.Chand& Co. New Delhi.
2. Gupta R.L. & M. Radhaswamy, 1991, Advanced Accounts Vol. II, Sultan Chand & Sons, New Delhi.
3. Man Mohan & S.N. Goyal, 1987, Principles of Management Accounting, Arya Sahithya Bhawan.

REFERENCE BOOKS

1.T.S. Reddy & Hari Prasad Reddy – Management Accounting – Margham Publications, Chennai.2014
2. R C Sekhar and A V Rajagopalan , Management Accounting , oxford university press, 20
3. S.P. Gupta – Management Accounting – Sultan Chand & Sons, New Delhi. 2010
4. Dr. Maheswari S.N.- Management Accounting, Sixth Edition, January 2018

Course Coordinator **HOD**

MCA3L1	PROGRAMMING IN JAVA LAB	L	T	P	C
	Total Contact Hours – 30	0	0	4	2
	Prerequisite – UG Level				
	Course Coordinator Name & Department:				

COURSE OBJECTIVES:-

Ability to develop application using java SDK environment, AWT and Applet

COURSE OUTCOMES (COs)

CO1	Remember the simple java program using OOPs concepts
CO2	Understand the use of an interface and implement predefined classes.
CO3	Describe packages and apply exception handling in real time application
CO4	Demonstrate the concept of thread
CO5	Illustrate applications using AWT and Applet.
CO6	Analyze and handle Frames & Layout

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	H								
	CO2	H	L								
	CO3	H	L							H	
	CO4	L	H								
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					
4	Approval	Academic Council Meeting								

S.NO	LIST OF PROGRAMS
1.	Determining the order of numbers generated randomly using Random Class.
2.	Implementation of Point Class for Image manipulation
3.	Usage of Calendar Class and manipulation
4.	String Manipulation using Char Array
5.	Database Creation for string e-mail address and manipulation
6.	Usage of Vector Classes
7.	Implementing Thread based applications and Exception Handling (Synchronization and a synchronization)
	APPLETS
8.	Working with frames and various controls.
9.	Working with Dialogs and Menus
10.	Working with Panel and Layout

Course Coordinator **HOD**

MCA3L2	VISUAL PROGRAMMING LAB	L	T	P	C
	Total Contact Hours – 30	0	0	4	2
	Prerequisite – UG Level				
	Course Coordinator Name & Department:				

COURSE OBJECTIVES:-

Learners will understand about visual basics and how to use concept in visual programs.

COURSE OUTCOMES (COs)

CO1	Remember new ideas and advances, techniques, and tools and to use them effectively
CO2	Understand the Visual Basic programming language in the aspects of designing, coding and implementation
CO3	Describe client server based applications
CO4	Demonstrate the Design, develop, test
CO5	Illustrate the debug VB programs using SDI development environments
CO6	Analyze the develop, test and VB programs using SDI development environment

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L								
	CO2	H	L								
	CO3	H	L							H	
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					

4	Approval	Academic Council Meeting

S.NO	LIST OF PROGRAMS
1.	SDI
2.	MDI
3.	Drawing inside View Windows, Device Context
4.	Message Map
5.	Event Handling
6.	Graphics Devices, Colors and Fonts
7.	Dialog Controls
8.	Static and Dynamic Controls
9.	Creating Pop-Up menus
10.	Tool Bar and Status Bar
11.	SDI with Serialization

Course Coordinator **HOD**

SEMESTER IV

MCA401	**DATABASE TECHNOLOGY**	**L**	**T**	**P**	**C**
	Total Contact Hours – 60	3	1	0	4
	Prerequisite course – UG Level				
	Course Coordinator Name & Department:-				

COURSE OBJECTIVES:-

Learners will gain knowledge in basics of Database Technology,file management and transaction processing

COURSE OUTCOMES (COs)

CO1	Remember the fundamental elements of relational database management
CO2	Understand the basic concepts of relational data model, entity-relationship model, Relational database design, relational algebra and SQL.
CO3	Describe the various ER-models and object oriented model to represent simple database application scenarios
CO4	Demonstrate the storage and file structure for a database
CO5	Illustrate and improve the database design by normalization.
CO6	Analyze the database system architecture.

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO 3	PO4	PO5	PO6	PO7	PS O1	PS O2	PSO3
2	CO1	H	L								
	CO2	H	L								
	CO3	H	L								H
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					
4	Approval	Academic Council Meeting								

UNIT I: INTROUDCTION **12**

Database concepts / basic concepts / constraints / keys ER diagram / reduction or ER schema / UML/ design of an ER database schema / relational model / relational algebra / views / relational database / SQL / structure / set quotation / sub queries / join relation / DDL / DML / embedded SQL,QBE.

UNIT II: INTEGRITY AND SECURITY **12**

Integrity & security / domain constraints / referential integrity / assertion / triggers / authorization in SQL / relational database design / 1, 2, 3, 4, BCNF normal forms / decomposition

UNIT III: OBJECT RELATIONAL DATA MODEL **12**

Object relational data model / nested relations / complex types / inheritance / reference / types / querying with complex / types / functions & procedures / object oriented versus object relational / intro to xml concepts.

UNIT IV: STORAGE AND FILE STRUCTURE **12**

Storage and file structure / physical storage media / file organization, data dictionary storage, queryprocessing / selection operation / sorting / join operation transaction / concepts / state / atomicity and amiability / Serialisability / transaction definition in sql / concurrency control / protocols / protocols / deadlock handling

UNIT V: SYSTEM ARCHITECTURE **12**

Database system architecture / centralized & client server architecture / server system architecture / case study / oracle.

TEXT BOOK:

1. Silberschatz, H.F. Korth and S. Sudharshan, 2006, Database System Concepts, 5th Edition, Tata McGraw Hill, New Delhi.
2. Henry F Korth, Abraham Silberschatz and S. Sudharshan, "Database System Concepts", Sixth Edition, McGraw Hill, 2011.
3. C.J.Date, A.Kannan and S.Swamynathan,"An Introduction to Database Systems", Eighth Edition, Pearson Education, 2006.

REFERENCE BOOKS:

1. Silbersehatz, h.f. korth and sudharshan / database system concepts / iv ed / mcgraw hill
2. Jeffrey .d. ullman / principles of database systems / galgotia
3. R. Elmasri, S.B. Navathe, "Fundamentals of Database Systems", Fifth Edition, Pearson Education/Addison Wesley, 2007.
4. Thomas Cannolly and Carolyn Begg, "Database Systems, A Practical Approach to Design, Implementation and Management", Third Edition, Pearson Education, 2007.
5. Subramaniam, " Multimedia Databases", Morgan Kauffman Publishers, 2008.

Course Coordinator **HOD**

MCA402	WEB TECHNOLOGY	L	T	P	C
	Total Contact Hours – 60	4	0	0	4
	Prerequisite course – UG Level				
	Course Coordinator Name & Department:-				

COURSE OBJECTIVES:-

Learners will be familiar with the basic concepts of web technology and Understand the various steps in designing a creative and dynamic website.

COURSE OUTCOMES (COs)

CO1	Remember the basic internet concepts
CO2	Understand the dynamic and interactive web pages
CO3	Describe and create Events and functions in java script
CO4	Demonstrate the fundamentals of xml
CO5	Illustrate the use of vb script functions
CO6	Analyze with data base for real time application.

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L								
	CO2	H	L							H	
	CO3	H	H								
	CO4	L	L								
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					

4	Approval	Academic Council Meeting

UNIT I: INTRODUCTION **12**

Basic Web Concepts - How the web server works – static web pages-Dynamic web pages-How scripting languages work – Server side scripting Language – Client Side Scripting – Introduction to Common HTML

UNIT II: HTML **12**

Links and Addressing –Linking in HTML –Images and Anchor –HTML and Images –HTML Image Basics – ALT Attributes – Image Alignment – HSPACE and VSPACE – HEIGHT and WIDTH –Layout with Tables – Introduction Tables – Simple Tables – ROWSPAN and COLSPAN – Tables for Layout– Frames –Simple Frame Example-Forms – Form Controls-Text Controls-Additional <Input> Type- New and Emerging Form Elements – <Button Elements>- Labels.

UNIT III: JAVA SCRIPT **12**

Core Java Script – Variables-Constant – Experssions Conditions- Relational Operators- Data Types – FlowControl – Functions-Objects – Data type Conversion & Equality – Windows and Frames – Forms and data.

UNIT IV: XML **12**

Characteristics of Markup Languages- Examples of Markup Languages-What is XML – The data revolution-Breaking beyond data display-Well Formed Documents - Valid Documents - Writing DTDs - Styling XML – XSL.

UNIT V: VB SCRIPT **12**

VB Script- Operators- Math Functions-Date and Functions-Unsupported array functions and statements-Unsupported string functions, statements and constructs-String Constants-Conversion Functions-Unsupported Conversion Functions.

TEXT BOOKS

1. Professional Java Script 2nd Edition – April 2002 (Chapter 2,4,5)
2. Eric Ladd, Jim O'Donnel –"**Using HTML 4, XML and JAVA**"-Prentice Hall of India - 1999.
3. Rajkamal, "Web Technology", Tata McGraw-Hill, 2001.

REFERENCE BOOKS

1. "**Web Server Programming** "– Nail Grey –Wiley Publications –2004.
2. HTML BLOCK BOOK.
3. Professional IBM Websphere 5.0 – Tim Francis , Eric Harness –SPD Publications –2003
4. Aferganatel, "Web Programming: Desktop Management", PHI, 2004.

Course Coordinator **HOD**

MCA403	SOFTWARE PROJECT MANAGEMENT	L	T	P	C
	Total Contact Hours – 60	3	1	0	4
	Prerequisite course – UG Level				
	Course Coordinator Name & Department:-				

COURSE OBJECTIVES:-

Learners will understand basic project management skills with a strong emphasis on issues and problems associated with delivering successful IT projects

COURSE OUTCOMES (COs)

CO1	Remember what is a product, project and process is.
CO2	Understand Product Development Life Cycle
CO3	Describe the Goal and Scope of the Software Project
CO4	Demonstrate the software project development process.
CO5	Illustrate the scheduling algorithm for software project management
CO6	Analyze real time software with quality assurance and its requirements

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L								
	CO2	H	L								
	CO3	H	L						H		
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					
4	Approval	Academic Council Meeting								

UNIT I: INTRODUCTION **12**

Introduction to Competencies - Product Development Techniques - Management Skills - Product Development Life Cycle - Software Development Process and models - The SEI CMM - International Organization for Standardization.

UNIT II: DOMAIN PROCESSES **12**

Managing Domain Processes - Project Selection Models - Project Portfolio Management - Financial Processes - Selecting a Project Team - Goal and Scope of the Software Project - Project Planning - Creating the Work Breakdown Structure - Approaches to Building a WBS - Project Milestones - Work Packages - Building a WBS for Software.

UNIT III: SOFTWARE DEVELOPMENT **12**

Tasks and Activities - Software Size and Reuse Estimating - The SEI CMM - Problems and Risks - Cost Estimation - Effort Measures - COCOMO: A Regression Model - COCOMO II - SLIM: A Mathematical Model - Organizational Planning - Project Roles and Skills Needed.

UNIT IV: SCHEDULING ACTIVITIES **12**

Project Management Resource Activities - Organizational Form and Structure - Software Development Dependencies - Brainstorming - Scheduling Fundamentals - PERT and CPM - Leveling Resource Assignments - Map the Schedule to a Real Calendar - Critical Chain Scheduling.

UNIT V: QUALITY ASSURANCE **12**

Quality: Requirements – The SEI CMM - Guidelines - Challenges - Quality Function Deployment - Building the Software Quality Assurance - Plan - Software Configuration Management: Principles - Requirements - Planning and Organizing - Tools - Benefits - Legal Issues in Software - Case Study.

