VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

IBRAHIMBAGH, HYDERABAD - 31

DEPARTMENT OF COMPUTER APPLICATIONS

MCA I YEAR (I & II SEMESTER)

SCHEME OF INSTRUCTION AND SYLLABUS UNDER CBCS

(With effect from the Academic Year 2016-17)

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO OSMANIA UNIVERSITY & ACCREDITED BY A.I.C.T.E)

DEPARTMENT OF COMPUTER APPLICATIONS

IBRAHIMBAGH, HYDERABAD – 500 031

www.vce.ac.in

VASAVI COLLEGE OF ENGINEERING (AUTONOMUS), HYDERABAD – 31

DEPARTMENT OF COMPUTER APPLICATIONS

DEPARTMENT – VISION

To enable students to achieve excellence in computational skills embedded with human values.

MCA PROGRAM – MISSION

To imbibe technical competence for developing innovative solutions and new applications in computer science and technology, there by transforming them as better professionals.

MCA PROGRAM – PROGRAM EDUCATIONAL OBJECTIVES (PEOS):

1. To gain knowledge and proficiency for analysis, design and problem solving, to have a successful career in industry and for higher studies.

2. To promote application of technical knowledge coupled with project management abilities.

3. To imbibe leadership qualities with professional ethics and communication skills.

4. To provide positive attitude for lifelong learning.

MCA PROGRAM – PROGRAM OUTCOMES (POs):

a. An ability to apply knowledge in computer applications to become successful professionals.

b. An ability to develop logic and understand the essential mathematics related to Information Technology.

c. An ability to Design, implement, and evaluate a software product.

d. An ability to apply skills for solving technical problems in software development.

e. An ability to familiarize with emerging & advanced software tools.

f. An ability to experience the industrial environment for understanding the impact of computational solutions in a global & societal context.

g. An ability to analyse the knowledge of contemporary issues.

h. An ability to apply professional ethics.

i. An ability to get readiness to collaborate in a multi-disciplinary team.

j. An ability to communicate effectively.

k. An ability to participate in life-long learning.

l. An ability to handle the projects through appropriate project management techniques.

CONTENTS

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD-31
DEPARTMENT OF COMPUTER APPLICATIONS

The Master of Computer Applications Program Courses are categorized into four groups under Choice based Credit System (CBCS):
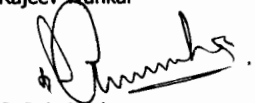
1) Foundation Courses (FC)

2) Professional Core Courses (PC)

3) Professional Elective Courses (PE)
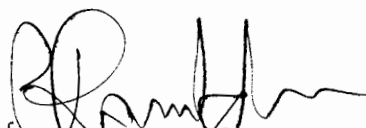
4) Employability Enhancement Courses (EEC)

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD-31
DEPARTMENT OF COMPUTER APPLICATIONS

SCHEME OF INSTRUCTION & EXAMINATION
MCA I YEAR I-SEMESTER (CBCS)

Sl. No.	Course Code	Course Title	Category	Scheme of Instruction Periods per week L	T	P	End Sem Exam Hrs	Maximum Marks End Sem Exam	Sessi-onals	Credits
THEORY										
1	HS 5010	Communicative English - I	EEC	2	-	-	2	35	15	2
2	CA 5020	Discrete Structures	FC	3	1	-	3	70	30	3
3	HS 5030	Managerial Economics and Accountancy	FC	3	1	-	3	70	30	3
4	CA 5040	Problem Solving and Programming In C	FC	3	1	-	3	70	30	3
5	CA 5050	Management Information Systems	PC	3	1	-	3	70	30	3
6	CA 5060	Computer Organization	PC	3	1	-	3	70	30	3
PRACTICALS										
7	HS 5311	English Language Training Lab – I	EEC	-	-	2	2	25	25	1
8	CA 5321	Programming Lab-I (C)	FC	-	-	4	3	50	25	2
9	CA 5331	Programming Lab-II (Elements of Information Technology)	FC	-	-	4	3	50	25	2
			TOTAL	32			-	510	240	22

Dr. Rajeev Wankar

Mr. S. Bala Krishna

Mr. S. Rambabu

Mr. Oruganti Prasad

Dr. Durga Bhavani

Dr. P. Hemagiri Rao

HS 5010

COMMUNICATIVE ENGLISH - I

Lecture	: 2 Hrs/Week	**Internal Assessment**	: 15
Tutorial	: -	**End Sem Exam**	: 35
Practical	: -	**Credits**	: 02

COURSE OBJECTIVES:	COURSE OUTCOMES:
The Course will enable the learners to:	At the end of the course the learners should be able to:
1. Explain the importance of communication in English. 2. Listen for relevant details and filter distractions. 3. Use strategies in speaking and writing to enhance their success at the interpersonal level. 4. Read and understand various types of texts and react accordingly. 5. Use grammar and vocabulary accurately in various contexts.	1. Overcome barriers to communication to a large extent. 2. Respond to communication in given contexts appropriately. 3. Use the functional aspects of grammar to interact effectively in different situations. 4. Read for gist and details with ease and produce that into appropriate writing. 5. Apply relevant vocabulary in writing paragraphs, letters and reports.

COURSE CONTENTS:

UNIT – 1:

Importance of Communication – barriers to communication – surmounting the barriers – awareness of non - verbal communication

UNIT – 2:

Listening Skills – sub-skills of listening – Barriers to Listening – strategies for effective listening – Practice Tests (with Audio/ Visual)

UNIT – 3:
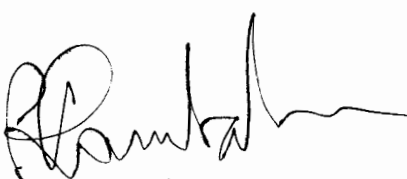
Oral Communication – speaking skills and strategies for general conversations and public Speaking – Self Introduction in given contexts – Situational Dialogues – Functional Grammar & Usage – Conditional Sentences and responses – Roots, Prefixes and Suffixes – tenses – question tags – articles – prepositions – active-passive voice – Words often mis-spelt or confused – Mispronounced words – Practice Sessions- Practice Sessions – Tests.

UNIT – 4:

Reading skills – reading for gist/ for details/ guessing meaning from context- importance of loud reading and silent reading.
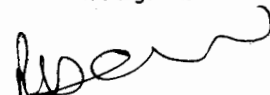
Dr. Rajeev Wankar	Mr. S. Rambabu	Dr. Durga Bhavani
Mr. S. Bala Krishna	Mr. Oruganti Prasad	Dr. P. Hemagiri Rao

UNIT – 5:

Writing Skills – Paragraph Writing – Basic Letter Writing – Email Writing – Punctuation – Sentence Usage to improve writing skills – types of sentences – Practice Sessions – Tests

LEARNING RESOURCES:

Text book:
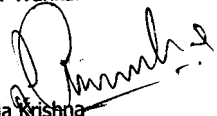
Raymond Murphy – "Essential English Grammar", Second Edition, Cambridge University Press.

