



RAMAIAH
Institute of Technology

CURRICULUM

For the Academic year 2018 – 2019

DEPARTMENT OF COMPUTER APPLICATIONS

I & II Semester MCA

RAMAIAH INSTITUTE OF TECHNOLOGY

(Autonomous Institute, Affiliated to VTU)

BANGALORE – 54

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 2016 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

- Imparting quality technical education by nurturing a conducive learning environment through continuous improvement and customization
- Establishing research clusters in emerging areas in collaboration with globally reputed organizations
- 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

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

PROGRAM EDUCATIONAL OBJECTIVES (PEOs):

- PEO1.** Learn and apply computing and managerial principles to excel in professional career in the field of Computer Applications as an individual, as part of a team, as an entrepreneur and equip them with orientation towards research
- PEO2.** Analyze real world problems, design and develop solutions through the knowledge of mathematics and computing principles that are socially acceptable
- PEO3.** Exhibit professional ethics, cyber regulations and communication skills, engage in lifelong learning and to adapt emerging technologies and tools

PROGRAM OUTCOMES (POs):

- PO1:** An ability to apply knowledge of mathematics and computing principles appropriately to develop conceptual model for real world problems.
- PO2:** An ability to identify and formulate problem definition for real world problems, analyze the literature of the domain and provide solutions using mathematics and computing.
- PO3:** An ability to design, develop and assess a software system, process, component, or program of varying complexity as per needs of public and society
- PO4:** An ability to use research based knowledge to analyze and interpret data and synthesize information to provide valid conclusions.
- PO5:** An ability to apply the computing and management principles for managing projects as an individual, as a member and as a leader in a team under multidisciplinary environments.
- PO6:** An ability to understand, select, use and create modern tools and technologies necessary for computing practices.
- PO7:** An ability to adapt professional ethics, principles of professional computing practices, cyber regulations and responsibilities.
- PO8:** An ability to communicate effectively about computing activities in both verbal and written form with the computing community and with society.
- PO9:** An ability to assess the local and global impact of software solutions on individuals, organizations and society.
- PO10:** An ability to recognize the need and engage in self-learning for continual development as a computing professional.
- PO11:** An ability to perform effectively as an individual and as a member or leader in diverse teams and in multidisciplinary environments.
- PO12:** An ability to adapt 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)	Professional Courses- Electives (PC-E)	Project Work/Internship (PW /IN)	Co-Curricular Activities (CCA)	Seminar (SEM)	Total credits in a semester
First	4		3	15			2		22
Second		4		18					22
Third				12	9			1	22
Fourth				12	9			1	22
Fifth				11	9				20
Sixth						22			24
Total	4	4	3	68	27	22	2	2	132

SCHEME FOR 2018-2021 BATCH

I SEMESTER

	Course Code	Course Name	Credits*			
			L	T	P	Total
1.	MCA11	Problem Solving Using 'C'	3	0	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			15	3	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	3	0	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	-	4	0	0	4
6.	MCA26 [#]	JavaScript Frameworks	MCA16	0	1	2	3
Total				13	2	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
5	MCAE--	Elective I					3
6	MCAE--	Elective II					3
7	MCAE--	Elective III					3
8	MCAS1	Seminar I					1
Total							22

[#]Semester End Examination will be conducted for Laboratory

* L: Lecture T: Tutorial P: Practical

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	Object Oriented Modeling and Design Patterns	-	3	0	1	4
3	MCA43	Predictive Analytics	-	3	0	1	4
4	MCAE--	Elective III					3
5	MCAE--	Elective IV					3
6	MCAE--	Elective V					3
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 [#]	Mobile Application Development		0	2	2	3
2	MCA52	Information Security		3	0	1	4
3	MCASC-	Soft-core Course		3	0	0	3
4	MCAE--	Elective VII					3
5	MCAE--	Elective VII					3
6	MCAE--	Elective VIII					3
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

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*** L: Lecture T: Tutorial P: Practical**

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)	Credits*			
				L	T	P	Total
1	MCAE01	Programming in Java	MCA21	2	0	1	3
2	MCAE02	Operations Research		2	1	0	3
3	MCAE03	Machine Learning	MCA43	2	0	1	3
4	MCAE04 [#]	Web Programming with PHP and AJAX	MCA26	0	1	2	3
5	MCAE05 [#]	Computer Graphics and Animation		0	1	2	3
6	MCAE06	Secure Coding in C and C++	MCA21	2	0	1	3
7	MCAE07 [#]	NoSQL Databases	MCA23	0	1	2	
8	MCAE08	Programming with Python	MCA11, MCA26	2	0	1	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