TEXT BOOK:

1. Robert T. Futrell, Donald F. Shafer, Linda I. Safer, “Quality Software Project Management”, Pearson Education, Asia, 2002.
2. Bob Hughes, Mike Cotterell and Rajib Mall: Software Project Management – Fifth Edition, Tata McGraw Hill, New Delhi, 2012.
3. Walker Royce: ―Software Project Management- Addison-Wesley, 1998.

REFERENCE BOOKS:

1. Pankaj Jalote, “Software Project Management in Practice”, Addison Wesley, 2002.
2. Hughes, “Software Project Management, 3/E”, Tata McGraw-Hill, 2004.
3. Robert K. Wysocki ―Effective Software Project Management – Wiley Publication, 2011.
4. Gopalaswamy Ramesh, ―Managing Global Software Projects – McGraw Hill Education (India), Fourteenth Reprint 2013.

Course Coordinator **HOD**

MCA4E1	MOBILE COMMUNICATION	L	T	P	C
	Total Contact Hours – 45	3	0	0	3
	Prerequisite course – UG Level				
	Course Coordinator Name & Department:-				

COURSE OBJECTIVES:-

Learners will understand basic network architectures, protocols or service algorithms and wireless networks and problems associated with applications and computing services supports the mobile user.

COURSE OUTCOMES (COs)

CO1	Remember the Applications and computing services supporting the mobile user
CO2	Understand the Network architectures, protocols, or service algorithms
CO3	Describe Performance characterization of mobile/wireless networks
CO4	Demonstrate the Data management and databases for mobile environments
CO5	Illustrate the Service integration and interworking of wired and wireless networks
CO6	Analyze Interaction between different layers of mobile or wireless systems

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L								
	CO2	H	L								
	CO3	H	L						H		
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					

4	Approval	Academic Council Meeting

UNIT I Introduction **9**

Introduction of Mobile Communication - Application - History - Market for Mobile Communications - Open Research topics - Simplified Reference Model - Overview - Wireless Transmission - Frequencies for Radio Transmission - Signal - Antennas - Signal Propagation - Multiplexing - Modulation - Spread Spectrum - Cellular Systems.

UNIT II Medium Access Control **9**

Medium Access Control - Motivation for Specialized MAC - SDMA - FDMA - TDMA - CDMA - Comparisons - GSM - DECT -TETRA - UMTS and IMT - 2000 - Satellite Systems - History Applications - Basics - Routing- Localization - Handover.

UNIT III Broadcast Systems **9**

Broad casting Systems - Overview - Cyclic Repetition - Digital audio Broadcasting - Digital Video Broadcasting - Wireless LAN - Infrared Vs Radio Transmission - Infrastructure and Ad hoc networks - IEEE 802.11 - HIPERLAN - Bluetooth.

UNIT IV Wireless ATM **9**

Wireless ATM - Motivation - Working group- WATM Reference model - Functions - Radio access layer - Handover- Location Management - Addressing - Quality of Service - Access Point layer- Handover- Location Management - Addressing - Quality of Service - Access Point control Protocol.

UNIT V Mobile Network Layers **9**

Mobile Network Layer- Mobile IP - Dynamic host Configuration Protocol - Ad hoc Networks - Mobile Transport layer - Transitional TCP - Indirect TCP - Snooping TCP - Mobile TCP - Transmissions - Transaction - Support for Mobility.

TEXT BOOKS:

1. "Mobile Communications" - Jochen Schiller, Pearson Education Asia Publication.
2. Prasant Kumar Pattnaik, Rajib Mall, Fundamentals of Mobile Computing, PHI Learning Pvt.Ltd, New Delhi – 2012
3. William C. Y Lee, "Mobile Cellular Telecommunication system"- Mcgraw Hill International Edition, 1990

REFERENCE BOOKS:

1. T. S. Rapport, "Wireless Communication" prentice hall NJ 2002
2. Dharma Prakash Agarval, Qing and An Zeng, “Introduction to Wireless and Mobile systems”,Thomson Asia Pvt Ltd, 2005.
3. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, Principles of Mobile Computing, Springer, 2003.
4. C.K.Toh, AdHoc Mobile Wireless Networks, First Edition, Pearson Education, 2002.
5. Android Developers : http://developer.android.com/index.html
6. Apple Developer : https://developer.apple.com/
7. Windows Phone Dev Center : http://developer.windowsphone.com
8. BlackBerry Developer : http://developer.blackberry.com

Course Coordinator **HOD**

MCA4 L1	WEB TECHNOLOGY LAB	L	T	P	C
	Total Contact Hours – 30	0	0	4	2
	Prerequisite course – UG Level				
	Course Coordinator Name & Department:-				

COURSE OBJECTIVES:-

Learners will gain knowledge to handle basic web concepts and to create a dynamic website.

COURSE OUTCOMES (COs)

CO1	Remember the basic internet concepts using html.
CO2	Understand dynamic and interactive web pages.
CO3	Describe web pages using CSS
CO4	Demonstrate Events and functions in java script
CO5	Illustrate Dynamic HTML to create website
CO6	Analyze application using HTML tags and JavaScript.

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L								
	CO2	H	L								
	CO3	H	L								
	CO4	H	L							H	
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					

4	Approval	Academic Council Meeting

S.NO	LIST OF PROGRAMS
1.	Create a simple page introducing your-self, how old you are, what you do, what you like and dislike. Modify the introduction to include a bullet list of what you do and put a list on the 5 things you like most and dislike is numbered lists. Create another page about your favorite hobby, and link it to (and from) your main page. Center something, and put a quote on one of your pages.
2.	Put an existing image on a web page. Create a table, use a heading and at least one use of row span / col span. Colour a page and some text within the page. Link to another site.
3.	Create a new file called index.html.
	a. Put the normal HTML document structure tags in the file.
	b. Give a title.
	c. At the bottom of the page (i.e. the last thing between the body tags) put the following:
4.	A horizontal rule.
5.	A link to your email-address (with your name between the tag); remember to put the link to your email address within address tags.
6.	A line break.
7.	The Date (I have this same structure at the bottom of this page)
8.	Above this Block (which is called the footer), put a title in heading tags.
9.	Add some text describing you. (You can split this into multiple headings and paragraphs if you want).
10.	Write a script to create an array of 10 elements and display its contents.

Course Coordinator **HOD**

MCA4L2	SOFTWARE DEVELOPMENT LAB	L	T	P	C
	Total Contact Hours – 30	0	0	4	2
	Prerequisite course – UG Level				
	Course Coordinator Name & Department:-				

COURSE OBJECTIVES:-

Learners to provide basic project management skills with a strong emphasis on issues and problems associated with delivering successful IT projects.

COURSE OUTCOMES (COs)

CO1	Remember SRS document, design document &test cases
CO2	Understand the lifecycle for a software product.
CO3	Describe the quality and performance of software.
CO4	Demonstrate the project development process.
CO5	Illustrate the development life cycle for various applications.
CO6	Analyze a real time project for the client.

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L								
	CO2	H	L							H	
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					
4	Approval	Academic Council Meeting								

S.NO	LIST OF PROGRAMS
1.	Library Information Processing.
2.	Students Mark Sheet Processing.
3.	Telephone Directory maintenance.
4.	Gas Booking and delivery system.
5.	Electricity Bill Processing.
6.	Bank Transactions.
7.	Pay Roll Processing.
8.	Inventory
9.	Question Database and conducting Quiz.
10.	Purchase Order Processing.

Course Coordinator **HOD**

SEMESTER V

MCA501	MULTIMEDIA SYSTEMS	L	T	P	C
	Total Contact Hours – 60	4	0	0	4
	Prerequisite course – UG Level				
	Course Coordinator Name & Department:-				

COURSE OBJECTIVES:-

Learners gain the ability to create quality animation performance through a creative and professional portfolio using principles of animation, drawing, design, artistic expertise and innovation. Learners will have refined communications skills and the adaptability to work within a dynamic animation community.

COURSE OUTCOMES (COs)

CO1	Remember a significant knowledge on fundamental and advanced aspects of animation, video and informational graphics.
CO2	Understand the fundamental tools of multimedia
CO3	Describe and interpret Multimedia data.
CO4	Demonstrate the different components of multimedia
CO5	Illustrate the vector graphics and 2D animations, making use of various tools and animation techniques provided by Flash
CO6	Analyze multimedia software skills at an intermediate level to complete projects using audio, text and visual imagery.

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L								
	CO2	H	L								
	CO3	H	L							H	
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					
4	Approval	Academic Council Meeting								

UNIT I: INTRODUCTION **12**

Definitions - CD - Rom and the multimedia highway - where to use multimedia - Introduction - to making multimedia : The stages of a project - What you need - Multimedia skills and Training : The team - Macintosh and windows production platforms: Macintosh versus PC - The Macintosh platform - The windows Multimedia PC Platform - Networking Macintosh and windows computers - Hardware peripherals - Connection - Memory and stage Devices - Input Devices-Output Hardware - Communication Devices.

UNIT II: FUNDAMENTAL TOOLS OF MULTIMEDIA **12**

Basic Tools - Text editing and word processing Tools- OCR Software - Painting and Drawing Tools - 3-D Modeling and Animation Tools - Image - Editing Tools - Sound Editing Tools - Animation, Video and Digital Movie Tools - Helpful Accessories- Making Instant Multimedia - Linking Multimedia Objects - Office - Suites - Word Processors - Spreadsheets - Databases - Presentation Tools - Multimedia Authoring Tools: Types of Authoring Tools - cards -and- Page - Based Authoring Tools - Icon - Based Authoring Tools - Time Based Authoring Tools-Object - Oriented Authoring Tools - Cross Platform Authoring Notes.

UNIT III: COMPONENTS OF MULTIMEDIA **12**

Text: The Power of meaning: About fonts and Faces - Using Text in Multimedia - Computers and text - Font Editing and Design Tools - Hypermedia and Hypertext -Sound: The Power of Sound- Multimedia System Sounds - MIDI Versus Digital Audio -Digital Audio -Making MIDI Audio - Audio File formats - Working with sound on the Macintosh - Notation Interchange file Format (NIFF) - Adding sound to your multimedia Project - Toward Professional sound : The Red Book standard - Production Tips.

UNIT IV: IMAGES- AND ANIMATION **12**

Images: Making still Images - colours - Image File formats - Animation: The Power of Motion - Principles of Animation - Making Animations that work - Video: Using Video - How Video works Broadcast Video standards - Integrating Computers and Television - shooting and Editing video - Video Tips - Recording formats -Digital Video.

UNIT V: PROJECT PLANNING AND MAINTENANCE **12**

Planning and Costing: Project Planning - Estimating - REPs and Bit Proposals - Designing and producing - Designing - Producing - Content and Talent: Acquiring content - Using content created by others - Using Talent - Delivering : Testing - Preparing for Delivery - Delivering on CD-Rom - Compact Disc Technology - Wrapping It up - Delivering on the World wide web.

TEXT BOOKS:

1. Tay Vaughan - "Multimedia Making it Work" - Fourth Edition Tata McGraw Hill Edition -1999.
2. Walterworth John A - "Multimedia Technologies and Application"-Ellies Horwod Ltd - London - 1991.
3. Andleigh, P. K and Kiran Thakrar, “Multimedia Systems and Design”, PHI, 2003.

REFERENCE BOOKS:

1. John F Korgel Buford -"Multimedia Systems"-ACM press, 2001
2. Rajneesh Agarwal, Bharath Bhushan Tiwari – Excel books,2000
3. Erik Holsinger-“How Multimedia works”, Ziff davis Press 1994.
4. Judith Jeffcoate, “Multimedia in practice: Technology and Applications”, PHI, 1998.

