RAMAIAH
Institute of Technology

CURRICULUM

for the Academic year 2019 – 2020

MASTER OF COMPUTER APPLICATIONS

I & II SEMESTER MCA

RAMAIAH INSTITUTE OF TECHNOLOGY
(Autonomous Institute, Affiliated to VTU)
Bangalore – 560054.

About the Institute

Ramaiah Institute of Technology (RIT) (formerly known as M. S. Ramaiah Institute of Technology) is a self-financing institution established in Bangalore in the year 1962 by the industrialist and philanthropist, Late Dr. M S Ramaiah. The Institute is accredited with "A" grade by NAAC in 2014 and all engineering departments offering bachelor degree programs have been accredited by NBA. RIT is one of the few institutes with faculty student ratio of 1:15 and achieves excellent academic results. The institute is a participant of the Technical Education Quality Improvement Program (TEQIP), an initiative of the Government of India. All the departments are full with competent faculty, with 100% of them being postgraduates or doctorates. Some of the distinguished features of RIT are: State of the art laboratories, individual computing facility to all faculty members. All research departments are active with sponsored projects and more than 150 scholars are pursuing PhD. The Centre for Advanced Training and Continuing Education (CATCE), and Entrepreneurship Development Cell (EDC) have been set up on campus. RIT has a strong Placement and Training department with a committed team, a fully equipped Sports department, large air-conditioned library with over 1,35,427 books with subscription to more than 300 International and National Journals. The Digital Library subscribes to several online e-journals like IEEE, JET etc. RIT is a member of DELNET, and AICTE INDEST Consortium. RIT has a modern auditorium, several hi-tech conference halls, all air-conditioned with video conferencing facilities. It has excellent hostel facilities for boys and girls. RIT Alumni have distinguished themselves by occupying high positions in India and abroad and are in touch with the institute through an active Alumni Association. RIT obtained Academic Autonomy for all its UG and PG programs in the year 2007. As per the National Institutional Ranking Framework, MHRD, Government of India, Ramaiah Institute of Technology has achieved 60th rank among the top 100 engineering colleges across India.

About the Department

The Department of Computer Applications was established in 1997 with the objective of producing high quality professionals to meet the demands of the emerging field of Computer Applications. The department got academic autonomy in the year 2007 and is accredited by NBA. The department is recognized as a Research Centre under Visvesvaraya Technological University in 2012.

VISION OF THE INSTITUTE

To be an Institution of International Eminence, renowned for imparting quality technical education, cutting edge research and innovation to meet global socio economic needs

MISSION OF THE INSTITUTE

MSRIT shall meet the global socio-economic needs through
1. Imparting quality technical education by nurturing a conducive learning environment through continuous improvement and customization
2. Establishing research clusters in emerging areas in collaboration with globally reputed organizations
3. Establishing innovative skills development, techno-entrepreneurial activities and consultancy for socio-economic needs

QUALITY POLICY

We at M. S. Ramaiah Institute of Technology strive to deliver comprehensive, continually enhanced, global quality technical and management education through an established Quality Management System complemented by the synergistic interaction of the stake holders concerned

VISION OF THE DEPARTMENT

To be a nationally prominent and internationally recognized department in academics and research activities with the aim of developing competitive software professionals to serve the society and ever changing industry

MISSION OF THE DEPARTMENT

1. To enable the students to be knowledgeable and creative through state–of-the-art curriculum and innovative teaching methodologies
2. To provide training programs that bridges the gap between academia and industry to produce competitive software professionals
3. To inculcate ethical values in students enabling them to become socially committed professionals
4. To enhance the research quality and productivity by providing required facilities

PROGRAM EDUCATIONAL OBJECTIVES (PEOs):

PEO1. Excel in professional career in the field of Computer Applications and contribute to research and development activities.

PEO2. Provide software solutions that are socially acceptable and adapt emerging technologies and tools.

PEO3. Exhibit ethical and communication skills and engage in lifelong learning.

PROGRAM OUTCOMES (POs):

PO1: Apply knowledge of mathematics and computing principles appropriately to develop conceptual model for real world problems.

PO2: Identify and formulate problem definition for real world problems, analyse the literature of the domain and provide solutions using mathematics and computing**.**

PO3: Design, develop and assess a software system, process, component, or program of varying complexity that meet specified needs with appropriate consideration for public health and safety and societal considerations.

PO4: Use research based knowledge to analyse and interpret data and synthesize information to provide valid conclusions.

PO5: Adapt to understand, select, use and create modern tools and technologies necessary for computing practices.

PO6: Adopt professional ethics, principles of professional computing practices, cyber regulations and responsibilities.

PO7: Recognize the need and engage in self-learning for continual development as a computing professional.

PO8: Apply the management principles for managing projects as an individual, as a member and as a leader in a team under multidisciplinary environments.

PO9: Communicate effectively about computing activities in both verbal and written form with the computing community and with society.

PO10: Assess the local and global impact of software solutions on individuals, organizations and society.

PO11: Perform effectively as an individual and as a member or leader in diverse teams and in multidisciplinary environments.

PO12: Adopt standardized software engineering practices with innovative ideas to succeed as an employee or entrepreneur.