[#]Semester End Examination will be conducted for Laboratory

*** L: Lecture**

T: Tutorial

P: Practical

SCHEME OF TEACHING

I SEMESTER

Sl. No.	Course Code	Course Name	Category	Credits				Contact Hours
				L	T	P	Total	
1.	MCA11	Problem Solving Using 'C'	PC-C	3	0	1	4	5
2.	MCA12	Discrete Mathematics	MTH	3	1	0	4	5
3.	MCA13	Fundamentals of Computer Organization	PC-C	4	0	0	4	4
4.	MCA14	Introduction to UNIX	PC-C	3	0	1	4	5
5.	MCA15	Professional Communication and Ethics	HSS	2	1	0	3	4
6.	MCA16	Topics in Web Programming	PC-C	0	1	2	3	6
Total				15	3	4	22	29

II SEMESTER

Sl. No	Course Code	Course Name	Category	Credits				Contact Hours
				L	T	P	Total	
1.	MCA21	Object Oriented Programming with C++	PC-C	3	0	1	4	5
2.	MCA22 [#]	Data Analysis using Spreadsheets	PC-C	0	1	2	3	6
3.	MCA23	Database Management Systems	PC-C	3	0	1	4	5
4.	MCA24	Data Structures Using 'C'	PC-C	3	0	1	4	5
5.	MCA25	Management Information Systems	MGT	4	0	0	4	4
6.	MCA26 [#]	JavaScript Frameworks	PC-C	0	1	2	3	6
Total				13	2	7	22	31

#Semester End Examination will be conducted for Laboratory

*** L: Lecture T: Tutorial P: Practical**

Problem Solving Using 'C'

Course Code: MCA11

Credits: 3:0:1

Prerequisite: Nil

Contact Hours: 42L 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, declaring a variable as volatile, overflow and underflow of data

Operators and Expressions: Arithmetic operators, relational operators, logical operators, assignment operator, increment and decrement operator, conditional operator, bitwise operators, comma operator, special operators, arithmetic expressions, evaluation of expressions, precedence of arithmetic operators, type conversions in expressions, operator precedence and associativity, mathematical functions

UNIT II

Managing Input and Output Operations: The scanf() and printf() functions for input and output operations, 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 statement, the if..else statement, nesting of if..else statements, the else..if ladder, the switch statement, the ?: operator, the goto statement, the break statement, programming examples

Decision Making and Looping: The while statement, the do..while statement, the for statement, nested loops, jumps in loops, the continue statement, 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, multidimensional 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, other features 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, no arguments and no return values, arguments but no return values, arguments with return values, no arguments with return value, functions that return multiple values, nesting of functions, recursion, passing arrays to functions, passing string to functions, programming examples

Structures and Unions: 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, structures and functions, Unions, 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, chain Of pointers, pointer expressions, pointers and arrays, pointer and character strings, array of pointers, pointer as function arguments, functions returning pointers, pointers to functions, pointers and structures, programming examples.

Dynamic memory allocation: Allocating a block of memory: *malloc*, allocating 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, error handling during I/O operations, and random access 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 to 13.6, 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:

1. Identify the different types of variables, keyword, tokens, arithmetic expressions to solve real world problems and design algorithms, flowcharts, (PO-1,2)
2. Apply decision making, branching, looping constructs for solving problems and developing programs. (PO-2,3)
3. Apply the concepts of arrays and strings to develop programs for a given problem. (PO-3)
4. Apply the concept of structures and unions to design memory efficient structures to develop programs. (PO-3)
5. Apply the concepts of pointers, dynamic memory allocation, preprocessor to develop programs. (PO-3)

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:

1. Analyze and solve given diverse enumeration problems using the basic counting principles, combination and permutations. (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 for the investigated mathematical topic. (PO-1,2)
4. Prove the given statement using principle of mathematical induction and design a function to map set of inputs to a set of possible outputs where each input is related to exactly one output. (PO-1,2)
5. Emphasize on the relations exists in a given set and examine the algebraic structures involving closed binary operation. (PO-1,2)

Fundamentals of Computer Organization

Course Code: MCA13

Prerequisite: Nil

Course Coordinator: Dr. M Mrunalini

Credits: 4:0:0

Contact Hours: 56L

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, 5thEdition, 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:

1. Describe Number system, Logic Gates and Boolean laws. (PO-1)
2. Describe the structure and functioning of a Digital Computer. (PO-1)
3. Analyze different machine instructions and addressing modes. (PO-1)
4. Describe the basics of I/O data transfer and the technical and organizational details of Memory Design. (PO-1)
5. Demonstrate the operation of the arithmetic unit using the algorithms of fixed-point and floating- point addition, subtraction, multiplication and division. (PO-1)