Reference Books:
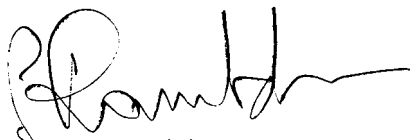
1. Teaching listening comprehension, Penny ur, CUP
2. Teaching reading as a foreign language, Christine Nuttal, Macmillan
3. Essential Business grammar and practice, Michael Duckworth, OUP ·
4. Activities using Resources, Heather Westrop, Ioanna Baker, OUP
5. Business vocabulary in use, Bill Mascal, CUP
6. Developing Grammar in context, Mark Nettle & Diana Hopkins, CUP

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CA 5020

DISCRETE STRUCUTRES

Lecture	: 3 Hrs/Week	**Internal Assessment**	: 30
Tutorial	: 1 Hrs/Week	**End Sem Exam**	: 70
Practical	: -	**Credits**	: 03

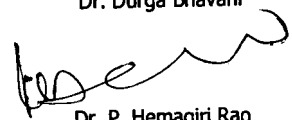| COURSE OBJECTIVES:	COURSE OUTCOMES:
The Course will enable the learners to:	At the end of the course the learners should be able to:
1. Introduce a number of Discrete Mathematical Structures (DMS) found to be serving as tools in the development of theoretical computer science. 2. Course focuses on of how Discrete Structures actually helped computer engineers to solve problems occurred in the development of programming languages. 3. Also, course highlights the importance of discrete structures towards simulation of a problem in computer science and engineering.	1. Verify the correctness of an argument using propositional and predicate logic and truth tables. 2. Perform operations on discrete structures such as sets, functions, relations. 3. Demonstrate the ability to solve problems using counting techniques. 4. Solve problems involving recurrence relations and generating functions. 5. Use graphs and trees as tools to visualize and simplify situations.

COURSE CONTENTS:

UNIT - I

Fundamentals of Logic: Basic Connectives and Truth Tables, Logical Equivalence, Logical Implication, Quantifiers: Definition and uses, Definitions and the Proof of Theorems.
Boolean Algebra and Switching Functions: Switching Functions:- Disjunctive and Conjunctive Normal Forms
Set Theory: Sets and Subsets, Set operations and the Laws of Set theory, Counting and Venn Diagrams.

UNIT –II

Properties of Integers: The well-ordering principle, Recursive definitions, The Division Algorithm, Euclidean Algorithm, Fundamental theorem of arithmetic.
Functions: Cartesian Product, Functions, Onto Functions, Special Functions, Pigeonhole Principle, Function, Composition and Inverse Functions.
Relations: Partial Order Relations, Hasse Diagrams, Lattices, Equivalence Relations and Partitions.
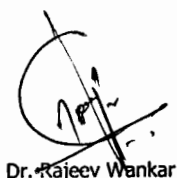
UNIT – III

Principle of Inclusion and Exclusion: Principle of Inclusion and Exclusion, Generalizations of the Principle, Derangements.
Generating Functions: Introductory examples, Definitions and examples: Calculation Techniques, Partitions of Integers, The Exponential Generating Function.

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UNIT – IV

Recurrence Relations: First-order linear recurrence relation, Second-order linear homogeneous recurrence relation with constant coefficients, Non-homogeneous recurrence relation, Divide-and-conquer algorithm.
Algebraic Structures: Algebraic Structure:- Definition, Examples and properties.
Groups: Definition, Examples and elementary properties, Homomorphism, Isomorphism and Cyclic groups.

UNIT – V

Graph Theory: Definitions and examples, Subgraphs, Complements and Graph Isomorphism, Vertex Degree: Eular Trails and Circuits, Planar graphs: Hamiltonian Paths and Cycles, Graph Coloring (only definitions and examples no proofs of the theorems).
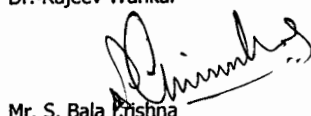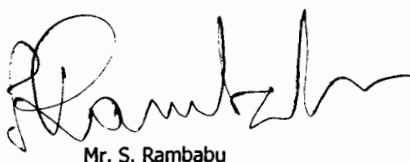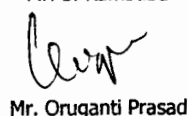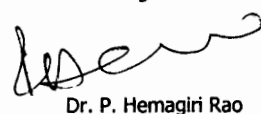**Trees:** Definitions, Properties and examples, Rooted Trees, Spanning Trees and Minimum Spanning Trees (only definitions and examples no proofs of the theorems).

LEARNING RESOURCES:

Text Books:

1. Ralph P.Grimaldi, "Discrete and Combinatorial Mathematics", Pearson Education, 5th Edition, 2008.

Reference Books:
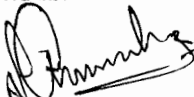
1. Kenneth H Rosen, "Discrete Mathematics and its Applications" Tata McGraw Hill, 6th Edition, 2007.
2. J.P.Tremblay & R.Manohar, "Discrete Mathematical Structures with Applications to Computer science", Mc Graw Hill, 1987.
3. Joe L.Mott, A.Kandal & R. Manohar, "Discrete Mathematics for Computer scientists, & Mathematicians", Prentice Hll N.J., 1986.
4. Kevin Ferland, "Discrete Mathematics", Houghton Mifflin Company, 2009.

Web Resources:
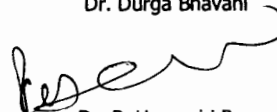
http://nptel.iitm.ac.in

Dr. Rajeev Wankar

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HS 5030

MANAGERIAL ECONOMICS AND ACCOUNTANCY

Lecture	: 3 Hrs/Week	**Internal Assessment**	: 30
Tutorial	: 1 Hrs/Week	**End Sem Exam**	: 70
Practical	: -	**Credits**	: 03

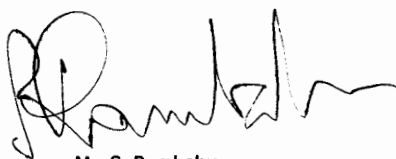| COURSE OBJECTIVES:	COURSE OUTCOMES:
The Course will enable the learners to:	At the end of the course the learners should be able to:
1. Assess the significance of economics in decision making 2. Design products according to the societal needs and forecast demand 3. identify and control costs and price the commodities as per the market structures 4. employ techniques in long term investment decisions and manage working capital in corporate world 5. analyse the performance of companies through financial statements	1. solve economic problems of the organization 2. prescribe customer centered product development and estimate the future of the company 3. produce economically through optimum combination of inputs and develop appropriate pricing strategies for better profits 4. identify the right investment proposal and manage day to day running expenditure 5. analyse the past financial performance of the company for future decision making or set up own enterprise.

COURSE CONTENTS:

UNIT – I

Meaning and Nature of Managerial Economics: Micro and Macro Economics, Managerial Economics its usefulness to Engineers, Fundamental Concepts of Managerial Economics, Scarcity, Marginalism, Equi-marginalism, opportunity costs, Discounting, Time Perspective, Risk and Uncertainty, Profits, Case study method.

UNIT – II

Consumer Behaviour: Law of Demand, Demand Determinants, Kinds; Elasticity of Demand (Price, Income and Cross-Elasticity); Demand forecasting, Law of Supply, concept of Equilibrium. (Theory questions and small numerical problems on Elasticity of demand can be asked).

UNIT – III
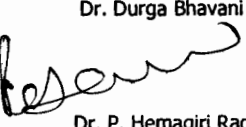
Theory of Production and Markets: Production Function, Law of Variable Proportion, ISOquants, Economics of Scale, Cost of Production (types and their measurement), Concept of Revenue, Cost-Output relationship, Break-Even Analysis, Price-Output determination under Perfect Competition and Monopoly (theory and problems on Break Even Analysis can be asked).

UNIT – IV

Capital Management: Its Significance, determination and estimation of fixed and working capital requirements, sources of capital, Introduction to capital budgeting, Techniques of Capital Budgeting. (Theory questions and numerical problems on evaluation of capital budgeting techniques can be asked).

