COIMBATORE INSTITUTE OF TECHNOLOGY

(Government Aided Autonomous Institution Affiliated to Anna University, Chennai)

M.Sc. SOFTWARE SYSTEMS

Curriculum for the students admitted during the Academic Year 2014 - 2015 only

Semester I

Code No.	Course Title	L	T	P	C
	THEORY				
14MSS11	Technical English	2	0	2	3
14MSS12	Mathematics I	3	1	0	4
14MSS13	Problem Solving and Programming in C	3	1	0	4
14MSS14	Basics of Information Systems	3	0	0	3
14MSS15	Digital Electronics	3	0	0	3
	PRACTICALS				
14MSS16	Programming Lab in C	0	0	4	2
14MSS17	Digital Electronics Lab	0	0	3	2
14MSS18	Computing Lab I	0	0	4	2
	Total Credits				**23**

Semester II

Code No.	Course Title	L	T	P	C
	THEORY				
14MSS21	Professional English	3	0	0	3
14MSS22	Mathematics II	3	1	0	4
14MSS23	Fundamentals of Web Technology	3	0	0	3
14MSS24	Data Structures	3	1	0	4
14MSS25	Object Oriented Programming in C++	3	0	0	3
	PRACTICALS				
14MSS26	Data Structures Lab using C	0	0	4	2
14MSS27	Object Oriented Programming Lab using C++	0	0	4	2
14MSS28	Scripting Lab	0	0	4	2
	Total Credits				**23**

Semester III

Code No.	Course Title	L	T	P	C
	THEORY				
14MSS31	Mathematical Foundations of Computer Science	3	0	0	3
14MSS32	Computer Architecture	3	0	0	3
14MSS33	Operating Systems	3	0	0	3
14MSS34	Database Management Systems	3	1	0	4
14MSS35	Unix System Programming	3	0	0	3
	PRACTICALS				
14MSS36	Database Management Systems Lab	0	0	4	2
14MSS37	Visual Programming Lab	0	1	3	2
14MSS38	Operating Systems Lab	0	0	4	2
	Total Credits				**22**

Semester IV

Code No.	Course Title	L	T	P	C
	THEORY				
14MSS41	Design and Analysis of Algorithms	3	1	0	4
14MSS42	Microprocessors and Assembly Language Programming	3	0	0	3
14MSS43	Java Programming	3	1	0	4
14MSS44	Internetworking Protocols	3	0	0	3
14MSS45	Software Engineering	3	0	0	3
	PRACTICALS				
14MSS46	Microprocessors Lab	0	0	4	2
14MSS47	Java Programming and Algorithms lab	0	0	4	2
14MSS48	Network Programming Lab	0	0	4	2
	Total Credits				**23**

Semester V

Code No.	Course Title	L	T	P	C
	THEORY				
14MSS51	Resource Management Techniques	3	1	0	4
14MSS52	Object Oriented Software Engineering	3	0	0	3
14MSS53	Computational Intelligence	3	1	0	4
14MSS54	Distributed Systems	3	1	0	4
14MSS55	Enterprise Application Development	3	0	0	3
	PRACTICALS				
14MSS56	Object Oriented Software Development Lab	0	0	4	2
14MSS57	Computational Intelligence Lab	0	0	4	2
14MSS58	Enterprise Application Development Lab	0	0	4	2
14MSS69	Communication Skills and Personality Development*				
	Total Credits				**24**

* A Pass is required

Semester VI

Code No.	Course Title	L	T	P	C
	THEORY				
14MSS61	Data Warehousing	3	0	0	3
14MSS62	Software Architecture	3	1	0	4
14MSS63	Mobile Computing	3	0	0	3
14MSS64	Software Testing and Quality Assurance	3	0	0	3
	Elective I	3	0	0	3
	PRACTICALS				
14MSS66	Software Testing Lab	0	0	4	2
14MSS67	Mobile Application Development Lab	0	0	4	2
14MSS68	Data Warehousing Lab	0	0	4	2
14MSS69	Communication Skills and Personality Development*				
	Total Credits				**22**

* A Pass is required

Semester VII

Code No.	Course Title	L	T	P	C
14MSS71	Project Work and Viva Voce-I	0	0	0	18
	Total Credits				**18**