Introduction to UNIX

Course Code: MCA14

Credits: 3:0:1

Prerequisite: Nil

Contact Hours: 42L 28P

Course Coordinator: Dr. Madhu Bhan

UNIT I

Introduction: The Operating System, The UNIX Operating Systems, The UNIX Architecture, Features of UNIX, POSIX and the Single UNIX Specification, 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**, When Things Go Wrong

General Purpose Utilities: cal, date, echo, printf, bc, script, passwd, who, uname, tty, stty

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, ls, The Unix File System

Handling Ordinary Files: cat, cp, rm, mv, more, lp, file, wc, od, cmp, comm., diff

Basic File Attributes: ls -l, the -d option, 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

UNIT III

The vi Editor: vi Basics, Input Mode- Entering and Replacing Text, Saving Text and Quitting- The ex Mode, Navigation, Editing text, Uncoding Last Editing Instructions, replacing the Last Command, Searching for a pattern, Substitution- Search and Replace

The Shell: The Shell's Interpretive Cycle, Shell Offerings, Pattern Matching- The Wild-cards, Escaping and Quoting, Redirection: The Three Standard Files, /dev/null and /dev/tty: Two Special Files, Pipes, tee: Creating a Tee, Command Substitution, Shell Variables

Simple Filters: The Sample Database, pr, head, tail, cut, paste, sort, uniq, tr commands

UNIT IV

Essential Shell Programming: 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,\$0, while: looping, for: looping with a list, set and shift, The Here Document, trap, Debugging Shell Scripts with **set -x**

UNIT V

The Process: Process Basics, ps: Process Status, System Processes, Mechanism of Process Creation, Internal and External Commands, Process States and Zombies, Running Jobs in Background, nice, Killing Processes with Signals, Job Control, at and batch, cron, time commands

Customizing the Environment: The Shells, Environment Variables, The Common Environment Variables, Aliases, Command History, In-Line Command Editing

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

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.

References:

1. UNIX: The Complete Reference: Kenneth Rosen et al, Osborne/McGraw Hill, 2000.
2. Using UNIX: Steve Montsugu, 2nd Edition, 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:

1. Describe the Features and Utilities of Unix Operating System. (PO-1,2)
2. Apply the commands on Files and Directories to manage Unix file system. (PO-3)
3. Create and Edit text files through vi-editor and introduction to shell. (PO-6)
4. Develop Shell Script for simple applications. (PO-2,3)
5. Demonstrate process control commands and filter commands. (PO-3)

Professional Communication and Ethics

Course Code: MCA15

Prerequisite: Nil

Course Coordinator: Ms. B N Nithya

Credits: 2:1:0

Contact Hours: 28L 28T

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, 5th Edition, 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:

1. Demonstrate oral communication skills required for a profession. (PO-8)
2. Work effectively in groups or teams to solve a problem. (PO-11)
3. Acquire skills to face the interview. (PO-8)
4. Demonstrate reading and writing skills in personal and professional life. (PO-8)
5. Adopt ethical practices in day to day life and profession. (PO-7)

Topics in Web Programming

Course Code: MCA16

Credits: 0:1:2

Prerequisite: Nil

Contact Hours: 28T 56P

Course Coordinator: Dr. Niranjanamurthy M

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:

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

Prerequisite: MCA11

Course Coordinator:

Credits: 3:0:1

Contact Hours: 42L 28P

UNIT I

An Overview of C++: The origins of C++, What is object oriented programming, Some C++ fundamentals, Old-style vs Modern C++, C++ keywords, The general form of a C++ program, Introduction to classes, Difference between structure and classes.

Classes and Objects: Classes, Friend functions, friend classes, Inline functions, default constructors, parameterized constructors, when constructors and destructors are called, scope resolution operator.

UNIT II

Classes and Objects: Static class members, Nested classes, passing objects to functions, Returning objects, Object assignment.

Array, Pointers, References, and dynamic memory allocation operators: Array of objects, Pointers to objects, this pointer, pointers to derived types, pointers to class members, References, Dynamic allocation operators

UNIT III

Function overloading, Copy Constructors and Default Arguments: Function overloading, overloading constructors, copy constructors, Default function arguments

Operator overloading: Creating a member operator function, operator overloading using friend function, overloading new and delete, overloading some special operators

Templates: Generic functions, Generic classes

UNIT IV

Inheritance: Base class access control, inheritance and protected members, inheriting multiple base classes, constructors, destructors and inheritance, granting access, virtual base classes

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

UNIT V

File I/O: C++ Stream classes, formatted I/O, Overloading <<, and >>, fstream and the file classes, file operations.