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Mr. S. Bala Krishna   Mr. Oruganti Prasad   Dr. P. Hemagiri Rao

UNIT – V

Book-Keeping: Principles and significance of double entry book keeping, Journal, Ledger accounts Trial Balance, Concept and preparation of Final Accounts with simple adjustments, Analysis and interpretation of Financial Statements through Ratios (Liquidity and Profitability ratios). (theory questions and numerical problems on preparation of final accounts, cash book, petty cash book, bank reconciliation statement, calculation of some ratios).
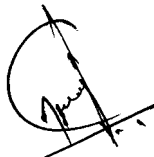
LEARNING RESOURCES:

Text Books:

1. Mehta P.L., "Managerial Economics – Analysis, Problems and Cases", Sulthan Chand & Son's Educational publishers, 2011.
2. Maheswari S. N. "Introduction to Accountancy", Vikas Publishing House, 2005.
3. Panday I.M. "Financial Management" Vikas Publishing House, 2009.

Reference Books:

1. Micro Economics by M. L.Seth.
2. Financial Accounting by Jain & Narang.
3. Financial Management by Khan & Jain.

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CA 5040

PROBLEM SOLVING AND PROGRAMMING IN C

Lecture	: 3 Hrs/Week	Internal Assessment	: 30
Tutorial	: 1 Hr/Week	End Sem Exam	: 70
Practical	: -	Credits	: 03

COURSE OBJECTIVES:	COURSE OUTCOMES:
The Course will enable the learners to:	At the end of the course the learners should be able to:
Acquire necessary skills to design solution for a given problem using C language.	1. Draw flowcharts and write algorithms for a given problem. 2. Choose appropriate data types for writing programs in C language 3. Design programs involving input output operations, decision making and looping constructs. 4. Design modular programs 5. Use pointers for dynamic memory management.

COURSE CONTENTS:

UNIT – I

Introduction to computers: Computer Systems, Computing Environments, Computer Languages, Creating and Running Programs, Software Development, Flowcharts.
Number Systems (Binary, Octal, Decimal and Hexadecimal), Representation of numbers (fixed and floating point).
Introduction to C Language: Background, C Programs, Identifiers, Types, Variables, Constants, Input / Output, Expressions, Precedence and Associativity, Side Effects, Evaluating Expressions, Type Conversion, Statements, Bitwise Operators.

UNIT – II

Selection: Logical Data and Operators, if...else, switch statements, Standard Functions.
Repetition: Loops, while, for, do-while statements, Loop examples, break, continue, goto.
Functions: Designing Structured Programs, Functions Basics, User Defined Functions, Inter Function Communication, Standard Functions, Scope, Storage Classes-Auto, Register, Static, Extern, Scope Rules and Type Qualifiers.

UNIT – III

Recursion: Recursive Functions, Preprocessor Commands.
Arrays: Concepts, Using Arrays in C, Inter-Function Communication, Array Applications, Two-Dimensional arrays, Multidimensional Arrays, Linear search and Binary Search, Selection Sort and Bubble Sort.

UNIT – IV

Pointers: Introduction, Pointers for Inter-Function Communication, Pointers to Pointers, Compatibility, LValue and RValue, Arrays and Pointers, Pointer Arithmetic and Arrays, Passing on Array to a Function, Memory Allocation Functions, Array of Pointers, Programming Applications, Pointers to void, Pointers to Functions, Command line arguments.
Strings: Concepts, C Strings, String Input / Output, Functions, Arrays of strings, String Manipulation Functions.

Dr. Rajeev Wankar

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UNIT – V

The Type Definition (typedef), Enumerated Types.
Structure: Definition and Initialization of Structures, Accessing Structures, Nested Structures, Arrays of Structures, Structures and Functions, Pointers to Structures, Self referential Structures, Unions
Input and Output: Files, Streams, Standard Library Input Output Functions, Character Input Output Functions.

Learning Resources:

Text books:

1. B. A. Forouzan & Richard F. Gilberg, A Structured Programming Approach using C, 3rd Edition, Cengage Learning, 2013.

Reference Books:
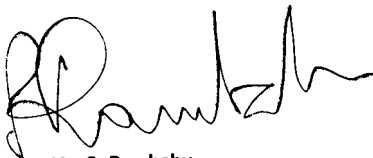
1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, 2nd Edition, Prentice-Hall, 2006.
2. Steve Oualline, Practical C Programming, 3rd Edition, O'reilly Press.
3. Jeri R. Hanly, Elliot B. Koffman, Problem Solving and Program Design in C, Pearson Education,2007
4. E. Balagurusamy, Programming in ANSI C, TMG
5. Gottfried, Programming with c, Third Edition, TMH.
6. R G Dromey, How to solve it by Computer, Pearson Education, 1st Edition, 2006
7. Jon Bentley, Programming Pearls, Second Edition, Addison-Wesley, Inc., 2000.

Dr. Rajeev Wankar

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CA 5050

MANAGEMENT INFORMATION SYSTEMS

Lecture	: 3 Hrs/Week	**Internal Assessment**	: 30
Tutorial	: 1 Hrs/Week	**End Sem Exam**	: 70
Practical	: -	**Credits**	: 03

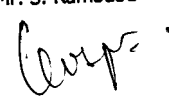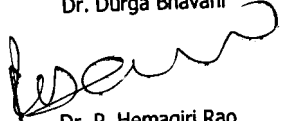| COURSE OBJECTIVES:	COURSE OUTCOMES:
The Course will enable the learners to:	At the end of the course the learners should be able to:
1. Understand various Levels of Information systems 2. Study various business processes in an organization. 3. Identify and address various issues of Information system Management. 4. Understand the impact of latest technologies on Information System management. 5. Aid decision making in development of Information system	1. Interpret the role and use of technology in business systems and operations. 2. Identify and describe organizational structure and business processes within these structures. 3. Demonstrate an understanding of the process in systems design and development. 4. Describe Knowledge ˙ management in an organization. 5. Identify the security concerns in an Information System and illustrate the enterprise system.

COURSE CONTENTS:

UNIT – I

Meaning and Role of Information Systems – Definition of Information Systems, Types of Information systems. Their advantages and disadvantages. An Introduction to concepts of Systems and Organizations. Strategic Uses of Information Technology. Business Process Re-engineering and Information Technology.

UNIT – II

Applications to Operational Information Systems to Business, Tactical and Strategic Information Systems to Business.

UNIT – III

Information Systems Planning, Approaches to System Building, Alternative Application Development.

UNIT – IV
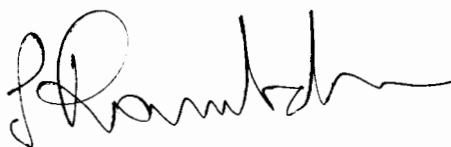
Managing Knowledge, Knowledge Management in the Organization, Enhancing Management Decision Making, DSS, GDSS, ESS.