Curriculum Course Credits Distribution

Semester	Mathematics (MTH)	Management (MGT)	Humanities & Social Sciences (HSS)	Professional Courses Core (Hard core, Soft core, Lab) (PC-C)	Electives (PC-E)	Project Work / Internship (PW /IN)	Seminar (SEM)	Self-Study (SS)	Total credits in a Semester
First	4		3	15					22
Second		3		18			1		22
Third				16	6				22
Fourth				12	9		1	2	22
Fifth				11	9				20
Sixth						22			22
Total	**4**	**3**	**3**	**72**	**24**	**22**	**2**	**2**	**132**

SCHEME FOR 2019-2022 BATCH

I SEMESTER

S. No	Course Code	Course Name	Credits*			
			L	T	P	Total
1.	MCA11	Problem Solving Using 'C'	2	1	1	4
2.	MCA12	Discrete Mathematics	3	1	0	4
3.	MCA13	Fundamentals of Computer Organization	4	0	0	4
4.	MCA14	Introduction to UNIX	3	0	1	4
5.	MCA15	Professional Communication and Ethics	2	1	0	3
6.	MCA16	Topics in Web Programming	0	1	2	3
		Total	14	4	4	22

II SEMESTER

S. No	Course Code	Course Name	Pre-requisite Course(s)	Credits*			
				L	T	P	Total
1.	MCA21	Object Oriented Programming with C++	MCA11	2	1	1	4
2.	MCA22#	Data Analysis using Spreadsheets	-	0	1	2	3
3.	MCA23	Database Management Systems	-	3	0	1	4
4.	MCA24	Data Structures Using 'C'	MCA11	3	0	1	4
5.	MCA25	Management Information Systems	-	3	0	0	3
6.	MCA26#	JavaScript Frameworks	MCA16	0	1	2	3
7.	MCAS1	Seminar I					1
		Total		11	3	7	22

III SEMESTER

S. No	Course Code	Course Name	Pre-requisite Course(s)	Credits*			
				L	T	P	Total
1	MCA31	Operating Systems		4	0	0	4
2	MCA32	Design and Analysis of Algorithms	MCA24	3	0	1	4
3	MCA33	Software Engineering		4	0	0	4
4	MCA34	Programming in Java	MCA21	3	0	1	4
5	MCAE--	Elective I					
6	MCAE--	Elective II					
		Total					22

IV SEMESTER

S. No	Course Code	Course Name	Pre-requisite Course(s)	Credits*			
				L	T	P	Total
1	MCA41	Computer Networks	-	3	0	1	4
2	MCA42	Programming with Python	MCA11, MCA26	3	0	1	4
3	MCA43	Machine Learning		3	0	1	4
4	MCAE--	Elective III					
5	MCAE--	Elective IV					
6	MCAE--	Elective V					
7	MCAS2	Seminar II					1
		Total					22

V SEMESTER

S. No	Course Code	Course Name	Pre-requisite Course(s)	Credits*			
				L	T	P	Total
1	MCA51	Object Oriented Modeling and Design Patterns	MCA21	3	0	1	4
2	MCA52	Information Security		3	0	1	4
3	MCASC-	Soft-core Course		3	0	0	3
4	MCAE--	Elective VI					
5	MCAE--	Elective VII					
6	MCAE--	Elective VIII					
Total							20

SOFTCORE COURSES

S. No	Course Code	Course Name	Credits*			
			L	T	P	Total
1	MCASC1	Supply Chain Management	3	0	0	3
2	MCASC2	Software Project Management	3	0	0	3
3	MCASC3	Enterprise Resource Planning	3	0	0	3

VI SEMESTER

S. No	Course Code	Course Name	Credits*			
			L	T	P	Total
1.	MCA61	Project Work				22
		Total				22

Students have to acquire 2 credits by accomplishing any one of the following Co-Curricular Activities within the duration of the Programme (MCACCA):

- On-line Certification Course
- Internship of 8-weeks followed by a report
- Paper Publication in International Conference along with a report and presentation
- Clearing one level in any of the recognized competitions

ELECTIVE COURSES

S. No	Course Code	Course Name	Pre-requisite Course(s)	L	T	P	Total
1.	MCAE01	User Interface and User Experience Design		2	0	1	3
2.	MCAE02	Operations Research		2	1	0	3
3.	MCAE03	Hadoop Eco System		0	1	2	3
4.	MCAE04#	Web Programming with PHP and AJAX	MCA26	0	1	2	3
5.	MCAE05#	Computer Graphics and Animation		0	1	2	2
6.	MCAE06	Secure Coding in C and C++	MCA21	2	0	1	3
7.	MCAE07#	NoSQL Databases	MCA23	0	1	2	3
8.	MCAE08	Mobile Application Development		0	1	2	3
9.	MCAE09#	Web Component Development with J2EE	MCAE01	0	1	2	3
10.	MCAE10	Programming with C#.Net	MCA21	2	0	1	3
11.	MCAE11	Digital Forensics		2	0	1	3
12.	MCAE12	System Modeling and Simulation		2	0	1	3
13.	MCAE13#	Cloud Computing	MCA31, MCA41	0	1	2	3
14.	MCAE14	Software Testing	MCA33	2	0	1	3
15.	MCAE15#	Programming IoT	MCAE08	0	1	2	3
16.	MCAE16#	ASP.Net with C#	MCA21, MCA26	0	1	2	3
17.	MCAE17	UNIX Systems Programming		2	0	1	3
18.	MCAE18	Deep Learning		2	0	1	3
19.	MCAE19	Storage Area Networks		2	0	1	3
20.	MCAE20	Introduction to Big Data Analytics using SPARK		0	1	2	3
21.	MCAE21	Soft Skills and Personality Development		2	1	0	3
22.	MCAE22	Management and Entrepreneurship		3	0	0	3
23.	MCAE23	Agile Software Development		2	0	1	3
24.	MCAE24	Social Network Analysis		2	0	1	3

#Semester End Examination will be conducted for Laboratory
* L: Lecture   T: Tutorial   P: Practical

Problem Solving using 'C'

Course Code: MCA11　　　　　　　　**Credits: 2:1:1**
Prerequisite: Nil　　　　　　　　**Contact Hours:28L 28T 28P**
Course Coordinator: Dr Manish Kumar

UNIT I

Algorithms and Flowcharts: The meaning of algorithms, Flowcharts and their need, writing algorithms and drawing flowcharts for simple exercises.
Data Types: Character set, C tokens, keywords & identifiers, structure of C program, executing a C program. Constants, variables, data types, declaration of variables, declaration of storage classes, assigning values to variables defining symbolic constants, declaring a variable as constant.
Operators and Expressions: Arithmetic, relational, logical, assignment, increment and decrement, conditional, bitwise, comma, special operators, arithmetic expressions, evaluation of expressions, precedence of arithmetic operators, type conversions in expressions, operator precedence and associativity.