Course Coordinator **HOD**

MCA502	COMPUTER NETWORKS	L	T	P	C
	Total Contact Hours – 60	4	0	0	4
	Prerequisite course – UG Level				
	Course Coordinator Name & Department:-				

COURSE OBJECTIVES:-

Learners will gain knowledge in computer networks and concentrates on building a firm foundation for understanding Data Communications and Networks.

COURSE OUTCOMES (COs)	
CO1	Remember the layers of OSI and TCP/IP networks.
CO2	Understand the solution for the error control and flow control problems.
CO3	Describe the working principles of IP layer and its routing algorithms.
CO4	Demonstrate the functionalities of transport layer protocols and its congestion control mechanism.
CO5	Illustrate the functionalities of application layer protocols.
CO6	Analyze network security and cryptography

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L								
	CO2	H	L								
	CO3	H	L						H		
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					
4	Approval	Academic Council Meeting								

UNIT I: INTRODUCTION **12**

Introduction – Network Hardware – Software – Reference Models – OSI and TCP/IP models – Example networks: Internet, ATM, Ethernet and Wireless LANs - Physical layer – Theoretical basis for data communication - guided transmission media.

UNIT II: WIRELESS TRANSMISSION **12**

Wireless transmission - Communication Satellites – Telephones structure –local loop, trunks and multiplexing, switching. Data link layer: Design issues – error detection and correction.

UNIT III: DATA LINK LAYER **12**

Elementary data link protocols - sliding window protocols – Data Link Layer in the Internet - Medium Access Layer – Channel Allocation Problem – Multiple Access Protocols.

UNIT IV: NETWORK LAYER **12**

Network layer - design issues - Routing algorithms - Congestion control algorithms – IP protocol – IP Address – Internet Control Protocol.

UNIT V: TRANSPORT LAYER **12**

Transport layer - design issues - Connection management - Addressing, Establishing & Releasing a connection – Simple Transport Protocol – Internet Transport Protocol (TCP) - Network Security: Cryptography.

Texts Books

1. S.Tanenbaum, 2003, Computer Networks, Fourth Edition, - Pearson Education, Inc, (Prentice hall of India Ltd), Delhi.
2. Behrouz A. Forouzan, Data Communications and Networking, Fifth Edition TMH, 2013.
3. Larry L. Peterson, Bruce S. Davie, Computer Networks: A Systems Approach, Fifth Edition, Morgan Kaufmann Publishers Inc., 2012.

Reference Books

1. F. Halsall, 1995, Data Communications, Computer Networks and Open Systems, Addison Wesley.
2. D. Bertsekas and R. Gallagher, 1992, Data Networks, Prentice hall of India, New Delhi.
3. Lamarca, 2002, Communication Networks, Tata McGraw Hill, New Delhi.
4. Ying-Dar Lin, Ren-Hung Hwang and Fred Baker, Computer Networks: An Open Source Approach, McGraw Hill Publisher, 2011.
5. William Stallings, Data and Computer Communications, Tenth Edition, Pearson Education, 2013. 3. Nader F. Mir, Computer and Communication Networks, Second Edition, Prentice Hall, 2014.

Course Coordinator **HOD**

MCA503	PROGRAMMING IN ASP.NET	L	T	P	C
	Total Contact Hours – 60	3	1	0	4
	Prerequisite course – UG Level				
	Course Coordinator Name & Department:-				

COURSE OBJECTIVES:-

Learners will be familiar with basics of the ASP .NET. Learners will understand the design and implementation of the complete applications over the web

COURSE OUTCOMES (COs)

CO1	Remember the basic concepts of developing and creating ASP .Net Applications
CO2	Understand the usage of web controls and forms
CO3	Describe the development products of Microsoft Visual Studio.Net® products
CO4	Demonstrate the implementation and connect the automated system to a database stored on a
CO5	Illustrate how to link and publish Visual Studio.Net® applications to reflect a web application.
CO6	Analyze an real time application using ASP .NET

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L								
	CO2	H	L								
	CO3	H	L							H	
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					

4	Approval	Academic Council Meeting

UNIT I: INTRODUCTION TO .NET FRAMEWORK **12**

Genesis of .Net – Features of .Net - .Net binaries – Microsoft Intermediate Language – Meta Data - .Net types and .net name spaces – Common Language Runtime – Common Type System – Common Language Specification - .Net Applications using command line compiler and visual studio .net IDE.

UNIT II: BASICS OF ASP. NET **12**

Introducing ASP.NET – Creating and deploying ASP .NET applications – Web forms – Web controls – working with events – Rich web controls – Custom web controls – Validation controls – Debugging ASP .NET pages.

UNIT III: ADVANCED ASP .NET **12**

ASP .NET configuration – Business objects – HTTP Handlers – Caching in ASP .NET – ASP .NET security – Localizing ASP .NET applications – Deployment projects.

UNIT IV BUILDING WEB SERVICES **12**

Introduction to web services – Web services Infrastructure – SOAP – Building a web service – Deploying and publishing web services – Finding web services – Consuming web services.

UNIT V ADO .NET **12**

Basics of ADO .NET – Changes from ADO – Data Table – Data Views – Data Set – Data Relation Type – ADO .NET Managed Providers – OlEDB and SQL Managed Providers – OlEDB Data Adapter Type.

TEXT BOOKS:

1. Andrew Troelsen – **"C# and the .Net Platform"** – Apress – 2001(Unit I and II)
2. Mridula Parihar, et. al. – **"ASP .NET Bible"** – Wiley-dreamtech India Pvt. Ltd. – 2002.
3. Herbert Schildt, "The Complete Reference: C# 4.0", Tata Mc Graw Hill, 2012. 2. Christian Nagel et al. "Professional C# 2012 with .NET 4.5", Wiley India, 2012

REFERENCE BOOKS:

1. David S. Platt – **"Introducing .Net"** – Microsoft Press – 2002.
2. Alex Homer et. al. – **"Professional ASP .NET 1.1"** – Wiley-dreamtech India Pvt. Ltd. – 2004.
3. Rebecaa M. Riordan – **"ADO .Net step by step"** - Microsoft Press.
4. Ian Griffiths, Matthew Adams, Jesse Liberty, "Programming C# 4.0", Sixth Edition, O"Reilly, 2010.

Course Coordinator **HOD**

MCA5E1	SOFTWARE TESTING	L	T	P	C
	Total Contact Hours – 45	3	0	0	3
	Prerequisite – UG Level				
	Course Designed by – Dept of Computer Applications				

COURSE OBJECTIVES:-

To Study the concepts of Software Testing , Process, Criteria, Strategies and Methods

COURSE OUTCOMES (COs)

CO1	Remember software Testing and Engineering Methods
CO2	Understand the design and Conduct a Software test process for testing Projects.
CO3	Describe software test automation, define and develop a test tool to support test automation.
CO4	Demonstrate Various communication Methods and Skills to communicate with their Teammates
CO5	Illustrate an real time application using test metrics
CO6	Analyze various software testing problems and solve these problem

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L								
	CO2	H	L								
	CO3	H	L								
	CO4	H	L							H	
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					
4	Approval	Academic Council Meeting								

UNIT 1: INTRODUCTION **9**

Software Testing – Role of Software Testing – A structural approach to Testing – Test strategy – Methods for developing Test strategy – Testing Methodology.

UNIT 2: LIFE CYCLE TESTING APPROACH **9**

Test plan – Requirement Testing – Walk through test tool – Risk Matrix test tool – Testing for requirement phase and Design phase – Design renew test tool – Test data Volume test tools.

UNIT 3: INSTALLATION **9**

Installation Phase Testing – Tools for Acceptance Test - Software Acceptance process – Software maintenance – Methodologies for Testing – Testing and Change Installation .

UNIT 4: TESTING METHODES **9**

Tools and Techniques – Cost Estimation for Testing – Testing phase life cycle – Point accumulation tracking system – Performance analysis of Testing – Inspection plan and Test plan documents.

UNIT 5: TESTING STRATEGIES **9**

Rapid Prototype – Spiral Testing – Tool Selection process – Structural system testing – Documentation of Test Result – Test effectiveness evaluation – Test measurement process – Test metrics.

TEXT BOOK:

1. **William Perry "Effective Methods of Software Testing", John Wiley & sons USA, 1995**
2. **Ron Patton, "Software Testing", Tech media.**

Course Coordinator **HOD**

MCA5E2	**HUMAN RESOURCE MANAGEMENT**	**L**	**T**	**P**	**C**
	Total Contact Hours – 45	**3**	**0**	**0**	**3**
	Prerequisite course – UG Level				
	Course Coordinator Name & Department:- P.Srinivasan / BBA				

COURSE OBJECTIVES:-

- Today's competitive business environment owes its success to effective management of its human resource.
- The quality of the organization's employees, their attitude, behavior and satisfaction with their jobs, and their behavior towards ethics and values and a sense of fair treatment all impact the firm's productivity, level of customer service, reputation, and survival.
- The students of human resources management must aware of basic aspects of human resource management to understand the functioning of human resource management in an organizational setting.
- Students gained knowledge in the present day human resources development practice by incorporate themselves in the changing environment of HRM.

COURSE OUTCOMES (COs)

CO1	Identify how firms gain a sustainable competitive advantages through people
CO2	To be aware of the responsibility managers of have concerning human resource management
CO3	Identify the importance of change management.
CO4	To implement basics compensation and performance appraisal
CO5	Importance of labour welfare and grievance handling for employment
CO6	Understand the importance of Employee participation and Relations.

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PS O1	PS O2	PS O3
2	CO1	H	H								
	CO2	M	M						M		
	CO3	L	H								
	CO4	M	L								
	CO5	M	M								
	CO6	H	H								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship(PR)
							□ □	□		
4	Approval	Academic Council Meeting								

UNIT – I **9**

Human Resource Function- Human Resource Philosophy – Changing environments of HRM – Strategic human resource management – Role of HR Managers.

UNIT – II **9**

Recruitment & Placement: Sources, Developing and using application forms - IT and online recruitment - Selection process, basic testing concepts - types of test - work samples & simulation - selection techniques – interview - Designing & conducting the effective interview - computer aided interview.

UNIT – III **9**

Training & Development: Employee Orientation- Training process- Need analysis- Training techniques- special purpose training- Performance appraisal: Methods - Problem and solutions - MBO approach - Performance appraisal in practice.

UNIT – IV **9**

Basic Compensation & Pay plans - factors determining pay rate - Current trends in compensation - Computerized job evaluation - financial incentives - benefits - Insurance benefits - retirement benefits – welfare measure

UNIT – V **9**

Trade unions - Discipline administration - grievances handling - Labour Welfare: Importance & Implications of labour legislations - Employee health.

TEXT BOOKS

1. Dr. R.Venkatapathy&AssissiMenacheri, Industrial Relations &Labour Welfare, Adithya Publications, CBE, 2001. 5. Robert L.Gibson and Marianne H.Mitchell, Introduction to Counseling and Guidance, VI edition, PHI, 2005
2. L.M. Prasad – Human Resource Management – S. Chand & Sons – 2007.

REFERENCEBOOKS

1. Gary Dessler, "
2. zo& Stephen P.Robbins, Personnel/Human Resource Management, Third edition, PHI/Pearson.
3. VSP Rao, Human Resource Management: Text and cases, First edition, Excel Books, New Delhi - 2000.
4. P.SrinivasanHuman Resource Management", Seventh edition, Prentice-Hall of India P.Ltd., Pearson.