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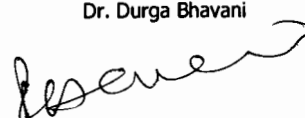
Mr. Oruganti Prasad

Dr. P. Hemagiri Rao

UNIT – V

Management of Information Systems, Information System security and control, Ethical issues. Cyber crimes – Global Perspective, Managing Firm Infrastructure and Enterprise System. Introduction to E-commerce (what is e-commerce)

LEARNING RESOURCES:

Text Books:

1. Robert Schultheis, Mary Sumner, "Management Information Systems-The Manager's View", Tata McGraw Hill, 4th Edition, 1998. (UNIT-1,II ,III)
2. Kenneth C Laudon, Jane P Laudon "Management Information systems" Prentice Hall, 2000.(UNIT-IV,V)

Reference Books:

1. Ralph Stair, George Reynolds "Principles of Information systems", Cengage Learning 2008.
2. James A, O'Brien, "Management Information Systems", Tata McGraw Hill, Sixth Edition, 2004.
3. D. P. Goyal, "Management Information Systems-Managerial Perspective", Macmillan, 3rd Edition, 2010.(FOR CASE STUDIES)

Web Resources:

1. Lecture Series on Management Information System by Prof.Biswajit Mahanty, Department of Industrial Engineering and Management, IIT Kharagpur.(www.nptel.iitm.ac.in)
2. http://hbsp.harvard.edu/he-main/resources/documents/web-files/Turban_formatted1.pdf

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CA 5060

COMPUTER ORGANIZATION

Lecture	: 3 Hrs/Week	**Internal Assessment**	: 30
Tutorial	: 1 Hrs/Week	**End Sem Exam**	: 70
Practical	: -	**Credits**	: 03

COURSE OBJECTIVES:	COURSE OUTCOMES:
The Course will enable the learners to:	At the end of the course the learners should be able to:
1. Describe the fundamentals of computer organization and its relevance to classical and modern problems of computer design 2. Acquire the knowledge of basic digital components and how to build simple logic circuits. 3. Explain about parallel processing and solve computer arithmetic problems. 4. List the importance of registers and explain how microoperations are performed. 5. Identify the fundamentals of how the CPU, I/O and Memory subsystems work.	1. Identify and explain about digital logic circuits, components and various data representations. 2. List and use the various register transfer microoperations and describe basic computer organization and design. 3. Write simple assembly language programs and describe micro programmed control. 4. Calculate effective address based on given addressing modes, illustrate issues in parallel processing and use basic computer arithmetic. 5. Explain the basic I/O activities and the Memory subsystem.

COURSE CONTENTS:

UNIT – I

Digital Logic Circuits: Digital Computers, Logic Gates, Boolean Algebra, Map Simplification, Combinational Circuits, Flip Flops, Sequential Circuits.
Digital Components: Integrated Circuits, Decoders, Multiplexers, Registers, Shift Registers, Binary counter, Memory unit.
Data Representation: Data types, Complements, Fixed and Floating Point Representation, Other binary codes and error Detection codes

UNIT – II

Register Transfer and Microoperations: Register Transfer language, Register transfer, Bus and Memory Transfer, Arithmetic Micro operations, Logic Micro operations, Shift Microoperations and Arithmetic logic shift unit.
Basic Computer Organization and Design: Instruction codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycles, Memory Reference Instructions, Input-Output and Interrupt, Design of Accumulator logic.

UNIT – III

Programming the Basic Computer: Introduction, Machine Language, Assembly Language, The Assembler, Programming Arithmetic and Logic Operations, Subroutines and input output Programming.
Microprogrammed Control: Control Memory, Address Sequencing, Microprogram Example, Design of Control Unit.

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UNIT – IV

Central Processing Unit: Introduction, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program control, RISC.
Parallel Processing: Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline.
Computer Arithmetic: Addition and Subtraction, Multiplication algorithms, Division Algorithms, Floating point arithmetic operations, decimal arithmetic unit and decimal arithmetic operations.

UNIT – V

Input – Output organization: Peripheral Devices, I/O interface, Asynchronous data transfer, Modes of transfer, Priority Interrupt, DMA, Input-output Processor, Serial Communication.
Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associate Memory, Cache Memory, Virtual Memory.

LEARNING RESOURCES:

Text Books:

1. M.Morris Mano, "Computer System Architecture", Pearson Asia / Prentice Hall, Third edition, 1993.

Reference Books:

1. Miles Murdocca, Vincent Hecuring, "Computer Architecture and Organization" , John Wiley & Sons 2007.
2. Sivarama P Dandamudi "Fundamentals of Computer Organization and Design", Springer/Dreamtech Publishers, 2003.
3. William Stallings, "Computer Organization & Architecture", Pearson Education, Sixth Edition, 2003.
4. G.V. Anjaneyulu, " Computer Organization" , Himalya Publishing House.

Web Resources:

1. http://en.wikipedia.org/wiki/Computer_architecture
2. http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-823-computer-system-architecture-fall-2005/index.htm

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HS 5311

English Language Training Lab – I

Lecture	: -	**Internal Assessment**	: 25
Tutorial	: -	**End Sem Exam**	: 25
Practical	: 2 Hrs/Week	**Credits**	: 01

COURSE OBJECTIVES:	COURSE OUTCOMES:
The Course will enable the learners to:	**At the end of the course the learners should be able to:**
1. Participate in group discussions keeping team dynamics in mind. 2. Agree and disagree politely using the polite functions of the English language. 3. Organize the structure of their speeches and presentations to make it more logical and understandable.	1. Use the functional aspects of the language to participate effectively in group discussions. 2. Make speeches for various occasions ranging from ceremonial introductions to informative and persuasive speeches. 3. Adapt their styles of presentations when making it as individuals and in teams.

COURSE CONTENTS:

Activities in IC Lab :
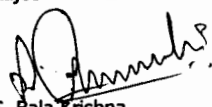
1. Group Discussion – Practice .   (7 Sessions)

2. Role Play and Simulations – Context Driven   (7 Sessions)

Prescribed Book:

Speak Well : Jayshree Mohanraj, Kandula Nirupa Rani and Indira Babbellapati – Orient BlackSwan
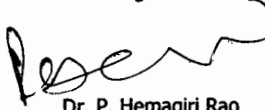
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CA 5321

PROGRAMMING LAB - I (C)

Lecture	: -	**Internal Assessment**	: 25
Tutorial	: -	**End Sem Exam**	: 50
Practical	: 4 Hrs/Week	**Credits**	: 02

COURSE OBJECTIVES:	COURSE OUTCOMES:
The course will enable the students to:	**At the end of the course students should be able to:**
1. Possess necessary skills to implement solution in C language for a given problem.	1. implement and debug programs in C language 2. select appropriate data type to develop programs 3. apply repetition control statements, single and multiple selection statements, to write programs implement modular programming solutions to problems 4. demonstrate the use of pointers for dynamic memory management

Course Contents:

1. Finding maximum and minimum of given set of numbers, Finding roots of quadratic equation
2. Sin x and Cos x values using series expansion.
3. Conversion of binary to decimal, octal, hexadecimal and vice versa
4. Generating Pascal Triangle
5. Recursion: Factorial, Fibonacci, GCD
6. Matrix addition and multiplication using arrays, Linear search and Binary Search.
7. Bubble sort, Selection sort
8. Programs on Pointers: pointer to arrays, pointer to functions
9. Functions for string manipulations
10. Programs on Structures and Unions
11. Finding the no: of characters, words and lines of given text file
12. File handling programs

Learning Resources:

1. B. A. Forouzan & Richard F. Gilberg, A Structured Programming Approach using C, 3rd Edition, Cengage Learning, 2013
2. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, 2nd Edition, Prentice-Hall, 2006
3. E. Balagurusamy, Programming in ANSI C, TM

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CA 5331

Programming Lab – II
(Elements of Information Technology Lab)

Lecture : -	**Internal Assessment** : 25
Tutorial :-	**End Sem Exam** : 50
Practical : 4 Hrs/Week	**Credits** : 02

COURSE OBJECTIVES:	COURSE OUTCOMES:
The Course will enable the learners to:	After completion of this course, the learners would be able to:
1. To ensure that students have basic computer operating knowledge. 2. To provide fundamental knowledge on computer hardware. 3. To provide knowledge on operating systems installations, and System troubleshooting. 4. To provide fundamental knowledge on office automation tools.	1. Identify and describe the relationships and role of the components of the "logical" diagram of the computer. (e.g. processor, RAM, ROM, BIOS, input, output, storage.) 2. Relate the "logical" diagram of a computer system to the "physical" system by identifying physical components of a computer. 3. Installation of Operating System with partitions for Windows and Linux, configure for network connection 4. Troubleshoot his/her PC from time to time 5. Identify and distinguish between various types of application software. 6. Hands on experience in Office automation tools like MS-Office, basic HTML, and Linux commands.