UNIT II

Managing Input and Output Operations: The scanf() and printf() functions, reading a character, writing a character, (the getchar() and putchar() functions) , the address operator (&), formatted input and output using format specifiers, Writing simple complete C programs.
Decision Making and Branching: Decision making with if statement, simple if, if..else , nesting of if..else, the else..if ladder, the switch, the ?: operator, the goto statement, the break statement, programming examples.
Decision Making and Looping: The while, the do..while statements, the for statement, nested loops, jumps in loops, the continue, programming examples.

UNIT III

Arrays: The meaning of an array, one dimensional and two dimensional arrays, declaration and initialization of arrays, reading, writing and manipulation of above types of arrays, dynamic arrays, programming examples.
Strings: Declaring and initializing string variables, reading string from terminal, writing string to screen, arithmetic operations on characters, putting strings together, comparison of two strings, string Handling functions, table of strings, programming examples.

UNIT IV

User Defined Functions: Need for user defined functions, a multi-function program, elements of User defined functions, defining functions, return values and their types, function calls, function declaration, category of functions, nesting of functions, recursion, passing arrays to functions, programming examples.
Structures: Defining a structure, declaring structure variables, accessing structure members, structure initialization, copying and comparing structure

variables, operations on individual members, array of structures, structures within structures, programming examples.

UNIT V

Pointers and Dynamic Memory Allocation: Understanding pointers, accessing the address space of a variable, declaring and initialization pointer variables, accessing a variable through its pointer, pointer expressions, pointers and arrays, pointer and character strings, array of pointers, pointer as function arguments, functions returning pointers, pointers and structures, programming examples.

Dynamic memory allocation: Allocating a block of memory: *malloc,* al locating multiple blocks of memory: *calloc*, releasing the used space: *Free*, altering the size of a block: *realloc.*

File Management in C: Defining and opening a file, closing a file, input/ output operations on files, command line arguments, programming examples.

The Pre-processor: Macro substitution, files inclusion and Compiler Control Directives.

Laboratory

Students shall implement programs which supplement the theory concepts (Platform Linux; GCC Compiler)

Text Books:
1. Balagurusamy: Programming in ANSI C, 6th Edition, Tata McGraw Hill, 2010.
   Chapters: 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13.1 to13.6, 14
2. V Rajaraman: Computer Programming in C, Prentice Hall India, 2000.
   Chapters: 1.1, 1.3, 2.1, 2.3, 3.1, 3.2, 3.3

Reference Books:
1. R G Dromey: How to solve it by Computer, Prentice-Hall India, 1982.
2. K R Venugopal, S R Prasad: Mastering C, Prasad, Tata McGraw Hill, 2006.

Course Outcomes (COs):

1. Design algorithms and flowcharts and develop C programs using basic constructs. (PO-1,2,3,5,9)
2. Identify the suitable control statements and implement the solution. (PO-1,2,3,5)
3. Implement operations on arrays and strings. (PO-1,2,3,5)
4. Develop user defined functions and data types like structures to solve problem. (PO-1,2,3,5)
5. Demonstrate dynamic memory allocation using pointers, file handling mechanism, command line arguments and preprocessors. (PO-1,2,3,5).

Discrete Mathematics

Course Code: MCA12   **Credits: 3:1:0**
Prerequisite: Nil   **Contact Hours: 42L 28T**
Course Coordinator: Mrs. K Sailaja Kumar

UNIT I

Fundamental Principles of Counting
The Rules of Sum and Product, Permutations Combinations: The Binomial Theorem, Combinations with Repetition.

UNIT II

Fundamentals of Logic
Basic Connectives and Truth Tables, Logic Equivalence - the laws of Logic, Logical Implications, Rules of Inference, The use of Quantifiers.

UNIT III

Set Theory
Sets and Subsets, Set Operations and the Laws of Set Theory, Counting and Venn Diagrams, A First word on Probability, The Axioms on Probability, Conditional Probability: Independence,
Properties of Integers: The Well - Ordering Principle: Mathematical Induction

UNIT IV

Relations and Functions
Cartesian products and Relations, Functions-Plain and One-to-One, Onto Functions, Stirling Numbers of the Second Kind, The Pigeon-hole principle, Function composition and inverse functions.

UNIT V

Relations-II
Properties of Relations, Computer Recognition-Zero One Matrices and Directed graphs, Partial Orders: Hasse Diagrams, Equivalence Relations and Partitions.
Groups: Algebraic Structures, Groups: Definition, Examples and Elementary Properties Homomorphisms, Isomorphisms and Cyclic groups.

Text Books:
1. Ralph P Grimaldi, B V Ramana, "Discrete and Combinatorial Mathematics, An Applied Introduction" 5th Edition, Pearson Education, 2007.
   Chapters: 1, 2.1-2.4, 3.1-3.6, 4.1, 5, 7.1-7.4, 15.1, 15.3, 15.4

Reference Books:
1. Jayant Ganguly: A Treatise on Discrete Mathematical Structures", Pearson Education, 2010.

2. Kenneth H Rosen, "Discrete Mathematics & its Applications" 7th Edition, McGraw-Hill, 2010.

Course Outcomes (COs):

1. Solve given diverse enumeration problems using the basic counting principles. (PO-1,2)
2. Apply the fundamentals of logic to provide proof for a given situation. (PO-1,2)
3. Formulate a concise structure using set theory and construct induction proofs. (PO-1,2)
4. Demonstrate an understanding of relations and functions and be able to determine their properties. (PO-1,2)
5. Identify the relations exists in a given set and Examine the algebraic structures involving binary operation. (PO-1,2)

Fundamentals of Computer Organization

Course Code: MCA13   **Credits: 4:0:0**
Prerequisite: Nil   **Contact Hours: 56L**
Course Coordinator: Ms. B N Nithya

UNIT I

Digital Systems and Binary Systems: Digital Systems, Binary Numbers, Number Base Conversion, Octal and Hexadecimal Numbers, Complements, Signed Binary Numbers, Binary Codes, Binary Storage and Registers, Binary Logic

Boolean Algebra and Logic Gates: Introduction, Basic Definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Other Logic Operations, Digital Logic Gates Gate-Level Minimization

UNIT II

Introduction to Basic Electronics: Electricity, Circuits, Amplifiers, Diodes, Transistors, Switches, Resistors, Capacitors, Inductors.