David A. DeCen

Course Coordinator **HOD**

MCA5L1	LAB – IX PROGRAMMING ASP.NET LAB	L	T	P	C
	Total Contact Hours – 30	0	0	4	2
	Prerequisite course – UG Level				
	Course Coordinator Name & Department:-				

COURSE OBJECTIVES:-

Giving the learners the insights of the Internet programming and how to design and implement complete applications over the web

COURSE OUTCOMES (COs)

CO1	Remember the basic concept of console applications like string manipulation, exception handling.
CO2	Understand the technical code to implement windows applications
CO3	Describe .Net application using command line complier.
CO4	Demonstrate the web forms application project.
CO5	Illustrate web applications that connect database and events
CO6	Analyze web pages using ASP .NET

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L								
	CO2	H	L								
	CO3	H	L							H	
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					
4	Approval	Academic Council Meeting								

S.No	List of Experiments
1	Working with MSIL,Metadata and NameSpace.
2	Usage of CLR, CTS and CLS.
3	.Net application using command line complier.
4	.Net application using visual studio .net IDE.
5	Simple ASP .Net Applications.
6	Creating web forms application project.
7	Usage of web controls.
8	Working with events
9	Usage of Rich web controls.
10	Usage of validation controls

Course Coordinator **HOD**

VI SEMESTER

S.NO	CATEGORY	SUB.CODE	SUBJECT	L	T	P	C
1.	MC	MCA6P2	PROJECT PHASE – II	0	0	24	12
Total Credits							12

MAJOR ELECTIVE – I

MCA3E11	**COMPUTER GRAPHICS**	**L**	**T**	**P**	**C**
	Total Contact Hours – 45	3	0	0	3
	Prerequisite – UG Level				
	Course Coordinator Name & Department:				

COURSE OBJECTIVES:-

Learners will understand about computer graphics and how to use concept in computer graphics

COURSE OUTCOMES (COs)

CO1	Remember the general software architecture of programs that use 3D computer graph.
CO2	Understand the hardware system architecture for computer graphics.
CO3	Create and use a current 3D graphics API (e.g., OpenGL or DirectX).
CO4	Describe the graphics pipeline, frame buffers, and graphic accelerators/co-processors
CO5	Demonstrate and be able to use the underlying algorithms, mathematical concepts, supporting computer graphics.
CO6	Analyze and Composite 3D homogeneous matrices for translation, rotation, and scaling transformations.

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L								
	CO2	H	L								
	CO3	H	L							H	
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					

4	Approval	Academic Council Meeting

UNIT 1: 9

Introduction to graphic devices - picture representation, display devices, display adapters, Types of printers , Plotters & input devices

UNIT 2: 9

Transformations - Basic 2D & 3D transformations - translation , scaling , rotation , reflection, shearing, Multiple transformations, Rotation about an axis parallel to a coordinate axis, Rotation about an arbitrary axis in space, Affine and perspective Geometry , Orthographic projections and Axonometric projections

UNIT 3: **9**

Raster Scan Graphics - Bresenham's line and circle drawing algorithms, scan conversion, RLE, Frame buffer, Scan converting polygons - Edge fill and Seed fill algorithms, Anti aliasing and Half toning

UNIT 4: **9**

Clipping and Display file Compilation - Sutherland - Cohen line clipping algorithm, Windowing and View porting - Segmented display file, structure and compilation. - Hidden Surface and hidden Line Removal - Backface removal algorithm, Z- buffer, Warnock algorithm, Hidden line elimination.

UNIT 5: **9**

Plane Curves and Space Curves - Curve Representation, Non-parametric and parametric curves,representation of space curves, Cubic Spline, Parabolic Blended curves, Bezier curves and B-spline curves.

TEXT BOOKS

1. D. F. Rogers, J. A. Adams, 2002, Mathematical elements for Computer Graphics, 2nd Edition, Tata McGraw-Hill, New Delhi.
2. John F. Hughes, Andries Van Dam, Morgan Mc Guire ,David F. Sklar , James D. Foley, Steven K. Feiner and Kurt Akeley ,"Computer Graphics: Principles and Practice", , 3rd Edition, Addison-Wesley Professional,2013. (UNIT I, II, III, IV).
3. Donald Hearn and Pauline Baker M, "Computer Graphics", Prentice Hall, New Delhi, 2007 (UNIT V).

REFERENCE BOOKS

1. Jeffrey McConnell, "Computer Graphics: Theory into Practice", Jones and Bartlett Publishers, 2006.
2. Hill F S Jr., "Computer Graphics", Maxwell Macmillan" , 1990.
3. Peter Shirley, Michael Ashikhmin, Michael Gleicher, Stephen R Marschner, Erik Reinhard, KelvinSung, and AK Peters, Fundamental of Computer Graphics, CRC Press, 2010.
4. William M. Newman and Robert F.Sproull, "Principles of Interactive Computer Graphics", Mc GrawHill 1978.

Course Coordinator **HOD**

MCA3E12	MOBILE COMMUNICATION	L	T	P	C
	Total Contact Hours – 45	3	0	0	3
	Prerequisite course – UG Level				
	Course Coordinator Name & Department:-				

COURSE OBJECTIVES:-

Learners gain knowledge in Network management for mobile and wireless networks

COURSE OUTCOMES (COs)

CO1	Remember the basic concepts and features of mobile networks.
CO2	Comprehend the knowledge in the working of wireless communication protocols.
CO3	Describe and analyze the Multiplexing concepts in medium access control
CO4	Demonstrate broadcast systems
CO5	Illustrate and apply the concept of Wireless ATM
CO6	Analyze Mobile Network layer & Adhoc networks

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L								
	CO2	H	L							H	
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					

4	Approval	Academic Council Meeting

UNIT I: INTRODUCTION **9**

Introduction of Mobile Communication - Application - History - Market for Mobile Communications - Open Research topics - Simplified Reference Model - Overview - Wireless Transmission - Frequencies for Radio Transmission - Signal - Antennas - Signal Propagation - Multiplexing - Modulation - SpreadSpectrum - Cellular Systems.

UNIT II: MEDIUM ACCESS CONTROL **9**

Medium Access Control - Motivation for Specialized MAC - SDMA - FDMA - TDMA - CDMA - Comparisons - GSM - DECT -TETRA - UMTS and IMT - 2000 - Satellite Systems - History Applications - Basics - Routing- Localization - Handover.

UNIT III: BROADCAST SYSTEMS **9**

Broad casting Systems - Overview - Cyclic Repetition - Digital audio Broadcasting - Digital Video Broadcasting - Wireless LAN - Infrared Vs Radio Transmission - Infrastructure and Ad hoc networks - IEEE 802.11 - HIPERLAN - Bluetooth.

UNIT IV: WIRELESS ATM **9**

Wireless ATM - Motivation - Working group- WATM Reference model - Functions - Radio access layer - Handover- Location Management - Addressing - Quality of Service - Access Point layer- Handover- Location Management - Addressing - Quality of Service - Access Point control Protocol.

UNIT V: MOBILE NETWORK LAYERS **9**

Mobile Network Layer- Mobile IP - Dynamic host Configuration Protocol - Ad hoc Networks - Mobile Transport layer - Transitional TCP - Indirect TCP - Snooping TCP - Mobile TCP - Transmissions - Transaction - Support for Mobility.

TEXT BOOKS:

1. "Mobile Communications" - Jochen Schiller, Pearson Education Asia Publication.

REFERENCE BOOK:

9. William C. Y Lee, "Mobile Cellular Telecommunication system"- Mcgraw Hill International Edition, 1990.
10. T. S. Rapport, "Wireless Communication" prentice hall NJ 2002

Course Coordinator **HOD**

MCA3E13	COMPUTER ARCHITECTURE	L	T	P	C
	Total Contact Hours – 45	3	0	0	3
	Prerequisite course – UG Level				
	Course Coordinator Name & Department:-				

COURSE OBJECTIVES:-

Learners will gain knowledge in the basic organization and architecture of digital computers.

COURSE OUTCOMES (COs)

CO1	Remember the organization and working principle of computer hardware components.
CO2	Understand the concept of Pipeline and its types
CO3	Describe the concept to design a hardware component
CO4	Demonstrate the various Input/ Output Operations & its data transfer
CO5	Illustrate the architecture design of a computer & its type of memory
CO6	Analyze design real time application using parallel architecture & pipelining concepts

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L								
	CO2	H	L						H		
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					

4	Approval	Academic Council Meeting

UNITI: INTRODUCTION TO DIGITAL DESIGN **9**

Digital Computers - Logic Gates - Boolean Algebra - Combinational Circuits - Address Flip Flops - Sequential Circuits - Integrated Circuits - Decoders - Multiplexers- Registers - Counters.

UNIT II: COMPUTER ORGANIZATION **9**

Basics - Instruction Codes - Timing Control - Instruction Cycle - Memory Reference Instruction - Input / Output - Design of Basic Computer. Addressing Modes - ALU design - Control Design - Hardware Control unit - Processor Design.

UNIT III: MEMORY **9**

RAM - ROM -Cache Memory - Associative Memories - Virtual Memory - Memory Management.

UNIT IV: INPUT-OUTPUT ORGANIZATION **9**

Peripheral Devices- Standard I/O interfaces - Asynchronous Data transfer interrupt - DMA - Serial Communication - I/O Processor- Storage device.

UNIT V: ADVANCED ARCHITECTURE **9**

Parallel architecture - Pipelining – Multiprocessors

TEXT BOOKS:

1. M. Morris Mano -"Computer System Architecture" - 3rd edition. PHI 1999

REFERENCE BOOKS:

1. John P Hayes, "Computer Architecture and Organization", Mc Graw Hill, 3rd edition, 1999
2. V C. Hamacher, Z .G. Vraesic, S. G. Zaky, "Computer Organization", Tata McGraw Hill. 1996.
3. Vincent P Heuring Harry F Jordan, "Computer system Design and Architecture", Addison Westey, 1999. '
4. David A. Patterson and John L. Henessy, "Computer Organization and Design", Harcourt as PTE Ltd, 2nd edition 1999.
5. Thomas c Bartee, "Computer Architecture and Logic Design", International Edition 1991, McGraw Hill

Course Coordinator **HOD**

MAJOR ELECTIVE - II

MCA4E21	**NETWORK SECURITY**	**L**	**T**	**P**	**C**
	Total Contact Hours – 45	3	0	0	3
	Prerequisite – UG Level				
	Course Coordinator Name & Department:-				

COURSE OBJECTIVES:-

Writing a basic article on network security is something like writing a brief introduction to flying a commercial airliner. Much must be omitted, and an optimistic goal is to enable the reader to appreciate the skills required.

COURSE OUTCOMES (COs)

CO1	Remember data communication system, components and the purpose of layered architecture.
CO2	Understand the functionality of each layer of OSI and TCP/IP reference model.
CO3	Describe the data link layer and network layer protocols.
CO4	Demonstrate the functions of transport layer protocols.
CO5	Illustrate of Layered architecture using network security.
CO6	Analyze an real time application firewall design principles

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
2	CO1	H	L								
	CO2	H	L								
	CO3	H	L						H		
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					

4	Approval	Academic Council Meeting

UNIT I : INTRODUCTION **9**

Attacks - Services - Mechanisms - Conventional Encryption - Classical And Modern Techniques – Encryption Algorithms - Confidentiality.

UNIT II : PUBLIC KEY ENCRYPTION **9**

RSA - Elliptic Curve Cryptography - Number Theory Concepts

UNIT III : MESSAGE AUTHENTICATION **9**

Hash Functions - Digest Functions - Digital Signatures - Authentication Protocols

UNIT IV : NETWORK SECURITY PRACTICE **9**

Authentication, Applications - Electronic Mail Security - IP Security - Web Security.

UNIT V : SYSTEM SECURITY **9**

Intruders – Viruses – Worms – Firewalls Design Principles – Trusted Systems.