COURSE CONTENTS:

Lab work/Programs:

1. Identify and describe the relationships and role of the components of the "logical" diagram of the computer. (e.g. processor, RAM, ROM, BIOS, input, output, storage).
2. Relate the "logical" diagram of a computer system to the "physical" system by identifying physical components of a computer and describing their purpose.(e.g. the processor, memory chips, mother board, disk drives and controller cards such s AGP board, network cards, sound card, as well as parallel and serial ports etc).
3. Assemble the computer which they will use and load the OS with partitions for Windows and Linux, configure for network connection.
4. Troubleshoot his/her PC from time to time.
5. Install/Uninstall SW/HW on his/her PC from time to time.
6. Identify and distinguish between various types of application software by describing and using them (e.g. word processor, spreadsheet, database, browser, mailers etc.).
7. **MS Word:** Create documents with standard formatting commands, single/multi column, insert pictures/objects, drawings, hyperlinks, header/footer, tables, No macros.
8. **MS Power Point:** Create presentations with preset animations, using different layouts, backgrounds, slide master, insert pictures/objects, drawings, hyperlinks, header/footer, tables.
9. **MS Excel :** Creating worksheets with various kinds of data, making charts, conditional formatting, awareness of the various functions-statistical, date/time, math/trig etc. ability to explore (help) and use these functions if need be, demonstration through some common functions like sum, average, standard deviation, logical and information.
10. **HTML:** Should be able to create their web-page(title, text, frames, hyperlinks to some sites, pictures, lists, tables, fonts and colors) without using any web authoring tools.

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11. Be able to use the following list of commands in Linux:

alias	cp	ftp	man	talk	cmp
banner	date	gzip	mkdir	telnet	ls
bc	diff	gunzip	more	unzip	tar
bg	dir	head	mv	vi	mail
cal	display	history	passwd	vim	chown
cat	df	Id	pine	vimtutor	find
cc	du	indent	ps	wall	logout
cd	echo	Kill	pwd	wait	tail
chgrp	exit	Last	reboot	whereis	zip
chmod	fg	login	rm	who	
clear	file	logname	rmdir	whoami	
chfn	finger	ln	shutdown	write	

12. **MS-Access:** Create database for student information, library information and inventory. Generation of queries, reports and transaction processing.

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LEARNING RESOURCES:

Text Books:

1. K. L. James, Computer Hardware, Installation, Interfacing Troubleshooting and Maintenance, Eastern Economy Edition.
2. Gary B.Shelly, Misty E Vermaat and Thomas J. Cashman, Microsoft Office 2007 Introduction Concepts and Techniques, Windows XP Edition, 2007, Paperback.
3. Williams B.K. Sawyer et.al., "Using Information Technology", Sixth Edition, Tata McGraw-Hill, 2006.
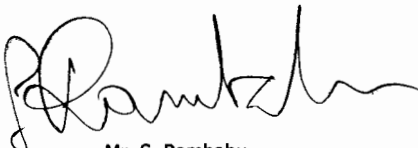
Web Resources:

1. http://office.microsoft.com/en-us/training/
2. http:// www.s3.amazonaws.com/szmanuals
3. http://www.baycongroup.com/wlesson0.htm
4. http://portal.aauj.edu/portal_resources/downloads/hardware/acomplete_illustrated_Guide_tothe_pc_hardware.pdf
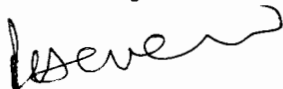5. http://faculty.ivytech.edu/~smilline/downloads/hardware.pdf

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VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD-31
DEPARTMENT OF COMPUTER APPLICATIONS

SCHEME OF INSTRUCTION & EXAMINATION
MCA I YEAR II-Semester (CBCS)

Sl. No.	Course Code	Course Title	Category	Periods per week			End Sem Exam hrs	Maximum Marks		Credits
				L	T	P		End Sem Exam	Sessi-onals	
THEORY										
1	HS 5510	Communicative English – II	EEC	2	-	-	2	35	15	2
2	CA 5520	Probability and Statistics	FC	3	1	-	3	70	30	3
3	CA 5530	Object Oriented Programming In C++	FC	3	1	-	3	70	30	3
4	CA 5540	Data Structures	PC	3	1	-	3	70	30	3
5	CA 5550	Operating Systems	PC	3	-	-	3	70	30	3
6	CA 5560	Software Engineering	PC	3	1	-	3	70	30	3
PRACTICALS										
7	HS 5811	English Language Training Lab – II	EEC	-	-	2	2	25	25	1
8	CA 5821	Programming Lab-III (C++ and DS)	FC	-	-	4	3	50	25	2
9	CA 5831	Programming Lab-IV (OS)	PC	-	-	4	3	50	25	2
			TOTAL	**31**			-	**510**	**240**	**22**

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HS 5510

COMMUNICATIVE ENGLISH - II

Lecture	: 2 Hrs/Week	**Internal Assessment**	: 15
Tutorial	: -	**End Sem Exam**	: 35
Practical	: -	**Credits**	: 02

COURSE OBJECTIVES:	COURSE OUTCOMES:
The Course will enable the learners to:	At the end of the course the learners should be able to:
1. Define communication and list the various styles and channels of communication. 2. Participate in group discussions keeping group dynamics and team spirit in mind. 3. Use the various techniques and styles involved in giving speeches. 4. Make purposeful oral and written presentations. 5. Implement the rules of writing reports and letters. 6. Grasp the forms and meaning of words in isolation as well as in contexts and use them to enhance their communication.	1. Use the English language as a tool for effective communication in various contexts. 2. Make informed judgments and articulate their views on various topics ranging from political issues to social ones. 3. Plan, prepare and execute speeches on various occasions. 4. Write reports and letters on various issues. 5. Use words, phrases and sentences clearly and accurately in the spoken and written forms of communication. 6. Adjust to their superiors, peers and subordinates at their workplace.

COURSE CONTENTS:

UNIT – 1:
Channels of communication- styles of communication-interpersonal communication – Johari window – Assertiveness.

UNIT – 2:
Reading different types of texts – for comprehension.

UNIT – 3:
Report writing – types of reports – structure of formal reports. Letter Writing and Resume   Writing.

UNIT – 4:
Advanced grammar and vocabulary- clauses modals and common errors. Synonyms antonyms, homonyms, idioms, phrasal verbs - technical and business vocabulary,

UNIT – 5:
Interview Skills – HR and Technical Interviews – Dos and Don'ts – Types of Questions – How to answer/Ask/Add to information – Dress code

LEARNING RESOURCES:
Textbook:
Technical communication – Principles and Practice (2nd Edition 2014) – Meeenakshi Raman and Sangeeta Sharma – Oxford University Press

Reference Books:
1. Teaching reading as a foreign language, Christine Nuttal, Macmillan
2. Business vocabulary in use, Bill Mascal, CUP
3. Decision maker, David Evans, CUP
4. Oxford practice grammar (with CD-Rom, George Yule (Advanced), OUP

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CA 5520

PROBABILITY AND STATISTICS

Lecture	: 3 Hrs/Week	**Internal Assessment**	: 30
Tutorial	: 1 Hrs/Week	**End Sem Exam**	: 70
Practical	: -	**Credits**	: 03

COURSE OBJECTIVES:	COURSE OUTCOMES:
The Course will enable the learners to:	At the end of the course the learners should be able to:
1. Statistical methods like Skewness, Kurtosis, Correlation and Regression analysis. 2. Probability laws, Bayes' theorem and Application. 3. Probability Distributions. 4. Tests of Significance.	1. Applications of measures of central tendency, correlation and regression. 2. Applications of probability laws and Bayes' theorem. 3. Applications of binomial and Poison distribution. 4. Applications of normal and gamma distribution. 5. Applications of x^2, t, F tests.