Introduction to Combinational and Sequential circuits: Adders, Subtractors, Decoders, Encoders, Multiplexers, Flip-Flops, Registers, Counters.

Basic Structure of Computers: Computer Types, Functional Units, Basic Operational Concepts, Bus structures

UNIT III

Machine Instructions and Programs: Memory Location and Addresses, Memory Operations, Instructions & Instruction Sequencing Addressing Modes, Assembly Language, Basic Input/output Operations, Additional Instructions.

UNIT IV

Input/output Organization: Accessing I/O Devices, Interrupts, Direct Memory Accesses, Buses.

Memory: Some Basics concepts, Semiconductors RAM Memories, Read-Only Memories, Cache Memories.

UNIT V

Arithmetic Unit: Addition & subtraction of Signed Numbers, Design of Fast adders, Multiplication of Positive Numbers, Signed-Operand Multiplication, Fast Multiplication, Integer division Floating-Point Numbers & Operations

Text Books:

1. M. Morris Mano: Digital Logic and Computer Design, 4th Edition, Pearson Education, 2008.
   Chapters: 1.1.to 1.7, 2.1 to 2.8, Only definitions from (4.2, 4.5, 4.9 to 4.11, 5.2, 5.4, 6.1, 6.2, 6.3)

2. Carl Hamacher, Z Varnesic and S Zaky: Computer Organization, 5[th]Edition, McGraw Hill, 2002.
   Chapters: 1.1 to 1.4, 2.2 to 2.7, 2.10, 4.1, 4.2, 4.4 to 4.5, 5.1 to 5.3, 5.5, 6.1 to 6.6, 6.7.1,6.7.2, 6.7.3.

Web Links:
1. www.instructables.com/id/Basic-Electronics/
2. www.Electronics-Tutorial.ws

Course Outcomes (COs):

1. Apply number system conversion methods and Boolean algebra. (PO-1,2,3)
2. Describe the structure and functioning of a digital computer. (PO-1,2)
3. Analyze different machine instructions and addressing modes. (PO-1,2,3)
4. Explore the design of I/O and memory organization. (PO-1,2)
5. Demonstrate the operations of the arithmetic unit using the algorithms for arithmetic operations. (PO-1,2,3)

Introduction to UNIX

Course Code: MCA14   **Credits: 3:0:1**
Prerequisite: Nil   **Contact Hours: 42L 28P**
Course Coordinator: Dr. Yogish H K

UNIT I

Introduction: The Operating System, The UNIX Operating Systems, The UNIX Architecture, Features of UNIX, Locating Commands, Internal and External Commands, Command Structure, Flexibility of Command Usage, Man Browsing the Manual Pages On-line, Understanding the man Documentation, Further Help with **man –k**, **apropos** and **whatis**, **General Purpose Utilities:** clear, cal, date, echo, printf, bc, script, passwd, who, **Handling Ordinary Files:** cat, cp, rm, mv, file, wc, od.

UNIT II

The File System: The File, What's in a File name? The Parent-Child Relationship, The HOME Variable: The Home Directory, pwd, cd, mkdir, rmdir, Absolute Pathnames, Relative Pathnames, The Unix File System.
The vi Editor: vi Basics, Input Mode, ex Mode and Command Mode.

UNIT III

Basic File Attributes: ls options, File Ownership, File Permissions, chmod, Directory Permissions, Changing the File Ownership
More File Attributes: File Systems and Inodes, Hard Links, Symbolic Links, The Directory, umask, Modification and Access Times, find.
The Shell: The Shell's Interpretive Cycle, Shell Offerings, Pattern Matching-The Wild-cards, Escaping and Quoting, Redirection: The Three Standard Files, Two Special Files: /dev/null and /dev/tty, pipes, tee: Creating a Tee, Command Substitution.

UNIT IV

Simple Filters: The Sample Database, head, tail, cut, paste, sort, uniq, tr commands.
Filters Using Regular Expressions - grep and sed: grep: Searching for a Pattern, Basic Regular Expressions - An Introduction, Extended Regular Expressions and egrep. **sed:** The Stream Editor, Line Addressing, Using Multiple Instructions, Context Addressing, Writing Selected Lines to a File, Text Editing, Substitution.

UNIT V

The Process: Process Basics, ps: Process Status, System Processes, Mechanism of Process Creation, Internal and External Commands, Running Jobs in Background, Killing Processes with Signals, Job Control, at and batch, cron.
Essential Shell Programming: Shell Variables, Environment Variables, Shell Scripts, read, Using Command Line Arguments, exit and exit status of command,

The Logical Operators, The if Conditional, using test and [] to Evaluate Expression, The case Conditional, expr, while: looping, for: looping with a list, set and shift, trap, Debugging Shell Scripts with **set – x**

Laboratory

Students shall implement programs which supplement the theory concepts**.**

Text Book:

1. Sumitabha Das: UNIX Concepts and Applications, 4th Edition, Tata McGraw Hill, 2006.
   Chapters: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 21.