TEXT BOOK:

1. Stallings, Cryptography & Network Security - Principles & Practice, Prentice Hall, 3rd Edition 2002.

REFERENCE BOOKS:

1. Bruce, Schneier, Applied Cryptography, 2nd Edition, Toha Wiley & Sons, 1996.
2. Man Young Rhee, “Internet Security”, Wiley, 2003.
3. Pfleeger & Pfleeger, “Security in Computing”, Pearson Education, 3rd Edition, 2003

Course Coordinator **HOD**

MCA4E22	IMAGE PROCESSING	L	T	P	C
	Total Contact Hours – 45	3	0	0	3
	Prerequisite – UG Level				
	Course Designed by – Dept of Computer Applications				

COURSE OBJECTIVES:-

Learners will gain knowledge in the applications of image processing.

COURSE OUTCOMES (COs)

CO1	Remember the fundamentals of image processing
CO2	Understand image formation and the role human visual system plays in perception of gray and color image data.
CO3	Describe suitable applications of image processing in industry, medicine, and defense.
CO4	Demonstrate the signal processing algorithms and techniques in image enhancement and image restoration.
CO5	Acquire an appreciation for the image processing issues and techniques and be able to apply these techniques to real world problems.
CO6	Analyze an real time applications using image processing problems and techniques

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L								
	CO2	H	L								
	CO3	H	L							H	
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					
4	Approval	Academic Council Meeting								

UNIT I: FUNDAMENTALS OF IMAGE PROCESSING : 9

Image Acquisition, Image Model, Sampling, Quantization, Relationship between pixels, distance measures, connectivity , Image Geometry, Photographic film. Histogram: Definition, decision of contrast basing on histogram, operatio ns basing on histograms like image stretching, image sliding, Image classification. Definition and Algorithm of Histogram equalization.

UNIT II : IMAGE TRANSFORMS : 9

A detail discussion on Fourier Transform, DFT,FFT, properties A brief discussion on WALSH Transform , WFT, HADAMARD Transform, DCT. **IMAGE ENHANCEMENT** : (by SPATIAL Domain Methods) Arithmetic and logical operations, pixel or point operations, size operations - Smoothing filters-Mean, Median, Mode filters – Comparative study - Edge enhancement filters – Directorial filters, Sobel, Laplacian, Robert, KIRSCH Homogeneity & DIFF Filters, prewitt filter, Contrast Based edge enhancement techniques. – Comparative study - Low Pass filters, High Pass filters, sharpening filters. – Comparative Study - Comparative study of all filters - Color image processing.

UNIT III: IMAGE ENHANCEMENT: 9

(By FREQUENCY Domain Methods) -design of Low pass, High pass, EDGE Enhancement, smoothening filters in Frequency Domain. Butter worth filter, Homomorphic filters in Frequency Domain Advantages of filters in frequency domain, comparative study of filters in frequency domain and spatial domain.

IMAGE COMPRESSION: DEFINITION: A brief discussion on – Run length encoding, contour coding, Huffman code, compression due to change in domain, compression due to quantization Compression at the time of image transmission. Brief discussion on:- Image Compression standards.

UNIT IV : IMAGE SEGMENTATION: 9

Definition, characteristics of segmentation. Detection of Discontinuities, Thresholding Pixel based segmentation method. Region based segmentation methods – segmentation by pixel aggregation, segmentation by sub region aggregation, histogram based segmentation, spilt and merge technique. Use of motion in segmentation (spatial domain technique only)

UNIT V: MORPHOLOGY: - 9

Dilation, Erosion, Opening, closing, Hit-and-Miss transform, Boundary extraction, Region filling, connected components, thinning, Thickening, skeletons, Pruning Extensions to Gray – Scale Images Application of Morphology in I.P

TEXT BOOK:

Digital Image Processing, Rafael C. Gonzalez and Richard E. Woods Addision Wesley

REFERENCE BOOKS:

1. Fundamentals of Electronic Image Processing by Arthyr – R – Weeks, Jr. (PHI)
2. Image processing, Analysis, and Machine vision by Milan Sonka vaclan Halavac Roger Boyle, Vikas Publishing House.

Course Coordinator **HOD**

MCA4E23	OBJECT ORIENTED ANALYSIS AND DESIGN	L	T	P	C
	Total Contact Hours – 45	3	0	0	3
	Prerequisite – UG Level				
	Course Designed by – Dept of Computer Applications				

COURSE OBJECTIVES:-

Learners will gain knowledge in the applications of object oriented analysis and design.

COURSE OUTCOMES (COs)

CO1	Remember the fundamentals concepts of object-oriented analysis and design approach.
CO2	Understand the models for object-oriented system development.
CO3	Describe suitable applications of image processing in industry, medicine, and defense.
CO4	Demonstrate system development design patterns
CO5	Acquire the object-oriented analysis and design approach and techniques and be able to apply these techniques to real world problems.
CO6	Analyze the real time applications using object-oriented analysis and design approach and techniques

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L								
	CO2	H	L								
	CO3	H	L							H	
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					

4	Approval	Academic Council Meeting

UNIT-I INTRODUCTION

System Development - Object Basics - Development life cycle - Methodologies-Patterns – Frameworks- Unified Approach -UML.

UNIT-II CLASS AND OBJECT

Use - Case Models - Object Analysis - Object relations - Attributes – Method - Class and object responsibilities - case studies.

UNIT-III DESIGN PROCESSING

Design Processes - Design Anxious - class design - Object Storage - Object interoperability - Case Studies.

UNIT-IV USER INTERFACE DESIGNING

User interface Design -View layer classes – Micro - level Processes - View layer Interface - Case Studies.

UNIT-V TESTING AND DEBUGGING

Quality Assurance Tests - Testing Strategies - Object orientation of testing -Test Cases - Test Plans - Continuous testing – Debugging Principles - System usability -Measuring user satisfaction -Case studies.

TEXT BOOKS:

1. Ali Bahrami – "Object Oriented System Development" – McGraw Hill International Edition -1999.
2. R. S. Pressman - "Software Engineering" - Fourth Edition - McGraw Hill international Edition - 1997.
3.Erich Gamma, a n d Richard Helm, Ralph Johnson, John Vlissides, Design patterns: Elements of Reusable Object-Oriented Software, Addison-Wesley, 1995.

REFERENCE BOOKS:

1. Pierre – Alain Miller – "instant UML"-Work Press-1997.
2. Grady Booch, James Rumbaugh,Ivar Jacobson, "The Unified Modeling Language, User Guide", Addison-Wesley Longman, 1999.
3. Graig Larman,"Applying UML and Patterns", Addison Wesley, 2000
4.Martin Fowler, UML Distilled: A Brief Guide to the Standard Object Modeling Language, Third edition, Addison Wesley, 2003

Course Coordinator **HOD**

MAJOR ELECTIVE IV

MCA5E11	SOFTWARE TESTING	L	T	P	C
	Total Contact Hours – 45	3	0	0	3
	Prerequisite – UG Level				
	Course Designed by – Dept of Computer Applications				

COURSE OBJECTIVES:-

To Study the concepts of Software Testing , Process, Criteria, Strategies and Methods

COURSE OUTCOMES (COs)

CO1	Remember software Testing and Engineering Methods
CO2	Understand the design and Conduct a Software test process for testing Projects.
CO3	Describe software test automation, define and develop a test tool to support test automation.
CO4	Demonstrate Various communication Methods and Skills to communicate with their Teammates
CO5	Illustrate an real time application using test metrics
CO6	Analyze various software testing problems and solve these problem

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PS O1	PS O2	PS O3
2	CO1	H	L								
	CO2	H	L								
	CO3	H	L								
	CO4	H	L							H	
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					
4	Approval	Academic Council Meeting								

UNIT 1: INTRODUCTION **9**

Software Testing – Role of Software Testing – A structural approach to Testing – Test strategy – Methods for developing Test strategy – Testing Methodology.

UNIT 2: LIFE CYCLE TESTING APPROACH **9**

Test plan – Requirement Testing – Walk through test tool – Risk Matrix test tool – Testing for requirement phase and Design phase – Design renew test tool – Test data Volume test tools.

UNIT 3: INSTALLATION **9**

Installation Phase Testing – Tools for Acceptance Test - Software Acceptance process – Software maintenance – Methodologies for Testing – Testing and Change Installation .

UNIT 4: TESTING METHODES **9**

Tools and Techniques – Cost Estimation for Testing – Testing phase life cycle – Point accumulation tracking system – Performance analysis of Testing – Inspection plan and Test plan documents.

UNIT 5: TESTING STRATEGIES **9**

Rapid Prototype – Spiral Testing – Tool Selection process – Structural system testing – Documentation of Test Result – Test effectiveness evaluation – Test measurement process – Test metrics.

TEXT BOOK:

3. **William Perry "Effective Methods of Software Testing", John Wiley & sons USA, 1995**
4. **Ron Patton, "Software Testing", Tech media.**

Course Coordinator **HOD**

MCA5E12	ADHOC NETWORKS	L	T	P	C
	Total Contact Hours – 45	3	0	0	3
	Prerequisite – UG Level				
	Course Designed by – Dept of Computer Applications				

COURSE OBJECTIVES:-

Each device in a MANET is free to move independently in any direction, and will therefore change its links to other devices frequently. Each must forward traffic unrelated to its own use, and therefore bea router

COURSE OUTCOMES (COs)

CO1	Remember the view of Ad hoc Wireless Networks and Mobile communication.
CO2	Understand the classifications of routing protocols and wireless routing protocols
CO3	Describe the classifications of QoS solutions
CO4	Demonstrate TCP and Network security in ad-hoc networks
CO5	Illustrate about multicast routing techniques for knowledge representation.
CO6	Analyze the Secure routing in Ad Hoc wireless networks.

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L								
	CO2	H	L								
	CO3	H	L						H		
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship (PR)
					✓				

4	Approval	Academic Council Meeting

UNIT I : INTRODUCTION **9**

Introduction-Fundamentals of Wireless Communication Technology - The Electromagnetic Spectrum - Radio Propagation Mechanisms - Characteristics of the Wireless Channel - IEEE 802.11a,b Standard – Origin Of Ad hoc: Packet Radio Networks - Technical Challenges - Architecture of PRNETs - Components of Packet Radios – Ad hoc Wireless Networks -What Is an Ad Hoc Network? Heterogeneity in Mobile Devices - Wireless Sensor Networks - Traffic Profiles - Types of Ad hoc Mobile Communications - Types ofMobile Host Movements - Challenges Facing Ad Hoc Mobile Networks-Ad hoc wireless Internet

UNIT II : AD HOC ROUTING PROTOCOLS **9**

Introduction - Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks - Classifications of Routing Protocols -Table-Driven Routing Protocols - Destination Sequenced Distance Vector (DSDV) - Wireless Routing Protocol (WRP) - Cluster Switch Gateway Routing (CSGR) - Source-Initiated On-Demand Approaches - Ad Hoc On-Demand Distance Vector Routing (AODV) - Dynamic Source Routing (DSR) - Temporally Ordered Routing Algorithm (TORA) - Signal Stability Routing (SSR) -Location-Aided Routing (LAR) - Power-Aware Routing (PAR) - Zone Routing Protocol (ZRP)

UNIT III : MULTICAST ROUTING IN AD HOC NETWORKS **9**

Introduction - Issues in Designing a Multicast Routing Protocol - Operation of Multicast Routing Protocols - An Architecture Reference Model for Multicast Routing Protocols -Classifications of Multicast Routing Protocols - Tree-Based Multicast Routing Protocols- Mesh-Based Multicast Routing Protocols - Summary of Tree-and Mesh-Based Protocols - Energy-Efficient Multicasting - Multicasting with Quality of Service Guarantees - Application-Dependent Multicast Routing - Comparisons of Multicast Routing Protocols