COURSE CONTENTS:

UNIT – I

Statistical Methods: Frequency Distributions, Measures of Central Tendency, Measures of Dispersion, Moments, Measures of Skewness, Measures of Kurtosis, Correlation and Regression analysis.

UNIT – II

Probability: Mathematical and Statistical Definition of Probability, Laws of Probability, Addition Theorem of Probability for n events, Conditional Probability, multiplication theorem of Probability for n events, Bayes' Theorem and examples.

UNIT – III

Discrete Distributions: Definition of Discrete Random Variable and Examples, Definition of Probability Mass Function, Probability Density Function, Definition of Mathematical Expectation, Variance, Moments, Moment Generating Function, Definition of Bernoulli Trial, Binomial Distribution, Poison Distribution – Properties and Applications.

UNIT – IV

Continuous Distributions: Definition of Continuous Random Variable and Examples, Definitions of PDF and CDF, Definition of Rectangular, Normal, Gamma and Beta Distributions – Properties and Applications.

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UNIT – V

Sampling Theory: Definition of Sample, Population and Examples, Sampling Methods, Introduction to Tests of Significance, Tests of Significance for Small Samples – Single Mean, Difference of two Means (t-test), One Variance (χ^2 - test), Two Variances (F-test) and χ^2 goodness of fit.

LEARNING RESOURCES:

Text Books:

1. S. C. Gupta and V.K Kapoor, "Fundamentals of Mathematical Statistics", 2006.

Reference Books:
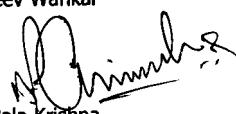
1. William Mendenhall, Robert J. Beaver, Barbara M.. Beaver, *"Introduction to Probability and Statistics"* Thomson Brooks/Cole, Eleventh Edition, 2003.
2. Richard A.Johnson, "Probability and Statistics for Engineers", Prentice Hall of India, Seventh Edition, 2005.
3. Miller & Freund, Probability and Statistics for Engineers", 5th Edition, PHI Publications.
4. Peyton Z. Peebles, Jr., "Probability, Random Variables And Random Signal Principles", 4th Edition, Tata McGraw-Hill.

Web Resources:

1. QEEE- recorded lectures – www.vcenet

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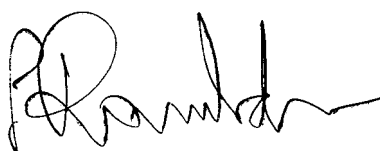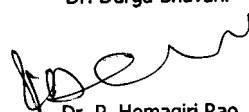**CA 5530**

OBJECT ORIENTED PROGRAMMING IN C++

Lecture	: 3 Hrs/Week	**Internal Assessment**	: 30
Tutorial	: 1 Hrs/Week	**End Sem Exam**	: 70
Practical	: -	**Credits**	: 03

COURSE OBJECTIVES:	COURSE OUTCOMES:
The course will enable the students to:	At the end of the course students should be able to:
Acquire fundamentals of object oriented programming to design solution for a given problem using C++ language.	1. Illustrate Object Oriented Programming concepts using C++. 2. Develop programs using functions, Input output operations, decision making and looping constructs. 3. Model classes using object oriented design principles. 4. Design programs using Inheritance, Polymorphism and exception handling. 5. Describe basic data structures using OOP concepts.

COURSE CONTENTS:

UNIT – I

Introduction to C++: Programming paradigms, Object oriented programming concepts, Advantages and Applications of OOPs.
Variables and Assignments, Input and Output, Data Types, Expressions, Simple Flow control and Control structures.

UNIT – II

Functions: Call by value, Call by reference, Parameters using procedural abstraction, Testing and Debugging functions.
I/O streams as an introduction to classes and objects.
Arrays: Introduction to Arrays, Arrays in functions, Programming with arrays and multidimensional arrays
Defining Classes: Structures, Classes, Abstract data types

UNIT – III
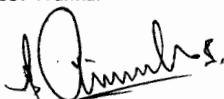
Strings, Pointers and Dynamic Arrays, Recursion, Constructors, Destructors, Copy Constructors.
Static Polymorphism: Function and Operator overloading, Friend functions.

UNIT – IV

Inheritance: The notion of Inheritance, Derived classes, overriding, Virtual base class Runtime polymorphism, virtual functions Function templates, Class templates.

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UNIT – V

Exception handling: Exception-handling basics, Programming techniques for exception-handling
Pointers and Linked lists: Nodes and Linked lists, Implementation of stacks and queues using arrays and linked lists, operations on linked lists, inserting a node, deleting a node, searching for a node.
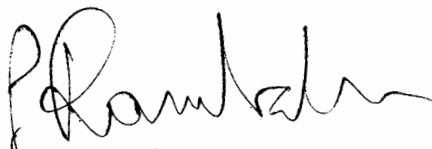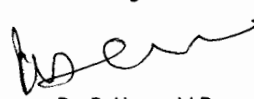
Learning Resources:

Textbooks:

1. Walter Savitch, "*Problem solving with C++*", Sixth Edition, Pearson Education Publishing, 2009.

Reference Books:
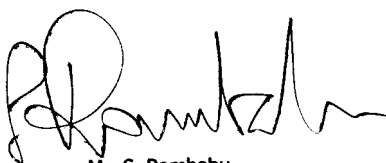
1. Behrouz A. Forouzan, Richard F. Gilberg, "Computer Science, A Structured approach using C++", 2 edition, Cengage Learning, 2010.
2. E. Balagurusamy, "Object-Oriented Programming with C++", second edition, Tata Mc-GrawHill
3. S. B. Lippman., J Lajoie ,"C++ Primer" 3rd Edition, AW Publishing Company, 2007.
4. Bjarne Stroustrup, "The C++ Programming Language" Third Edition, Pearson Education.

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CA 5540

DATA STRUCTURES

Lecture	: 3 Hrs/Week	**Internal Assessment**	: 30
Tutorial	: 1 Hrs/Week	**End Sem Exam**	: 70
Practical	: -	**Credits**	: 03

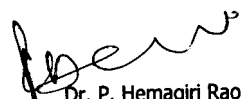| COURSE OBJECTIVES:	COURSE OUTCOMES:
The course will enable the students to:	**At the end of the course students should be able to:**
Explore efficient storage mechanisms for easy access, design and implementation of various data structures.	1. Apply different linear data structures to solve problems 2. Illustrate the usage of linked lists for various applications. 3. Demonstrate the usage of non-linear data structures – graphs and trees. 4. Apply different sorting and hashing techniques to a given problem. 5. Use advanced non-linear data structures to improve efficiency.

COURSE CONTENTS:

UNIT – I

Basic Concepts: Algorithm Specification, Performance Analysis and Measurement.
Arrays: Abstract Data Types, List, polynomial ADT, string ADT, Stack ADT and Queue ADT – review, Applications of stacks and queues – A mazing problem, evolution of expressions.

UNIT – II

Linked Lists: Singly Linked Lists, Chains, Representing Chains in C++, Template Class Chain, Circular Lists, Linked Stacks and Queues – Review, Applications of lists – polynomial manipulation operations (insertion, deletion, merge).