References:
1. UNIX: The Complete Reference: Kenneth Roson et al, Osborne/McGraw Hill, 2000.
2. Using UNIX: Steve Montsugu, 2ndEdition, Prentice Hall India, 1999.
3. UNIX and Shell Programming: M G Venkateshmurthy, Pearson Education Asia, 2005.
4. Behrouz A Forouzan and Richard F Gilberg: UNIX and Shell Programming, 1st Edition, Thomson Course Technology, 2005
5. www.elearning.vtu.ac.in
6. www.tutorialpoint.com/unix/

Course Outcomes (COs):
1. Describe the significance and Features of UNIX operating system. (PO-3,5)
2. Manage UNIX file system and Create, Edit text files through vi-editor. (PO-1,3,5)
3. Describe Various file attributes also explain shell's basic interpretive activities. (PO-2,3,5)
4. Apply basic and advanced filters for text processing. (PO-2,3,5)
5. Develop shell script for simple applications. And apply commands for process creation and control. (PO-1,2,3,5,9)

Professional Communication and Ethics

Course Code: MCA15   **Credits: 2:1:0**
Prerequisite: Nil   **Contact Hours: 28L 28T**
Course Coordinator: Dr. Niranjanamurthy

UNIT I

Basics of Technical Communication

Introduction, Importance of Technical Communication, General and Technical Communication, Objectives and Characteristics of Technical Communication, Process of Communication, Levels of Communication, Flow of Communication, Visual Aids in Technical Communication

Barriers to Communication

Introduction, Classification of Barriers

UNIT II

Non-verbal Communication

Introduction, Correlating Verbal and Non-verbal Communication

Active Listening

Introduction, Types of Listening, Listening for General Content and Specific Information.

Effective Speaking

Introduction, Achieving Confidence, Clarity, and Fluency, Vocal Cues

Conversations and Dialogues

Introduction, Conversation, Telephonic Conversations and Etiquette

UNIT III

Formal Presentations

Introduction, Planning, Outlining and Structuring, Nuances of Delivery, Guidelines for Effective Delivery, Controlling Nervousness and Stage Fright, Visual Aids in Presentations

Group Communication

Introduction, Use of Body Language in Group Communication, Discussions, Group Discussions, GD as part of a Selection Process

Reading Comprehension

Introduction, Techniques for Good Comprehension, Study Skills

UNIT IV

Interviews

Introduction, Objectives of Interviews, Types of Interviews, Job Interviews, Resumes: Resume, biodata and curriculum vitae, Resume Design and Structure

Formal Letters, Email and Research Papers
Introduction, Letter Writing, Business Letters – Enquiry, Order Placement, Claim, Cover Letters, Emails, Research Papers

UNIT V

Basic Concepts
Introduction, Terminology, Governing Edicts, Professional Ethics, Ethical Dilemmas, Emotional Intelligence, Value Education

Responsibilities and Rights of Professionals
Professional Responsibilities, Professional Rights

Global Issues
Computer Ethics, Intellectual Property Rights, Professionals and Ethics

Ethical Codes
Need for Ethical Codes, Sample code: Computer Society of India

Text Books:
1. Technical Communication - Principles and Practices, 3rd Edition, Meenakshi Raman and Sangeeta Sharma, Oxford University Press, 2015.
   Chapters: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 16
2. Professional Ethics, R. Subramanian, Oxford University Press, 2013.
   Chapters: 1, 6, 7, and 8.

Reference Books:
1. Ethics in Information Technology, George Reynolds, 5thEdition, Cengage, 2015.
2. Effective Technical Communication by M.AshrafRizivi, 1st Edition, Tata McGraw Hill, 2005.
3. Ethics in Engineering by Mike W Martin and Ronald Schinzinger, 4th Edition, Tata McGraw Hill, 2005.

Course Outcomes (COs):

1. Exhibit communication skills required for a profession. (PO-5,6,9,11)
2. Demonstrate on working effectively in groups or teams to solve a problem. (PO-6,9,11)
3. Acquire skills to face the interview. (PO-6,9,11)
4. Apply reading and writing skills in personal and professional life. (PO-6,9,11)
5. Adapt ethical practices in day to day life and profession. (PO-6,9,10, 11)

Topics in Web Programming

Course Code: MCA16   **Credits: 0:1:2**
Prerequisite: Nil   **Contact Hours: 28T 56P**
Course Coordinator: Dr. M Mrunalini

Topics to be covered in Tutorial
- Introduction to HTML5, Basic HTML Tags
- HTML Forms, Graphics and Media
- Designing HTML pages using CSS
- Basics of XML and DTD
- Introduction to Bootstrap
- Developing web pages using Bootstrap
- Introduction to JavaScript, JavaScript variables, operators
- Conditional and loop statements in JavaScript
- Functions and Arrays in JavaScript
- Event Handling and Document Object model in JavaScript
- Handling strings and working with window object

Laboratory
- Programs supplementing the concepts covered in tutorial.
- Students are expected to build a website using HTML5, Bootstrap and JavaScript.

Reference Books:
1. KOGENT Learning Solutions Inc.: HTML5BLACK BOOK, Dream tech Press, 2011.
2. Robert W. Sebesta: Programming the World Wide Web, 4thEdition, Pearson Education, 2008.
3. BOOTSTRAP Responsive Web Development by Tutorials Point.

Course Outcomes (COs):
1. Develop web pages using HTML5, CSS and XML. (PO-3)
2. Develop interactive web pages using JavaScript. (PO-3)
3. Develop web pages using Bootstrap framework. (PO-3,6)

II SEMESTER

Object Oriented Programming with C++

Course Code: MCA21   **Credits: 2:1:1**
Prerequisite: MCA11   **Contact Hours: 24L 28T 28P**
Course Coordinator: Dr S Jagannath

UNIT I

An Overview of C++: Object oriented programming concepts, differences between Object oriented programming and procedure oriented Programming, Introduction to C++, Sample Program, comments, Input out handling, Variables, const keyword, Scope resolution operator, references variables, Function Prototype, parameter meter passing techniques, function with default arguments. Function overloading, inline function.

UNIT II

Classes and Objects: Introduction to classes, Difference between structure and classes. Member Function overloading, Inline functions, Static class members, Nested classes, passing objects to functions, Returning objects, Object assignment. Friend functions.

Constructors and destructors

Introduction, default constructors, parameterized constructors, copy constructors, Destructors, overloading constructors.