UNIT IV : TRANSPORT LAYER, SECURITY PROTOCOLS **9**

Introduction - Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks - Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks -Classification of Transport Layer Solutions - TCP Over Ad Hoc Wireless Networks -Other Transport Layer Protocols for Ad Hoc Wireless Networks - Security in Ad Hoc Wireless Networks - Network Security Requirements - Issues and Challenges in Security Provisioning - Network Security Attacks - Key Management - Secure Routing in Ad Hoc Wireless Networks

UNIT V : QoS AND ENERGY MANAGEMENT **9**

Introduction - Issues and Challenges in Providing QoS in Ad Hoc Wireless Networks -Classifications of QoS Solutions - MAC Layer Solutions - Network Layer Solutions - QoS Frameworks for Ad Hoc Wireless Networks Energy Management in Ad Hoc Wireless Networks –Introduction - Need for Energy Management in Ad Hoc Wireless Networks - Classification of Energy Management Schemes - Battery Management Schemes - Transmission Power Management Schemes - System Power Management Schemes

TEXT BOOK:

1. C. Siva Ram Murthy and B.S. Manoj “Ad Hoc Wireless Networks: Architectures and Protocols”, Prentice Hall PTR,2004

REFERENCE BOOKS:

1. C.K. Toh, Ad Hoc Mobile Wireless Networks: Protocols and Systems, Prentice Hall PTR ,2001
2. Charles E. Perkins, Ad Hoc Networking, Addison Wesley, 2000

Course Coordinator **HOD**

MCA5E13	DATA MINING AND DATA WAREHOUSING	L	T	P	C
	Total Contact Hours – 45	3	0	0	3
	Prerequisite course – UG Level				
	Course Coordinator Name & Department:-				

COURSE OBJECTIVES:-

Learners will understand basic data mining and data warehousing, and extracting meaningful information from the flood of digital data collected by businesses, government, and scientific agencies.

COURSE OUTCOMES (COs)

CO1	Remember the efficient distribution of information
CO2	Understand the friendly reporting environment
CO3	Describe the unseen pattern in large volume of historical data that helps to manage an organization efficiently
CO4	Demonstrate the key method for extracting meaningful information
CO5	Illustrate the easy access to data
CO6	Analyze the concepts of various data mining Techniques

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L								
	CO2	H	L								
	CO3	H	L						H		
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					

4	Approval	Academic Council Meeting

UNIT I Data Warehouse **9**

Data Warehouse roles and structures – What can a data warehouse do? The Cost of Warehousing data – Data Stores, Warehouses and Marts – The Data Warehouse environment – Data warehouse characteristics – The Data Warehouse architecture – Metadata, Metadata Extraction – Implementing the Data Warehouse – Designing and building the Data Warehouse – The data warehouse project plan – Data warehouse architecture, specification and development- Data Warehouse project success factors.

UNIT II Introduction to Data Mining: **9**

Basic Data Mining tasks – Data mining versus knowledge discovery in data bases – Data Mining issues – Data Mining Metrics – Social implications of data mining - Data Mining from a database perspective – Data Mining Techniques – Introduction – A statistical perspective on Data Mining – Similarity measures – Decision trees – Neural networks – Genetic algorithms.

UNIT III Classification **9**

Introduction – Statistical based algorithms – Distance based algorithms – Decision tree based algorithms – Neural networks based algorithms – Rule based algorithms – Combining Techniques.

UNIT IV Clustering **9**

Introduction – Similarity and distance measures – Outliers – Hierarchical algorithms – Partitional algorithms – Clustering large data bases – Clustering with categorical attributes – Association Rules – Introduction – Large Item – sets – Basic Algorithms.

UNIT V Web Mining, Spatial Mining, Temporal Mining **9**

Web Mining – Introduction – Web Content Mining – Web Structure Mining – Web Usage Mining. Spatial Mining – Introduction – Spatial Data: Overview – Spatial Data Mining primitives – Generalization and Specialization – Spatial Rules – Spatial Classification algorithm – Spatial Clustering Algorithms. Temporal Mining – Introduction – Modeling temporal events.

TEXT BOOKS:

1. Margaret H.Dunham. “Data Mining Introductory and Advanced Topics”. Pearson Education – 2003.
2. George M. Maracas’. “Modern Data Warehousing, Mining and Visualization: Core concepts”, Pearson Education – 2003.
3. Jiawei Han and Micheline Kamber, ―Data Mining Concepts and Techniques, Third Edition, Elsevier, 2012.

REFERENCE BOOKS

1. Alex Berson and Stephen J.Smith, ―Data Warehousing, Data Mining & OLAP‖, Tata McGraw – Hill Edition, 35th Reprint 2016.
2. K.P. Soman, Shyam Diwakar and V. Ajay, ―Insight into Data Mining Theory and Practice, Eastern Economy Edition, Prentice Hall of India, 2006.
3. Ian H.Witten and Eibe Frank, ―Data Mining: Practical Machine Learning Tools and Techniques, Elsevier, Second Edition.

Course Coordinator **HOD**

OPEN ELECTIVE – III

MCA3E11	ADVERTISING AND SALES MANAGEMENT	L	T	P	C
	Total Contact Hours – 45	3	0	0	3
	Prerequisite course –UG Level				
	Course Coordinator Name & Department:- T Manjiniprakash/BBA				

COURSE OBJECTIVES: -

- Identify the terms and concepts that are commonly used in promotion and advertising.
- Demonstrate preparation to comprehend the basic advertising.
- Give the relationship which underlines these terms and conceptsTo familiarize the students with the basic fundamentals of accounting.
- To impart knowledge on final accounts of sole trading concern.
- To enable the students on the concept of income & expenditure and receipts and payments.

COURSE OUTCOMES (COs)

CO1	Students gain basic knowledge of Advertising its functions, roles and development of advertising.
CO2	Know about Advertising design and its strategies.
CO3	Expose on Advertising, media and about its types.
CO4	To forecast sales and its techniques used in management.
CO5	Students were enriched about salesmanship, sales planning, budgeting.
CO6	Develop an advertising plan and present and defend it persuasively.

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	L	M								
	CO2	H	L								
	CO3	L	H						M	L	
	CO4	H	L								
	CO5	L	M								
	CO6	M	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
								✓		
4	Approval	Academic Council Meeting								

UNIT - I **9**

Introduction to Advertising- Definition -Roles of Advertising- Functions of Advertising-Steps in Development of Advertisement

UNIT – II **9**

Advertising Design- Appeals- Structure of an Advertisement - Message Strategies - Cognitive strategy- Executional Strategies-Creating Advertising- Advertising Effectiveness.

UNIT– III **9**

Advertising Media - Merit and demerits- Kinds of Advertising - Advertising Media- print media - Broadcasting media- Non-media advertising- online advertising.

UNIT - IV **9**

Sales Management - Defining - Objectives -Strategies- Sales Executives – Functions -Qualities - Sales Presentation Techniques - Emerging Trends in Sales Management.

UNIT - V **9**

Selling Concept - Objectives- scope and techniques of Salesmanship- Sales Planning- Importance – process- Sales Budget- Objectives-uses of sales Budget.

Text book

1. Advertising & promotion: George E.Belch, THM
2. Advertising Management, Dr. Varma&Aggarwal, kingBooks
3. Geroge Belch, Michael Belch, and KeyoorPurani, Advertising & Promotion – an Integrated Marketing Communications Perspective, Tata Mcgraw Hill

Reference book:

1. Sales promotion and advertising management by M .N.Mishra. Himalaya Publication.
2. Advertising and sales management by SanjeevChauhan (Astha publication)
3. Anderson, Hair, Bush: Professional Sales Management, McGraw Hill, Singapore.
4. Kruti Shah & Alan DSouza, Advertising and Promotions: An IMC Perspective, Tata Mcgraw Hill,

T Manjiniprakash

Course Coordinator **HOD**

MCA3E12	BPO MANAGEMENT	L	T	P	C
	Total Contact Hours – 45	3	0	0	3
	Prerequisite course – UG Level				
	Course Coordinator Name & Department:- .P.Srinivasan/ Business Administration				

COURSE OBJECTIVES: -

- To familiarize the students with the basic fundamentals of BPO industry
- To impart knowledge on BPO industry
- To enable the students on the concept of various decisions in Business Process Outsourcing

COURSE OUTCOMES (COs)

CO1	Develop a strategic understanding of the concepts of BPO's and its benefits
CO2	Explaining various models used in functioning of BPO's and Trends.
CO3	Describe the opportunities and challenges in Human Resources BPO
CO4	Analyzes about call centers its functions, processes and classifications
CO5	Developing efficiency in understanding the customers and capabilities in handling calls.
CO6	To understand the future trends in BPO industry

Mapping of Course Outcomes with Program outcomes (POs) (1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
	CO1	H	M								
	CO2	H	L								
	CO3	H	M								
	CO4	M	H						M	L	
	CO5	M	M								
	CO6	L	M								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Enngsciences(ES)	Professional Core (PC)	Professional Core (PC)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship(PR)
								✓		
4	Approval	Academic Council Meeting								

UNIT-I **9**

Business Process Outsourcing – Meaning – definition - Basics - Benefits - BPO Models - - BPO Companies in India.

UNIT-II **9**

Healthcare BPO – Structure of the American Healthcare Sector – Activity Profile –Future Trends and Threats – Case Study – Cbay Systems.

UNIT - III **9**

Human Resource BPO – Reasons for outsourcing HR – Activities involved in HR BPO – HR Outsourcing Trends – Career in HR BPO – Emerging BPO Domains – Media and Entertainment BPO – Publishing BPO.

UNIT – IV **9**

Call Centres – Functions – Processes – classifications – Telemarketing – Tele selling – Preparing for a Job – Approach – Training – Selection Process.

UNIT – V **9**

Improving Efficiency – Handling Calls – Team Player – Pleasing the Customers –

Converse efficiently – Reducing stress.

TEXT BOOKS:

1.BPO Industry in India by S K Awasthi by Jain Book
2.Business Process Outsourcing: Its Prospects and Challenges by Barua.
3.Clifton, HD. System analysis for business data processing. India: Prentice Hall Publication.

REFERENCE BOOKS

1. SudhindraMokhasi(2009) ,BPO – Sutra : True stories from India's BPO and call centres, -Rupa& Co.
2. Kulkarni, Sarika.(2005), Business process outsourcing – Delhi, Jaico Publishing House.
3. Shikapur, Deepak(2004), BPO Digest. Ameya Inspiring Books.
4. Bingham, J. Mastering data processing. Macmillan Publishing House.

Mr.P.Srinivasan

Course Coordinator **HOD**

MCA3E13	**CALL CENTER MANAGEMENT-Voice and Non Voice**	**L**	**T**	**P**	**C**
	Total Contact Hours –45	3	0	0	3
	Prerequisite course – UG Level				
	Course Coordinator Name & Department:-A.Jhoncy / BBA				

COURSE OBJECTIVES:-

- Develop and motivate a call centre team.
- Get the most out of call monitoring technology and prepare effective management reports.
- React to and plan for operational bottlenecks.
- Give meaningful feedback to call-centre agents and set achievable goals and targets.
- Students will learn about the roles and methods of different kinds of call centers. They will apply this by designing their own call center and trying to anticipate customer needs.

COURSE OUTCOMES (COs)

CO1	Gaining a basic knowledge about call centers its functioning and classifications.
CO2	To know about handling the Issues and problems related to calls in a efficient manner.
CO3	Gives knowledge of technical communications, speech process and educate conversation of oral skills.
CO4	Students acquire knowledge towards pre-interview about Interview questions and answering techniques
CO5	Analyses fully about the medias of communications.
CO6	Demonstrate awareness of the pragmatics of call center planning and operation

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
	CO1	M	H								
	CO2	M	H								
	CO3	L	H						M	H	
	CO4	L	H								
	CO5	M	H								
	CO6	L	H								

	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professiona	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship(PR)
		□□□				□□		–		

4	Approval	Academic Council Meeting

UNIT – I **9**

Call centers – Meaning – Functions – Processes - Classifications – Tele selling – Types of call centers.