UNIT – III

Trees: Introduction, Binary Trees, Binary Tree Traversal and Tree Iterators, Copying Binary Trees, Heaps, Binary Search Trees.
Graphs: Graph Abstract Data Type, Elementary Graph Operations (DFS and BFS), Minimum Cost Spanning Trees (Prim's and Kruskal's algorithm), Shortest Path algorithm (Dijkstra's and Bellman-ford).
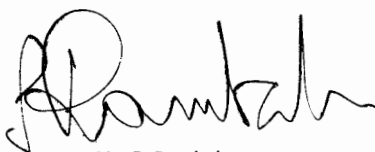
UNIT – IV

Sorting: Insertion sort, Quick sort, Merge sort, Radix sort, Heap sort, Best computing time for sorting storage.
Hashing: Static Hashing, Hash Tables, Hash Functions, Secure Hash Functions, Overflow Handling, Theoretical Evaluation of Overflow Techniques.

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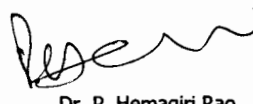
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UNIT – V

Efficient Binary Search Trees: AVL Trees, Red-Black Trees.
Multiway Search Trees: m-way Search Trees, B-Trees.
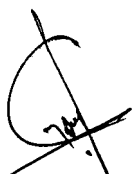
LEARNING RESOURCES:

Text Books:

1. Ellis Horowitz, Dinesh Mehta, S. Sahani. Fundamentals of Data Structures in C++, Universities Press. 2007.

Reference Books:
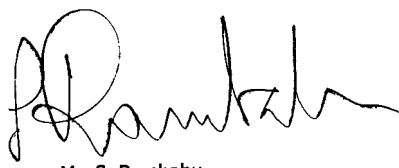
1. Mark Allen Weiss, Data Structures and Algorithm Analysis in C++, Third Edition, Pearson Education 2007.
2. Michael T. Goodrich, Roberto Tamassia, David Mount, "Data structures and Algorithms in C++", Second Edition, John Wiley & Sons, Inc., 2011
3. D S Malik, "Data Structures Using C++", Second Edition, Cengage Learning, 2009
4. Cormen Leiserson & Rivest, "Introduction to Algorithms", Third Edition, Prentice Hall India, 2009.

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CA 5550

OPERATING SYSTEMS

Lecture	: 3 Hrs/Week	**Internal Assessment**	: 30
Tutorial	: -	**End Sem Exam**	: 70
Practical	: -	**Credits**	: 03

COURSE OBJECTIVES:	COURSE OUTCOMES:
The course will enable the students to:	**At the end of the course students should be able to:**
1. Have an overview of what an operating systems are, learn process concepts scheduling algorithms and inter process communication 2. Understand several algorithms, properties used in memory management 3. Explore various methods related to inter process communication, process synchronization, dead locking and learn mechanisms related to security and protection 4. Understand system I/O in depth, including system design , interfaces, internal system structures and functions 5. Understand how process, memory, device and file management functions are designed and constructed in Linux and windows operating system.	1. To learn basic concepts of Operating System and analyze various scheduling algorithms. 2. To understand the process management of Operating system. 3. To Gain knowledge of memory management and virtual memory in Operating system. 4. To gain knowledge about process synchronization. 5. To explore the case studies with various operating systems and analyze the difference between Linux and Windows Operating Systems

Course Contents:

UNIT – I

Introduction to Operating Systems: OS structures, Overview of Unix/Linux OS, Commands, Shell Scripting, System calls, System Structure. Process Concept, Inter Process Communication, Threads, Multithreading Models.
Process scheduling: Scheduling criteria, Scheduling Algorithms.

UNIT – II

Memory Management, Main Memory, Swapping, Contiguous Allocation, Paging, demand paging, Page Virtual Memory, Replacement Algorithms, Thrashing, Segmentation With Paging.
File System Interface: File Concept, Access Methods, Directory Structure, File System Mounting, File sharing, protection.
File System implementation: File system structure, Directory implementation, Allocation Methods, Free space management.

UNIT – III

Process Synchronization: Critical section problem, semaphore, monitors. Classical problems of synchronization.
Deadlocks: Necessary conditions, resource allocation graph, methods for handling deadlocks, preventions, avoidance, detection and recovery.

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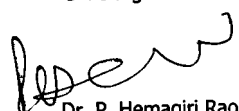
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UNIT – IV

Mass Storage Structure: Disk structure, Disk Scheduling, RAID Structure. Secondary Storage **Management:** Physical Characteristics
I/O Systems: I/O hardware, Application I/O interface, Kernel I/O Subsystem, I/O Hardware-Application I/O Interface-Kernel I/O Subsystem-Life cycle of an I/O request.

UNIT – V

LINUX System: Design Principles, Kernel Modules, File Systems, Input and Output, Inter process communication.
Windows XP: Design Principles, Architecture, Environmental subsystems, File Subsystem,, Programming interface.

Learning Resources:

Textbooks:

1. Abraham Silberschatz, Peter B. Galvin and Greg Gagne, "Operating System Concepts", Ninth Edition, John Wiley and Sons Inc, 2012.
2. Andrew S. Tanenbaum, "Modern Operating Systems", Second Edition, Addison Wesley, 2001.
3. Behrouz A. Forouzan and Richard F. Gilberg, "Unix and Shell Programming: a Text book" Cengage learning, 2008.

Reference Books:

1. William Stallings, Operating Systems Internals and Design Principles, PHI India, Fourth Edition, 2003. 2. H. M. Deitel, Operating Systems, Addison-Wesley, 2nd Edition.

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CA 5550

SOFTWARE ENGINEERING

Lecture	: 3 Hrs/Week	**Internal Assessment**	: 30
Tutorial	: 1 Hrs/Week	**End Sem Exam**	: 70
Practical	: -	**Credits**	: 03

COURSE OBJECTIVES:	COURSE OUTCOMES:
The Course will enable the learners to:	At the end of the course, the learners would be able to:
1. Study about various process models. 2. Discuss the importance of SRS. 3. Perform function oriented design and object oriented design. 4. Appreciate various techniques in design of test cases 5. Understand the concepts of re-engineering, maturity models and the significance of process.	1. Describe various Process models. 2. Analyze the requirements and create an SRS document for the given project. 3. Convert an SRS document into design using function oriented or object oriented design. 4. Design test cases and describe various product metrics. 5. Explain software reengineering and maturity models.

COURSE CONTENTS:

UNIT – I

The software Problem: Cost, Schedule and Quality, Scale and Change
Software Processes: Process and project, Component Software Processes, Software Development process Models, Project management Process

UNIT – II

Software Requirement Analysis and Specification: Value of a good SRS, Requirements process, Requirements specification, Functional Specification with Use Cases, Other approaches for analysis.
Software Architecture: Role of Software Architecture, Architecture Views, Component and Connector view, Architecture Styles for C and C View, Documenting Architecture Design, evaluating Architectures.

UNIT – III

Planning a Software Project: Effort Estimation, Project Schedule and staffing, Quality Planning, Risk Management Planning, Project Monitoring Plan, Detailed scheduling,
Design: Design concepts, Function oriented Design, Object Oriented Design, Detailed Design

UNIT – IV

Coding and Unit Testing: Programming Principles and Guidelines, Incrementally developing code, managing evolving code, unit testing, code inspection
Testing: Testing Concepts, Testing Process, Black Box testing, White box testing
Product Metrics: Metrics for Analysis model, Metrics for Design Model

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UNIT – V

Reengineering: Business process Reengineering, Software reengineering, Reverse engineering, Restructuring, Forward engineering, Economics of Reengineering
A Generic view of process: Software Engineering – A layered technology, A Process Framework, The Capability Maturity model Integration (CMMI), Process patterns, Process assessment, personal and Team process models, Process technology, product and process.