UNIT III

Template functions and Classes: Generic functions and Generic classes, **Dynamic memory management –** New and delete operators.
Operator overloading: Introduction, member operator function, operator overloading using friend function, overloading of arithmetic, relational operators. Overloading of special operators such as $<<$, $>>$, [ ], $\rightarrow$.

UNIT IV

Inheritance: Introduction, Base class access control, inheritance and protected members, types of Inheritances, constructors, destructors, passing arguments to base class constructor, granting access, virtual base classes.

UNIT V

Virtual functions and polymorphism: Virtual functions, the virtual attribute is inherited, virtual functions are hierarchical, pure virtual functions, using virtual functions, early vs. late binding

Exception Handling: Exception handling fundamentals, Exception handling options.

Laboratory
Students shall implement programs which supplement the theory concepts

Text Books:

1. Herbert Schildt: The Complete Reference C++, 4th Edition, Tata McGraw Hill, 2003.
2. E Balagurusamy, Object Oriented Programming with C++, 6th Edition, Tata McGraw Hill Publishing Company Limited. NEW DELHI.

Reference Books:

1. Stanley B.Lippmann, JoseeLajore: C++ Primer, 4th Edition, Addison Wesley, 2005.
2. Bjarne Stroustrup: The C++ Programming Language, Pearson Education, 2000.
3. K R Venugopal, RajkumarBuyya, T Ravi Shankar: Mastering C++, Tata McGraw Hill, 1999.

Course Outcomes (COs):

1. Exemplify the Concepts of C++ and, Friend, inline functions and scope resolution operator (PO-1,2,3,5)
2. Apply concepts of classes and objects, arrays, pointers, references and in creating objects and access class members. (PO-1,2,3,5)
3. Demonstrate dynamic memory allocation, the polymorphism features of OOP and generic function techniques. (PO-1,2,3,5)
4. Develop classes by applying suitable type of inheritance and (PO-1,2,3,5)
5. Demonstrate runtime polymorphism using virtual functions also Implement the concepts of exception handling . (PO-1,2,3,5)

Data Analysis using Spreadsheets

Course Code: MCA22   **Credits: 0:1:2**
Prerequisite: Nil   **Contact Hours: 28T 56P**
Course Coordinator: Dr M Mrunalini

Course Contents:

1. Introduction to Spreadsheet basics
2. Working with formula and functions
3. Tables and Charts
4. Organizing Data: Sorting and Filtering
5. Analyse data with Pivot Tables
6. Working with Macro
7. Essentials of Spreadsheet Application Development
8. Programming Concepts: Syntax and semantics
9. Descriptive Statistics: Histogram, Descriptive Statistics: Mean, Median, Mode, Standard Deviation, Range
10. Skewness and Kurtosis, Rank and Percentile
11. Hypothesis Testing: t-Test, z-Test, F-Test
12. Covariance, Correlation and Regression
13. Time Series Forecasting: Moving Average
14. Exponential Smoothing

Reference Books:

1. John Walkenbach: Excel® 2013 Power Programming with VBA, Willey, 2013.
2. Robert de Levie: Advanced Excel® for Scientific Data Analysis, OXFORD University Press, 2012.
3. ChandanSengupta: Financial Modeling using EXCEL and VBA, John Wiley & Sons, Inc, 2004.
4. Kirkup: Data Analysis with Excel, Cambridge University Press, 2003.

Course Outcomes (COs):

1. Organize and explore data using Spreadsheet. (PO-1,4,5,7,9)
2. Explore data with Pivot Tables and PivotCharts. (PO-1,4,5,7,9)
3. Create and modify Macros. (PO-1,2,3,4,5,7,9)
4. Analyse data using Spreadsheet data analysis tools for the given data set. (PO-1,2,3,4,5,7,9)
5. Design and Develop programs that automate the given task using the functionalities of Spreadsheets. (PO-1,2,3,4,5,7,9,11)

Database Management System

Course Code: MCA23   **Credits: 3:0:1**
Prerequisite: Nil   **Contact Hours: 42L 28P**
Course Coordinator: Prof. Sailaja Kumar

UNIT I

Introduction: Database-System Applications, Purpose of Database Systems, Database Architecture, Database Users and Administrators.
Relational Model: Relational Model Concepts; Relational Model Constraints and Relational Database Schemas; Update operations, Transactions, and Dealing with Constraint Violations

UNIT II

SQL: SQL Data Definition and Data Types; Specifying constraints in SQL, Schema Modification
Basic Retrieval Queries in SQL; INSERT, DELETE and UPDATE statements in SQL; Additional features of SQL

UNIT III

More SQL: Complex Queries, Views
PL/SQL: Introduction to PL/SQL, Procedures and Functions, Specifying Constraints as Assertions and Actions as Triggers

UNIT IV

Entity-Relationship Model: Using High-Level Conceptual Data Models for Database Design; A Sample Database Application; Entity Types, Entity Sets, Attributes and Keys; Relationship Types, Relationship Sets, Roles and Structural Constraints; Weak Entity Types; Refining the ER Design; ER Diagrams, Naming Conventions and Design Issues. Relationship types of degree higher than two.
Database Design: Informal Design Guidelines for Relation Schemas, Functional Dependencies; Normal Forms Based on Primary Keys.

UNIT V

Transaction Management
Transactions: Transaction Concept, A Simple Transaction Model, Storage Structure, Transaction Atomicity and Durability, Transaction Isolation, Serializability
Concurrency Control: Lock Based Protocols.
Recovery System: Failure Classification, ARIES, Architecture of a typical commercial DBMS.
Database Security: Introduction to Database Security Issues, Discretionary Access control Based on Granting and Revoking Privileges.