UNIT – II **9**

Improving Efficiency – Handling calls – Team Players – Components and working of call center – Issues and problems.

UNIT – III **9**

Nature of Technical communication: Stages of communication – Nature of Technical Communication - The speech process – Conversation and Oral skills.

UNIT – IV **9**

Job Interview: Pre – Interview preparation techniques – Interview questions – Answering Strategies – Frequently asked Interview questions.

UNIT – V **9**

Communication media – Telephone – Fax – Internet – Email – Video conferencing.

TEXT BOOKS

1. Brad Cleveland - Call Center Management on Fast Forward: Succeeding in the New Era of Customer Relationships (3rd Edition) Third Edition,
2. Mr. Thomas Anthony Laird - Advice from a Call Center Geek: Rethinking Call Center Operations,

REFERENCE BOOKS

1. W. Stallings “Data and Computer Communication” Pearson Education, 5 Edition, 2001.
2. M. AshrajRizvi,” Effective Technical Communication”, Tata McGraw – Hill Education, 2005.
3. R.S.N.Pillai&Bagavathi – Modern commercial correspondence.

A.Jhoncy

Course Coordinator **HOD**

MCA3E14	CUSTOMER RELATIONSHIP MANAGEMENT	L	T	P	C
	Total Contact Hours – 45	3	0	0	3
	Prerequisite course – UG Level				
	Course Coordinator Name & Department:- Dr.D Arun Kumar /BBA				

COURSE OBJECTIVES: -

- To Popularize the students with the basic fundamentals of CRM.
- To improve knowledge & skills on Customer relationship of Marketing strategy.
- To develop the students on the concept of Customer service.

COURSE OUTCOMES (COs)	
CO1	To popularize with the basics of CRM.
CO2	Can increase awareness about Customer relationship.
CO3	Able to be aware of the concept of Customer service.
CO4	Can respond to the concept of Customer needs.
CO5	Develop confidence in the practical aspects of Customer Satisfaction
CO6	Identify the main Customer Expectations.

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	M	L								
	CO2	L	L								
	CO3	M	L						M	L	
	CO4	L	L								
	CO5	M	H								
	CO6	H	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship(PR)
								✓		
4	Approval	Academic Council Meeting								

UNIT – I **9**

CRM – Introduction – Definition – Need for CRM – Customer satisfaction – Customer loyalty – Product Marketing – Direct Marketing-

UNIT – II **9**

Customer learning relationship – Key stages of CRM - Force driving CRM – Benefits of CRM – Growth of CRM Market in India – Key principles of CRM.

UNIT – III **9**

CRM – Program – Ground work for effective use of CRM – Components of CRM – Types of CRM.

UNIT - IV **9**

CRM Process - Frame work – Governance process- Performance evaluation process.

UNIT – V **9**

Use of Technology in CRM – Call center process – CRM Technology tools – Implementation – Requirements analysis – selection of CRM Package – reasons and failure of CRM.

TEXT BOOK

1. Kristin Anderson & Carol Kerr – Customer Relationship Management – McGrawHill 2002

2.Sheth – Customer Relationship Management – McGraw Hill Edition 1st Edition 2000

REFERENCE BOOK

1. Dr. P .Sheela Rani – Customer Relationship Management – Margham Publication.
2. K. Balasubramaniyam – Customer Relationship Management – GIGO Publication, 2005.
3. Dr. Ravi Kalakota E – business – Road map for success, Pearson education Asia, 2000.

Dr.D.ArunKumar

CourseCoordinator **HOD**

MCA3E15	ENTREPRENEURSHIP DEVELOPMENT	L	T	P	C
	Total Contact Hours – 45	3	0	0	3
	Prerequisite course – UG Level				
	Course Coordinator Name & Department:- Dr.DArun Kumar /BBA				

COURSE OBJECTIVES: -

- To make publicity on the students with the basic fundamentals of Entrepreneur Development
- To improve knowledge & skills on Entrepreneurship.
- To develop the students on the concept of Entrepreneurial skills.

COURSE OUTCOMES (COs)	
CO1	To popularize with the basics of Entrepreneur development.
CO2	Can increase awareness about Entrepreneurship.
CO3	Able to be aware of the concept of Entrepreneurial skills.
CO4	Can respond to the concept of Entrepreneurial knowledge.
CO5	Develop confidence in the practical aspects of Business Opportunity.
CO6	Identify the main Innovations in Entrepreneurial Development.

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	L	L								
	CO2	L	M								
	CO3	L	L						M	L	
	CO4	L	L								
	CO5	L	L								
	CO6	L	L								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship(PR)
								✓		
4	Approval	Academic Council Meeting								

UNIT – I **9**

Introduction to Entrepreneurship: Meaning and concept of entrepreneurship - the history of entrepreneurship development - role of entrepreneurship in economic development

UNIT – II **9**

The Entrepreneur: Meaning of entrepreneur - the skills required to be an entrepreneur, and role models, mentors and support system.

UNIT – III **9**

Business Opportunity Identification: Business ideas, methods of generating ideas - legal form of new venture, protection of intellectual property -marketing the new venture.

UNIT – IV **9**

Preparing a Business Plan: Meaning - significance of a business plan - components -feasibility study.

UNIT – V

Financing the New Venture: Importance - types of ownership securities - venture capital - types of debt securities -determining ideal debt-equity mix - financial institutions and banks.

TEXT BOOK

1. Robert D. Hisrich, Mathew J Manimala, Michael P Peters, Dean A Shepherd, “Entrepreneurship”, 9e,McGraw Hill Education, 2014.

2. Peter F. Drucker, “Innovation and Entrepreneurship”,Harper Collins, 2009.

REFERENCE BOOK

1. John Bessant, Joe Tidd, “Innovation and Entrepreneurship”,2e,Wiley India Private Limited, 2012.

2. Robin Lowe, Sue Marriott,"Enterprise: Entrepreneurship and Innovation: Concepts,Contexts and Commercialization"1e,Routledge, 2012.

3. VeeraBhadrappaHavinal – Management Entrepreneurship – New Age International Publishers.

Dr.D.ArunKumar

CourseCoordinator **HOD**

ELECTIVE – V

MCA5E21	**HUMAN RESOURCE MANAGEMENT**	**L**	**T**	**P**	**C**
	Total Contact Hours – 45	**3**	**0**	**0**	**3**
	Prerequisite course – UG Level				
	Course Coordinator Name & Department:- P.Srinivasan / BBA				

COURSE OBJECTIVES:-

- Today's competitive business environment owes its success to effective management of its human resource.
- The quality of the organization's employees, their attitude, behavior and satisfaction with their jobs, and their behavior towards ethics and values and a sense of fair treatment all impact the firm's productivity, level of customer service, reputation, and survival.
- The students of human resources management must aware of basic aspects of human resource management to understand the functioning of human resource management in an organizational setting.
- Students gained knowledge in the present day human resources development practice by incorporate themselves in the changing environment of HRM.

COURSE OUTCOMES (COs)

CO1	Identify how firms gain a sustainable competitive advantages through people
CO2	To be aware of the responsibility managers of have concerning human resource management
CO3	Identify the importance of change management.
CO4	To implement basics compensation and performance appraisal
CO5	Importance of labour welfare and grievance handling for employment
CO6	Understand the importance of Employee participation and Relations.

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	H								
	CO2	M	M						M		
	CO3	L	H								
	CO4	M	L								
	CO5	M	M								
	CO6	H	H								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship(PR)

4	Approval	Academic Council Meeting

UNIT – I **9**

Human Resource Function- Human Resource Philosophy – Changing environments of HRM – Strategic human resource management – Role of HR Managers.

UNIT – II **9**

Recruitment & Placement: Sources, Developing and using application forms - IT and online recruitment - Selection process, basic testing concepts - types of test - work samples & simulation - selection techniques – interview - Designing & conducting the effective interview - computer aided interview.

UNIT – III **9**

Training & Development: Employee Orientation- Training process- Need analysis- Training techniques- special purpose training- Performance appraisal: Methods - Problem and solutions - MBO approach - Performance appraisal in practice.

UNIT – IV **9**

Basic Compensation & Pay plans - factors determining pay rate - Current trends in compensation - Computerized job evaluation - financial incentives - benefits - Insurance benefits - retirement benefits – welfare measure

UNIT – V **9**

Trade unions - Discipline administration - grievances handling - Labour Welfare: Importance & Implications of labour legislations - Employee health.

TEXT BOOKS

3. Dr. R.Venkatapathy&AssissiMenacheri, Industrial Relations &Labour Welfare, Adithya Publications, CBE, 2001. 5. Robert L.Gibson and Marianne H.Mitchell, Introduction to Counseling and Guidance, VI edition, PHI, 2005
4. L.M. Prasad – Human Resource Management – S. Chand & Sons – 2007.

REFERENCEBOOKS

5. Gary Dessler, "
6. zo& Stephen P.Robbins, Personnel/Human Resource Management, Third edition, PHI/Pearson.
7. VSP Rao, Human Resource Management: Text and cases, First edition, Excel Books, New Delhi - 2000.
8. P.SrinivasanHuman Resource Management", Seventh edition, Prentice-Hall of India P.Ltd., Pearson.

David A. DeCen

D.K.SOWMIYALAKSHMI

Course Coordinator **HOD**

MCA5E22	**LOGISTICS & SUPPLY CHAIN MANAGEMENT**	**L**	**T**	**P**	**C**
	Total Contact Hours – 45	3	0	0	3
	Prerequisite course: UG Level				
	Course Coordinator Name & Department:- T.Manjiniprakash / BBA				

COURSE OBJECTIVES:-

- To make the students to understand the usefulness of logistics and supply chain.
- This document lists the course's major subject areas and the knowledge, comprehension, application, analysis, synthesis and evaluation skills that they are designed to impart.
- Identify the sources of cost in a supply chain.
- Define inventory and types of inventory in a supply chain.
- Define transportation cost and identify the factors that contribute to this cost.
- Calculate inventory cost and transportation cost for a logistics problem.
- Define fixed and variable cost.
- Understand the economies of scale in transportation and inventory cost

COURSE OUTCOMES (COs)

CO1	Identify and Analyze Business Models, Business Strategies and corresponding Competitive Advantage.
CO2	Formulate and implement Warehouse Best Practices and Strategies.
CO3	Plan Warehouse and Logistics operations for optimum utilization of resources
CO4	Apply logistics and purchasing concepts to improve supply chain operations
CO5	Apply quality management tools for process improvement
CO6	Create an ideas about logistics and supply chain management

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PS O1	PS O2	PS O3
2	CO1	H	H						H		
	CO2	H	M								
	CO3	M	M								
	CO4	L	M								
	CO5	H	M								
	CO6	M	H								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship(PR)
								✓		
4	Approval	Academic Council Meeting								

UNIT –I **9**

Logistics management and Supply Chain management - Definition, Evolution, Importance.The concepts of logistics.Logistics relationships -Functional applications - Logistics Organization - Logistics in different industries.

UNIT –II **9**

Logistics Activities: – objectives, solution. Customer Service, Warehousing and Material Storage, Material Handling, information handling and procurement Transportation and Packaging - Reverse Logistics - Global Logistics

UNIT-III **9**

Fundamentals of Supply Chain - Development of SCM - Strategic Supply Chain Management and Key components -Drivers of Supply Chain Performance – key decision areas – External Drivers of Change.