LEARNING RESOURCES:

Text Books:

1. Pankaj Jalote, "An Integrated Approach to Software Engineering", 3rd edition, Narosa Publishing House.
2. Roger S, Pressman, Software Engineering: A Practitioner's Approach, 8th Edition, Tata Mc GrawHill.

Reference Books:

1. James F. Peters, Witold Pedrycz, Software Engineering – An Engineering Approach, John WUey Inc., 2000.
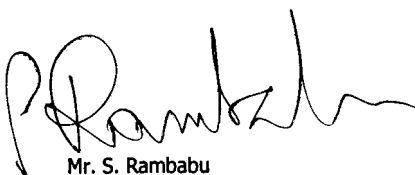
Web Resources:

1. www.mhhe.com/pressman
2. http://nptel.iitm.ac.in
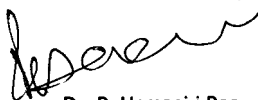
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HS 5811

ENGLISH LANGUAGE TRAINING LAB – II

Lecture	: -	**Internal Assessment**	: 25
Tutorial	: -	**End Sem Exam**	: 25
Practical	: 2 Hrs/Week	**Credits**	: 01

COURSE OBJECTIVES:	COURSE OUTCOMES:
The course will enable the students to:	**At the end of the course students should be able to:**
1. Identify the different sounds of the English language 2. Improve their pronunciation by learning stress, rhythm and intonation. 3. Reduce mother tongue influence when speaking English. 4. Use language effectively in debates, interviews, group discussions and meetings.	1. Speak fluently without too much mother-tongue interference. 2. Discuss topics using discourse makers and linkers appropriately while debating. 3. Make smooth transitions using appropriate words and sentences when making presentations. 4. Prepare power-point slides and effectively present them.

COURSE CONTENTS:

Activities in Phonetics Lab:

1. Identification of Consonant Sounds & Vowel Sounds   (3 Sessions)
2. Pronunciation of Words and Sentences - towards neutralization of accent.   (4 Sessions)

Activities in IC Lab:
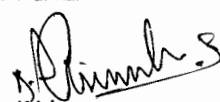
1. Debate – Practice Sessions   (3 Sessions)
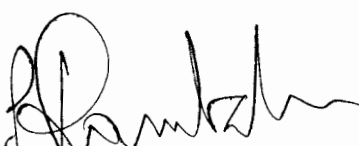2. Power Point Presentations   (4 Sessions)

LEARNING RESOURCES:

Text book:

Speak Well: Jayshree Mohanraj, Kandula Nirupa Rani and Indira Babbellapati - Orient BlackSwan

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CA 5821

PROGRAMMING LAB - III (C++ and DS)

Lecture	: -	**Internal Assessment**	: 25
Tutorial	: -	**End Sem Exam**	: 50
Practical	: 4 Hrs/Week	**Credits**	: 02

COURSE OBJECTIVES:	COURSE OUTCOMES:
The course will enable the students to:	At the end of the course students should be able to:
Implement solution for a given problem using C++ and various data structures in C++.	1. Implement and debug programs in C++ language 2. Choose appropriate data type, function, decision and looping constructs to develop C++ programs. 3. Implement OOP functionalities such as class, overloading, dynamic memory allocation. 4. Develop programs using inheritance, polymorphism, file I/O, templates and exception handling techniques. 5. Implement various linear and non-linear data structures. 6. Develop programs for sorting and searching techniques.

COURSE CONTENTS:

(a) C++ Lab

List of Lab programs:

1. Implementation of matrix and complex numbers using classes.

2. Programs using constructors, destructors and copy constructors.

3. Programs on dynamic memory allocation for arrays.

4. Programs on static data members, string manipulations.

5. Programs on friend class.

6. Programs on inheritance.

7. Programs on function overloading, operator overloading.

8. Programs on virtual functions, dynamic polymorphism.

9. Programs on templates, exception handling.

10. Programs on bubble sort, selection sort and insertion sort.

11. Program on operations in a singly linked list.

12. Program on implementation of stacks and queues using arrays and linked list.

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Data Structures Lab:

List of Lab programs:

1. Implementation of Array ADT and String ADT.
2. Infix to Postfix Conversion, evaluation of postfix expression.
3. Polynomial arithmetic using linked list.
4. Implementation of Double Linked List.
5. Implementation of Binary Search and Hashing.
6. Implementation of Merge Sort and Quick sort.
7. Implementation of Tree traversals on Binary trees.
8. Implementation of Heap Sort.
9. Implementation of insertion and deletion operations on AVL Trees.
10. Implementation of Graph Traversal Methods.

Learning Resources:

1. Walter Savitch, "*Problem solving with C++*", Sixth Edition, Pearson Education Publishing, 2009.
2. Behrouz A. Forouzan, Richard F. Gilberg, "Computer Science, A Structured approach using C++", second edition, Cengage Learning, 2010.
3. E. Balagurusamy, "Object-Oriented Programming with C++", second edition, Tata Mc-GrawHill
4. S. B. Lippman., J Lajoie ,"C++ Primer" 3rd Edition, AW Publishing Company, 2007
5. Bjarne Stroustrup, "The C++ Programming Language" Third Edition, Pearson Education.
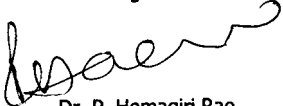
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CA 5831

PROGRAMMING LAB -IV (OS)

Lecture	: -	**Internal Assessment**	: 25
Tutorial	: -	**End Sem Exam**	: 50
Practical	: 4 Hrs/Week	**Credits**	: 02

COURSE OBJECTIVES:	COURSE OUTCOMES:
The course will enable the students to:	At the end of the course students should be able to:
The objective of this course is to gain practical experience in implementing concepts of operating system calls, CPU scheduling, process management, memory management, file systems using C language in Linux environment.	1. Understand and use basic services of OS using system calls. 2. Understand the need and the benefits of process synchronization and deadlock management. 3. Analyze and simulate CPU scheduling algorithms & memory management techniques.

Course Contents:

List of Lab programs:

1. Unix/Linux commands
2. Linux Shell Scripting.
3. Implement a program to get and the environment variables
4. Program to implement I/O related system calls(open, read, write etc)
5. Program to implement process related system calls(fork, exec, wait etc)
6. Implement a program to get the attributes of file/directory on Linux using related system calls.
7. Write a Program to calculate Turn Around Time and Waiting time of a process for FCFS, SJF CPU scheduling algorithms.
8. Write a Program to calculate Turn Around Time and Waiting time of a process using Round Robin CPU scheduling algorithm
9. Programs to create threads.
10. Program using signals.
11. Implement page replacement algorithms   a) FIFO b) LRU
12. Write a client/server program to implement echo server using Pipes.
13. Write a client/server program to implement echo Server using messages queues
14. Implementation of Producer & Consumer problem using Semaphores.
15. Implementation of inter process communication using Shared memory.
16. Implementation of Producer & Consumer problem using message passing
17. Implementation of Readers and Writers problem using Semaphores.
18. Implementation of Dining philosopher's problem using semaphores
19. Implementation of memory management schemes (First fit, Worst fit, Best fit)

Learning Resources:

Textbooks:
1. Behrouz A.Forouzan and Richard F.Gilberg, "Unix and Shell Programming: a Text book" Cengage learning, 2008.
2. W.Richard Stevens, Unix Network Programming, Prentice Hall/ Pearson Education,2009.

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