Laboratory

Students are expected to exercise the following:
1. Implement the database using any backend software.
2. Implement SQL queries for the given database schema
3. Implement PL/SQL triggers, procedures and functions
4. Develop an ER diagram for the defined problem and specify key attributes of each entity type and structural constraints on each relationship.
5. Normalize the tables up to 3rd Normal Form

Text Books:
1. RamezElmasri and Shamkanth B Navathe: Fundamentals of Database Systems, 6th Edition, Pearson Education, 2011.
   Chapters 3, 4, 5, 7.1 to 7.7, 7.9, 15.1 to 15.3, 24.1, 24.2
2. Abraham Silberschatz, Henry F Korth and S Sudarshan: Data base System Concepts, 6th Edition, Mc-Graw Hill, 2011.
   Chapters 1.1, 1.2, 1.9, 1.12, 14.1 to 14.6, 15.1.1 to 15.1.3, 16.1, 16.8

Web Links:
1. http://plsql-tutorial.com
2. http://k.web.umkc.edu/kumarv/cs471/oracle-arch.htm

Reference Books:
1. Raghu Ramakrishnan and Johannes Gehrke: Database Management Systems, 3rd Edition,   McGraw-Hill, 2003.
2. C.J. Date, A. Kannan, S. Swamynatham: A Introduction to Database Systems, 8th Edition, Pearson education, 2006.
3. Visual Basic 6.0 Professional by Micheal Halvarson, 2nd edition, Pearson Education.

Course outcomes (COs):

1. Describe the basic architecture of the database management system and database schema with constraints. (PO-1,3,5,9)
2. Execute SQL queries to access data. (PO-1,3,4,5,7,9,11)
3. Implement views, triggers, PL/SQL procedures and functions and develop relational algebra expressions. (PO-1,3,4,5,7,9,11)
4. Design ER model and relational database schema for real world application. (PO-1,2,3,7,9,11,12)
5. Explain the concepts of transaction, recovery and security in databases. (PO-1)

Data Structures using C

Course Code: MCA24   **Credits: 3:0:1:0**
Prerequisite: MCA11   **Contact Hours: 42L 28P**
Course Coordinator: Dr Niranjan Murthy

UNIT I

Introduction to Data Structures: Definition, Abstract Data Type, Model for an ADT, ADT Implementations and example.
Recursion: Recursive definition and processes, Example on recursion: Factorial, Fibonacci numbers, Towers of Hanoi problem, Example – Infix, Prefix and Postfix.
Stack: Introduction to Stacks, Operations on a Stack, Applications of Stacks.

UNIT II

Queues: Introduction to Queues, Array Representation of Queues, Types of Queues: Circular Queues, Deques, Priority Queues.
Lists – Singly linked list: Introduction, Linked Lists versus Arrays, Memory Allocation and De-allocation for a Linked List, Singly Linked Lists and Circular Linked Lists.

UNIT III

Lists – Doubly linked list: Doubly Linked Lists, Inserting a New Node in a Doubly Linked List, Deleting a Node from a Doubly Linked List.
Trees: Introduction, Types of Trees: General Trees, Forests, Binary Trees, BST, Expression Trees. Creating a Binary Tree from a General Tree, Traversing a Binary Tree.

UNIT IV

Efficient Binary Trees: Binary Search Tree, Operations on Binary Search Trees, Threaded Trees. Examples.
Advanced concepts in Trees: AVL Search trees: Basic concepts, implementations.

UNIT V

Multi way Trees: M-way search trees, B-trees: Basic concepts, Implementations, simplified B-Trees: 2-3 tree, 2-3-4 tree.
Graphs: Basic concepts, operations, storage structures, graph algorithms.

Laboratory

Students shall implement programs that supplement the theory concepts

Text Books:
1. Data Structures - A Pseudocode Approach with C, Richard F Gilberg and Behrouz A Forouzan, Cengage Learning, 6th Indian Reprint 2009.
   Chapters (1.2, 1.3, 1.4, 2.2, 2.3, 8, 8.1, 8.2, 10.1, 10.2, 10.4, 11.1, 11.2, 11.3, 11.4)
2. Data Structures Using C, Second Edition, Reema Thareja, Oxford University Press 2018. Chapters (7.1, 7.3, 7.7, 8.1, 8.2, 8.4, 8.4.1, 8.4.2, 8.4.3, 6.1, 6.1.2, 6.1.3, 6.2, 6.3, 6.4, 9.1, 9.2, 9.2.1 to 9.2.5, 9.3, 9.4, 9.4.1 to 9.4.5, 10.1., 10.2, 10.2.1, 10.2.2,10.2.3, 10.2.8, 10.2.9, 10.3)

Reference Books:
1. Data Structures using C and C++ by YedidyahLangsam and Moshe J. Augenstein and Aaron M Tenenbaum, 2nd Edition, Pearson Education Asia, 2004.
2. C programming Skills and Data Structures - Nanjesh Bennur, Manjaiah D H, G Anjan Babu, C K Subbaraya, InSc Publishing House, Primer- First Edition, 2019
3. Data Structures and Programming Design in C, Robert Kruse, C L Tondo, Bruce Leung, 2nd Edition, Pearson Education, 2007.

Course Outcomes (COs):
1. Apply the concepts of ADT for different types of data structures like stack. (PO-1,3,5,9)
2. Implement the queue and list for real world applications. (PO-1,2,3,5,9)
3. Demonstrate the usage and operation of Doubly Linked List and trees. (PO-1,2,3,5,9)
4. Demonstrate the operations and traversing of binary search tree and AVL tree. (PO-1,2,3,5,9)
5. Exhibit the construction of Multi way Trees and storage structures. (PO-1,3,5,9)

MANAGEMENT INFORMATION SYSTEMS

Course Code: MCA25   **Credits: 3:0:0**
Prerequisite: Nil   **Contact Hours: 42L**
Course Coordinator: Dr Niranjan Murthy

UNIT I

Information Systems in Global Business Today
The Role of Information Systems in Global Business Today, Perspective on Information Systems, Contemporary Approaches to Information Systems Global E-Business and collaboration: Business Process and Information Systems,
Types of Business Information Systems, The Information Systems Function in Business. Information Systems. What is an Organization? How Information Systems Impact Organizations and Business Firms.