Exception Handling: Exception handling fundamentals, Exception handling options

Introduction to Standard Template Library (STL): STL - an overview, containers, vectors, lists, maps

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.

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:

1. Identify data members, member functions and apply different C++ programming techniques such as friend functions, inline functions, friend classes, static members, nested classes and passing objects. (PO-3)
2. Apply concepts of arrays, pointers, references and dynamic memory allocation in creating objects and access class members for a given problem. (PO-3)
3. Identify and apply concept of function overloading, copy constructors, operator overloading and generic functions techniques for given problem statement and demonstrate the polymorphism features of OOP. (PO-3)
4. Identify suitable type of inheritance and develop classes to solve the given problems to achieve runtime polymorphism using virtual functions. (PO-3)
5. Apply the concepts of files, exception handling and built-in functions of Standard Template Library (STL) to develop programs. (PO-3)

Data Analysis using Spreadsheets

Course Code: MCA22

Prerequisite: Nil

Course Coordinator:

Credits: 0:1:2

Contact Hours: 28T 56P

Course Contents:

1. Introduction to Spreadsheet basics
2. Working with formula and functions
3. Tables and Charts
4. Organizing Data: Sorting and Filtering
5. Analyze 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:

1. Organize and explore data using Spreadsheet. (PO-4,6,10)
2. Analyse data with PivotTables and PivotCharts. (PO-4,6,10)
3. Create and modify Macros. (PO-4,6,10)
4. Analyse data using Spreadsheet data analysis tools for the given data set. (PO-4,6,10)
5. Design and Develop programs that automate the given task using the functionalities of Spreadsheets. (PO-4,6,10)

Database Management System

Course Code: MCA23

Prerequisite: Nil

Course Coordinator:

Credits: 3:0:1

Contact Hours: 42L 28P

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

SQL: SQL Data Definition and Data Types; Specifying constraints in SQL, Schema Modification

UNIT II

Basic Retrieval Queries in SQL; INSERT, DELETE and UPDATE statements in SQL; Additional features of SQL

More SQL: Complex Queries, Views

UNIT III

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

Relational algebra: Unary Relational Operations: SELECT and PROJECT; Relational Algebra Operations from Set Theory; Binary Relational Operations: JOIN and DIVISION; Additional Relational Operations, Examples of Queries in Relational Algebra

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.

Relational Database Design by ER-to-Relational Mapping: Relational Database Design Using ER- to-Relational Mapping

Database Design: Informal Design Guidelines for Relation Schemas

UNIT V

Database Design: Functional Dependencies; Normal Forms Based on Primary Keys

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. Design a Relational Schema for the database from the ER diagram and specify key attributes of each entity type and structural constraints on each relationship.
6. 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, 6.1 to 6.5, 7.1 to 7.7, 7.9, 9.1, 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:

1. Describe the basic architecture of the database management system and Implement database schema with constraints, given database design. (PO-1,3)
2. Implement SQL queries to access data, given relational database schema. (PO-3)

3. Implement views, triggers, PL/SQL procedures and functions for a given scenario and Develop relational algebra expressions, given the relational database schema (PO-1,2,3).
4. Design ER Model and Relational Database Schema for real world application, given unambiguous problem statement. (PO-1,2)
5. Describe the concepts of transaction, recovery and security in Databases. (PO-1)

Data Structures using C

Course Code: MCA24
Prerequisite: MCA11
Course Coordinator:

Credits: 3:0:1:0
Contact Hours: 42L 28P

UNIT – I

Introduction to Data Structures: Definition, Abstract Data Type, Model for an ADT, ADT Implementations and example

Recursion: Recursive definition and designing recursive algorithms, Example on recursion: GCD, Fibonacci numbers, Towers of Hanoi problem

Stack and its applications: Definition and examples, Representing stacks, Example – Infix, Prefix and Postfix

UNIT – II

Queues: Queue operations, Queue ADT. Queue Applications

Lists: Basic Operations, Implementation, List ADT, Applications, Complex Implementations.

UNIT – III

Trees: Basic concepts, Binary trees and its properties, operations on binary trees, Binary tree traversals, Expression tree, General trees: insertions, deletions, changing a general tree to a binary tree

Binary Search Tree: Binary Search tree: Basic concepts and its operations, threaded trees

UNIT – IV

Advanced concepts in Trees: AVL Search trees: Basic concepts, implementations, Heaps - Basic Concepts, implementation.