UNIT-IV **9**

Supply Chain Drivers and Design Drivers of supply chain performance: Framework for structuring Facilities warehouse – Inventory – Transportation – Information - Sourcing, and Pricing – Revenue management.

UNIT-V **9**

Demand and Inventory Aggregate Planning in a Supply Chain: role - strategies Implementation Responding to predictable variability in supply chain – Types of supply chains - creating responsive supply chains lean

TEXT BOOKS

1. Supply Chain Management: Ronald H. Ballou, Samir K. Srivastava, Pearson Education Ltd, Jan 2007.
2. Supply Chain Management**:** Anil Sinha, McGraw Hill Education, August 2011.

REFERENCE BOOKS

1. Logistics And Supply Chain Management: Martin Christopher, Pearson Education Ltd, 2016.
2. Supply Chain Management: Sunil Chopra, Peter Meindl, Dharma Virus Kalra, Pearson Education Ltd, 2016.
3. Supply Chain And Logistics Management: V. Anandaraj, S. Kumaran, IshankaSaikira, Airwalk Publication, Jan 2018.

T.Manjiniprakash.

Course Coordinator **HOD**

MCA5E23	OFFICE MANAGEMENT	L	T	P	C
	Total Contact Hours – 45	3	0	0	3
	Prerequisite course – UG Level				
	Course Coordinator Name & Department:- D.K.Sowmiyalakshmi /BBA				

COURSE OBJECTIVES: -

- To familiarize the students with the basic fundamentals of accounting.
- To impart knowledge on final accounts of sole trading concern.
- To enable the students on the concept of income & expenditure and receipts and payments.

COURSE OUTCOMES (COs)

CO1	To make them understand office management and duties of an office manager
CO2	To give an idea about proper filing and indexing of office documents
CO3	To understand the principles of record management and different types of records in business organization.
CO4	To enable them to aware about safety hazardous and steps to improve office safety.
CO5	To introduce different measures of office work
CO6	Create an ideas about office management

Mapping of Course Outcomes with Program outcomes (POs)
(1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	H								
	CO2	M	M								
	CO3	M	H						H		
	CO4	L	H								
	CO5	H	H								
	CO6	H	M								

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship(PR)
								✓		
4	Approval	Academic Council Meeting								

UNIT -I **9**

Introduction: Meaning, functions and importance of office management; office management and organization. Principles of office management and organization.Principal departments of modern office.

UNIT-II **9**

Office Manager: qualities of office manager. The authorities and responsibilities of an office manager. Office accommodation: Selection of site. Office layout.Environment and working conditions.

UNIT-III **9**

Office equipment's - Reproduction equipment - Typewriter - Duplicators - Photo Copier - Communication Equipment - Intercom - Telephone - Use of Computers in Office Management Office System - Procedure - Routine - And methods - Paper work in office Filling functions.

UNIT-IV **9**

Office Communication: Various means of communication- Their use, Correspondence through Internet - Office Correspondence -Central vs. Departmental Correspondence - Handling Mail - Postal Services - Oral written - Internal and external communication - Records Management Types - Forms Controls - Principles - Foremost -Continuous stationery

UNIT-V **9**

Office Supervisor - Meaning and characteristics of Supervisor - Status - Place and Role of Supervisor - Effective Supervisor - Qualification - skill of Supervisor.

TEXT BOOKS

1. Modern Office Management: N. D Sharma, And Publishers, Jan 2006.
2. Office Management: Prashansa K. Ghosh, S. Chand & Sons, Jan 2010

REFERENCE BOOKS

1. Office Management: R.S.N Pillai&Bhagavathi, S. Chandler & Come, Dec 2010.
2. Office Management: R. Nangia, G. K Gupta, Crescent Publishing House.
3. Office Management: Dr. R. K Chopra, PriyankaGauri, Himalaya Publishing House, Jan 2017.
4. Of Non-Trading Organization-Receipts And Payment Account- Income And Expenditure Account

D.K.Sowmiyalakshmi

CourseCoordinator **HOD**

MCA5E24	PHOTOGRAPHY AND VIDEOGRAPHY	L	T	P	C
	Total Contact Hours – 45	3	0	0	3
	Prerequisite – UG Level				
	Course Coordinator Name & Department:- L.Rakesh – Dept of Visual Communication				

COURSE OBJECTIVES

- To understand the fundamentals of Photography and Videography
- To examine the technical factors of indoor and outdoor photography and Videography
- To enable the students to equip themselves to become a photography and Videography professionals.

COURSE OUTCOMES (COs)

CO1	Can analyze the fundamentals of Photography and Videography
CO2	Understanding of the camera operations
CO3	Evaluating the lighting
CO4	Can be aware of the wrong exposures
CO5	Can promote various types of photography and Videography
CO6	Understanding the concept of photo-journalism

Mapping of Course Outcomes with Program outcomes (POs) (1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	M								
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								

3	Category	Humanities & Social Studies	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other
					✓				

4	**Approval**	Academic Council Meeting

UNIT-I: **9**

Human Eye and Camera. Basics of Camera (aperture, shutter speed, focal length, f-stop, depth of field etc.,) Camera operations, Introduction to Television Production,Types of telecasting, Television Crew, an overview of direction.

UNIT-II: **9**

Types of Still and video cameras. Types of Lenses. Visual Perception, Art direction, floor management- indoor & outdoor, production management, budget preparation. Locations: In-door, set, on-sights sets, - Outdoor on-sight sets, blue matte. Etc.,

UNIT-III: **9**

Understanding lighting-indoor and outdoor, Exposing and Focusing, Types of lighting, Natural and Artificial Lights, Controlling lights, Exposure Meters. Camera techniques & operation, Framing, shots & movements (wide, medium, close ups, shadow, zoom, pan, tilt, aerial etc.,),

UNIT-IV: **9**

Photography for advertising-Consumer and industrial. Usage of various types of camera lenses (Normal, Tele, Zoom etc.,), usages of various filters (day ,night, colour correcting filter, diffusion filter), objectives TV lighting, various types of Lights (baby, Junior, Senior, etc.,)

UNIT- V: **9**

Basics of photo-journalism, Photo-features, Photo - essays, Writing captions, Visual story telling. Planning a shoot-studio, location, set props and casting.Colour temperature, lighting for different situations (interviews, indoor, out-door), types of lighting(Back, Front, full, semi, etc.,)

TEXT BOOKS:

1.The Art of Photography: A Personal Approach to Artistic Expression, Barnbaum, Bruce, Rocky Nook
2.Photography Demystified: Your Guide to Gaining Creative Control, David McKay, Photography Inc.
3. Television Productions: A History of All Series and Pilots, by Jon Abbott,
Publisher: McFarland & Company (May 13, 2009)
4.Production Management for TV and Film: The Professional's Guide, Methuen Drama (August 1, 2010)

REFERENCE BOOKS:

1.The Photographer's Eye,Szarkowski, John, The Museum of Modern Art, New York (Publisher)
2.Creative Composition: Digital Photography Tips and Techniques, Davis, Harold, Wiley
3.From Concept to Screen: An Overview of Film and Television Production, Robert Benedetti, Pearson; 1 edition (June 11, 2001)
4.The Television Handbook, Routledge, Holland, P (1998)

Course Coordinator **HOD**

	YOGA AND STRESS MANAGEMENT	L	T	P	C
MCA5E25	Total Contact Hours – 45	3	0	0	3
	Prerequisite course – UG Level				
	Course Coordinator Name & Department:- Dr.K.Rajakumari/Dept.of.CS				

COURSE OBJECTIVES:-

After undergoing the course the participants will be able to Perform yogic exercises, asanas, breathing exercises (pranayam) & meditation techniques for keeping good health.

COURSE OUTCOMES (COs)

CO1	Introduction to Yoga as Science of living. Usefulness of Yoga. Principles of Yoga. Introduction to Patanjali's (a scientist of inner science), Yoga Sutra (Classic book on Yoga) and eight steps & limbs of Yoga. Importance of discipline in life.
CO2	Importance and description of abstentions (yam) Rules (niyam), the first two steps of Yoga. Description and importance of five virtues to be followed in daily life. Brief introduction to six cleaning processes (shatkarma) & its usefulness in yoga.
CO3	Yogic exercises – an introduction. Influence and benefits of asans on one's outlook. Principles, rules & important aspects to be followed.
CO4	Energy (Prana) and Energy Body (Pranic body) – an introduction. Modern Science and Prana. Important rules of yogic breathing (pranayam). Necessity of Pranayam. Introduction of simple paranayams.
CO5	Art & Science of relaxation. Physical manifestation of mental tension. Mechanics of relaxation techniques. The root cause of tension. Mysteries of mind. Functions of mind. Mind as mental computer.
CO6	What is inward looking (Pratayahar). Importance of Pratyahar. Concentration (Dharan), Meditation (Dhyaan) and total solution (samadhi). Importance of meditation for development of higher mental power.

Mapping of Course Outcomes with Program outcomes (POs) (1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low

1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1							H			
	CO2							H			
	CO3							H			
	CO4							H			
	CO5							H			
	CO6							H			

3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)
					✓					

4	Approval	47th Academic Council Meeting

UNIT I:- 9

Meaning and definition of Yoga – aims & objectives of yoga – misconception about yoga. Historical perceptive on yoga – yoga before the time of Patanjali (Indus valley civilization, Vedas, Brahmnas, Upanishads, Epics, Puranas). Contributions of Patanjali and Thirumular to yoga. Yoga practices and other systems of exercises.

UNIT II:- 9

Schools of Yoga: Bhakthi Yoga, Jnana Yoga, Karma Yoga, Kundalini Yoga, Mantra Yoga, Hatha Yoga, Raja Yoga. Eight Limbs of Yoga: Yama, Niyama, Asana, Pranayama, Pratyahara, Dharana, Dhyana & Samathi. General principles of practicing Asana, Pranayama, Meditation, Kriyas Bandhas and Mudra.

UNIT III:- 9

Classification of Asanas - Meditative Asanas – Relaxative Asanas – Cultural Asanas. - safety measure and precautions while performing asanas. Pranayama – different phases in Pranayama practices: Puraka (Inhalation), Kumbhaka (Retention) and Recaka (Exhalation), - safety measures and precautions while performing pranayama. Meditation - Its techniques & benefits. Practicing methods and benefits of Kriyas, Bandha and Mudra.

UNIT IV:- 9

Impact of Yoga on Muscular system, Respiratory System, Circulatory system, Nervous system, Digestive system and Endocrine system

UNIT V:- 9

Yoga and development of Social qualities of personality – Co-operation – Simplicity – Tolerance – Social adjustments – Yoga and personal efficiency. Improvement of personal efficiency through yoga.

REFERENCE BOOKS:-

1. Author's guide, (2003). Yoga – The Science of Holistic living. Chennai: Vivekananda Kendra Prakashana trust
2. Chandrasekaran, K., (1999) Sound Health through Yoga. Sedapatti: Prem Kalyan Publications.
3. Maguire, Imelda., (2005) Yoga for a Healthy Body. London: Greenwich Editions.
4. Mariayyah, P., (2000). Suriyanamaskar. Perunthurai: Jaya Publishing House.
5. Tummers, Nanette. E., (2009) Teaching Yoga for Life. Champaign: Human Kinetics.

Course Coordinator **HOD**

V SEMESTER

S.NO	CATEGORY	SUB.CODE	SUBJECT	L	T	P	C
1.	PR	MCA5P1	LAB-X PROJECT PHASE – I	0	0	4	2
Total Credits							2

VI SEMESTER

S.NO	CATEGORY	SUB.CODE	SUBJECT	L	T	P	C
1.	PR	MCA6P2	PROJECT PHASE – II	0	0	24	12
Total Credits							12