UNIT II

Information Technology Infrastructure
IT Infrastructure, Infrastructure Components, Contemporary Hardware Platform Trends, Contemporary Software Platform Trends, **Foundation of Business Intelligence: Databases and Information Management**
Organizing Data in a Traditional File Environment, The Database Approach to Data Management, Using Database to Improve Business Performance and Decision Making.

UNIT III

Key system Applications for the Digital Age
Enterprise Systems, Supply Chain Management Systems, Customer Relationship Management Systems, Enterprise Applications: New Opportunities and Challenges
E-Commerce: Digital Markets, Digital Goods
Electronic Commerce and the Internet, M-Commerce, Electronic Commerce, Electronic Commerce payment systems.

UNIT IV

Managing Knowledge
The Knowledge Management Landscape, Enterprises-Wide Knowledge Management Systems, Knowledge Work Systems

Enhancing Decision Making
Decision Making and Information Systems, Systems for Decision support, Executive support systems (ESS) and the Balanced Scorecard.

UNIT V

Building and Managing Systems
Systems as Planned Organizational Change, Overview of Systems Development, Alternative Systems-Building Approaches, Application Development for the digital firm.

Managing Projects
The Importance of Project Management, Selecting Projects, Establishing the Business Value of Information Systems, Managing Project Risk   .

Case Study

Text books:
1. Kenneth C.Laudon, Jane P.Laudon: Management Information Systems Managing the Digital Firm, 12thEdition, Pearson Education, 2015.
   Chapters: 1.1, 1.2, 1.3, 2.1, 2.2, 2.4, 3.1, 3.2, 5.1 to 5.4, 6.1 to 6.3, 9.1 to 9.4, 10.1 to 10.4, 11.1 to 11.3, 12.1 to 12.3, 13.1 to 13.4, 14.1 to 14.4.

Reference Books:
1. Kenneth C.Laudon, Jane P.Laudon: Management Information Systems Managing the Digital Firm, 1stEdition, Pearson Education, 2010.
2. Laudon & Laudon: Essentials of Management Information Systems, 8thEdition, Pearson Education, 2009.
3. McLeod & Schell: Management Information Systems, 10th Edition, Pearson Education, 2007.

Course Outcomes (COs):
1. Discuss the Role of Information Systems in Global Business Today. (PO-1,2,8,11)
2. Apply the foundations of Business Intelligence in software industry and describe the IT Infrastructure. (PO – 1,2,8,9,11)
3. Describe the enterprise systems and digital marketing and managing knowledge in Industry. (PO – 2,8,9)
4. Analyze the decision making concepts for building and managing information systems in an organization. (PO – 2,8,9,11)
5. Apply the project management principles for managing the system. (PO–1,2,8,11)

JavaScript Frameworks

Course Code: MCA26   **Credits: 0:1:2**
Prerequisite: MCA16   **Contact Hours: 28T 56P**
Course Coordinator: Dr Madhu bhan

Topics to be covered in Tutorial

1. Introduction to AngularJS, ExpressJS and Node.js
2. AngularJS – Directives, Expressions, Controllers
3. AngularJS – Filters, Tables, Modules, Forms
4. AngularJS – Services
5. ExpressJS – Hello World, Routing, HTTP Methods
6. ExpressJS – URL Building, Templating, Static Files
7. ExpressJS – Cookies, Sessions and Authentication
8. Node.js – First Application, REPL Terminal, Package Manager(NPM)
9. Node.js – Callbacks, Even Loop, Event Emitter
10. Node.js – Buffers, Streams, File System

Laboratory

- Programs supplementing the concepts covered in tutorial.
- Students are expected to build a website using AngularJS, ExpressJS and Node.js.

References:

1. MEAN Web Development Second Edition, PACKT.
2. https://www.tutorialspoint.com/angularjs/
3. https://www.tutorialspoint.com/nodejs/
4. https://www.tutorialspoint.com/expressjs/

Course Outcomes (COs):

1. Understand various JavaScript Frameworks. (PO-1,2,3,6,9,10,11,12)
2. Demonstrate and Develop simple programs using Angular JS. (PO-1,2,3,5,6,9)
3. Demonstrate and Develop simple programs using Express JS. (PO-1,2,3,5,6,9)
4. Demonstrate and Develop simple programs using Node JS. (PO-1,2,3,5,6,9)
5. Develop small Application using JavaScript Frameworks. (PO-1,2,3,5,6,7,9)

Co-Curricular Activities

Course Code: MCACCA   **Credits: 0:0:2**

Guidelines
- Students have to acquire 2 credits by accomplishing any one of the following Co-curricular activities within the duration of the Programme:
  - On-line Certification Course
  - Internship of 8-weeks followed by a report
  - Paper Publication in International Conference along with a report and presentation
  - Clearing one level in any of the recognized competitions
- On-line Certification Course
  - Students can register for any On-line Certification Course in the field of Computer Science/Management for a minimum duration of 8 weeks
  - They have to submit the Course Completion Certificate along with their scores
- Internship of 8-weeks followed by a report
  - Students have to undergo the Internship in any Institute of National repute or any reputed/well-known industry
  - They are expected to submit a report and give a presentation
- Paper Publication in International Conference along with a report and presentation
  - Students have to publish a research paper in a peer-reviewed International Conference.
  - After the conference, he/she has to submit a report and give a presentation
- Clearing one level in any of the recognized competitions
  - Students have to register for any recognized competitions and clear one level
  - The committee has to identify suitable competition and make the students to aware of that

Approval and Evaluation Process
- Approval and evaluation can be done by the committee along with the concerned proctor
- The students have to get prior approval from the committee to take up the activity
- A stipulated period can be provided for the approval and evaluation process

Course Outcomes (COs):
1. Identify the Course/Technology needed to learn by themselves.
2. Explain/Demonstrate the concepts/technology learnt.
3. Apply the concepts in solving real world problems.