UNIT – V

Multiway Trees: M-way search trees, B-trees: Basic concepts, Implementations, simplified B-Trees: 2-3 tree, 2-3-4 tree

Graphs: Graphs: Basic concepts, operations, storage structures, graph algorithms.

Laboratory

Students shall implement programs which supplement the theory concepts

Text Books:

1. Richard F Gilberg and Behrouz AForouzan: Data Structures - A Pseudocode Approach with C, Cengage Learning, 6th Indian Reprint 2009.
Chapters (1.2, 1.3, 1.4, 2.2, 2.3, 3.1, 3.2, 3.3 3.4, 3.5, 4.1, 4.2, 4.3, 4.5, chapter 5, 6.1, 6.2, 6.3, 7.1, 7.2, 7.3, 7.5, 8.1, 8.2, 9.1, 9.2, 10.1, 10.2, 10.4, 11.1, 11.2, 11.3, 11.4)

Reference Books:

1. Yedidyah Langsam and Moshe J. Augenstein and Aaron M Tenenbaum: Data Structures using C and C++, 2nd Edition, Pearson Education Asia, 2002.
2. Nanjesh Bennur, Dr. Manjaiaha DH, Dr. C.K. Subbaraya: C programming skills and Data Structures primer, First Edition, IPH Publication, 2017.
3. Mark Allen Weiss: Data Structures and Algorithm Analysis in C, 2nd Edition, Pearson Education Asia, 1997.
4. Robert Kruse, C L Tondo, Bruce Leung: Data Structures and Programming Design in C, 2nd Edition, Pearson Education, 2007.

Course Outcomes:

1. Remember and apply the concepts of ADT and its implementation for different types of data structures like Stack. (PO-1,2,3)
2. Demonstrate the implementation of Queue and List for real world applications. (PO-3)
3. Demonstrate the usage and implementation of Tree and Binary Search Tree. (PO-3)
4. Describe the concepts, algorithms and applications of AVL tree and Heaps. (PO-3)
5. Remember and recall the algorithms for different operations on Multiway Trees and graphs. (PO-3)

MANAGEMENT INFORMATION SYSTEMS

Course Code: MCA25

Prerequisite: Nil

Course Coordinator:

Credits: 4:0:0

Contact Hours: 56L

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, Systems for collaboration and Teamwork, The Information Systems Function in Business

Information Systems, Organizations and Strategy

What is an Organization? How Information Systems Impact Organizations and Business Firms, Using Information Systems to achieve Competitive Advantage

UNIT II

Information Technology Infrastructure

IT Infrastructure, Infrastructure Components, Contemporary Hardware Platform Trends, Contemporary Software Platform Trends, Management Issues

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, Managing Data Resources

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, Electronic Commerce: Business and Technology, The Mobile Digital Platform and Mobile E-Commerce, Building an E-commerce Website.

Managing Knowledge

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

UNIT IV

Enhancing Decision Making

Decision Making and Information Systems, Business Intelligence in the Enterprise, Business Intelligence Constituencies.

Building and Managing Systems

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

UNIT V

Managing Projects

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

Managing Global Systems

The Growth of International Information Systems, Organizing International Information Systems, Managing Global Systems, Technology Issues and Opportunities for Global Value Chains

Case Study

Text books:

1. Kenneth C.Laudon, Jane P.Laudon: Management Information Systems Managing the Digital Firm, 12th Edition, Pearson Education, 2015.
Chapters: 1.1, 1.2, 1.3, 2.1, 2.2, 2.4, 3.1, 3.2, 3.3, 5.1 to 5.5, 6.1 to 6.4, 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, 15.1 to 15.4

Reference Books:

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

Course Outcomes:

1. Discuss the Role of Information Systems in Global Business Today. (PO-3)
2. Describe the IT Infrastructure and Foundation of Business Intelligence in software industry. (PO-3)
3. Explain Enterprise Systems, Digital Markets and Managing Knowledge in industry. (PO-6)
4. Decision Making and Managing Information Systems in an organization. (PO-6)
5. Explain the Managing Global Systems and Managing Projects in software industry. (PO-6)

JavaScript Frameworks

Course Code: MCA26

Prerequisite: MCA16

Course Coordinator:

Credits: 0:1:2

Contact Hours: 28T 56P

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:

1. Develop applications using AngularJS, frameworks. (PO-3, 6)
2. Develop applications using ExpressJS frameworks. (PO-3, 6)
3. Develop applications using Node.js frameworks. (PO-3, 6)

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:

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.