Semester VIII

Code No.	Course Title	L	T	P	C
	THEORY				
14MSS81	Software Project Management	3	0	0	3
14MSS82	SOA and Web Services	3	0	0	3
14MSS83	Data Mining	3	0	0	3
	Elective II	3	0	0	3
	Elective III	3	0	0	3
	PRACTICALS				
14MSS86	Data Mining Lab	0	0	4	2
14MSS87	SOA and Web Services Lab	0	0	4	2
	Elective Lab I	0	0	4	2
	Total Credits				**21**

Semester IX

Code No.	Course Title	L	T	P	C
	THEORY				
14MSS91	Designing Internet of Things	3	0	0	3
14MSS92	Information Security	3	0	0	3
14MSS93	Software User Interface Design	3	0	0	3
	Elective IV	3	0	0	3
	Elective V	3	0	0	3
	PRACTICALS				
14MSS96	Internet of Things Lab	0	0	4	2
14MSS97	Information Security Lab	0	0	4	2
	Elective Lab II	0	0	4	2
	Total Credits				**21**

Semester X

Code No.	Course Title	L	T	P	C
14MSS101	Project Work and Viva Voce- II	0	0	0	18
	Total Credits				**18**
	Grand Total of Credits				**215**

ELECTIVE LIST

Code No.	Course Title	L	T	P	C
14MSSE1	Professional Ethics	3	0	0	3
14MSSE2	Advanced Database Concepts	3	0	0	3
14MSSE3	Cloud Computing	3	0	0	3
14MSSE4	Big Data Analytics	3	0	0	3
14MSSE5	Business Process Management	3	0	0	3
14MSSE6	IT Infrastructure Management	3	0	0	3
14MSSE7	Software Language Engineering	3	0	0	3
14MSSE8	Bio-Informatics	3	0	0	3
14MSSE9	Agile Process Models	3	0	0	3
14MSSE10	Accounting and Financial Management	3	0	0	3
14MSSE11	Human Resource Management	3	0	0	3
14MSSE12	Parallel Computing	3	0	0	3
14MSSE13	Image Processing	3	0	0	3
14MSSE14	Graphics and Multimedia Technologies	3	0	0	3
14MSSE15	Data Centric Computing	3	0	0	3
14MSSE16	Open Source Software Development	3	0	0	3
14MSSE17	Software Requirements Engineering	3	0	0	3
14MSSE18	Design Thinking	3	0	0	3
14MSSE19	Software Reliability	3	0	0	3
14MSSE20	Geographic Information Systems	3	0	0	3

ELECTIVE LAB LIST

Code No.	Course Title	L	T	P	C
14MSSEL1	Cloud Computing Lab	0	0	4	2
14MSSEL2	Parallel Programming Lab	0	0	4	2
14MSSEL3	Graphics and Multimedia Lab	0	0	4	2
14MSSEL4	Image Processing Lab	0	0	4	2

L-Lecture T-Tutorial P-Practical C-Credit

14MSS11 - TECHNICAL ENGLISH

L	T	P	C
2	0	2	3

PRE-REQUISITES

Consent of the Instructor

ASSESSMENT : THEORY & PRACTICAL

COURSE OBJECTIVE

- *To Learn the functional aspects of grammar*
- *To perceive the different forms of technical writing.*
- *To provide thematic and linguistic input appropriate to reading and listening technical materials.*
- *To enhance the efficiency and effectiveness of communication in varied situations.*

COURSE OUTCOME

At the end of the semester the students will:

- *Use the structures and produce language fluently, easily and accurately.*
- *Demonstrate knowledge in various forms of technical writing.*
- *Inculcate the habit of listening and reading leading to effective and efficient communication.*
- *Usage of accurate language for effective presentation.*

FOCUS ON LANGUAGE

Synonyms - Antonyms - Forms of Words - One word Substitutes - Word Formation - Contextual Meanings - Tenses - Prepositions - Subject-verb Agreement - Adjectives - Sequence Words - Wh-Questions - Direct Indirect Speech- Adverbs - Abbreviations and Acronyms. **(7)**

READING

Predicting the Content - Skimming the Text - Understanding the Gist -Topic Sentence and its Role - Scanning - Inferring Meanings: Lexical and Contextual - Note-Making - Interpreting Graphics in Technical Writing - Understanding Discourse Coherence - Sequencing of Sentences - Reading comprehension - Dictionary Skills - Itinerary **(5)**

WRITING

Filling Forms - Descriptive Writing - Autobiographical & Biographical Writing - Paragraph Writing - Academic Writing - Tweets - Paraphrasing - Channel Conversion - Essay Writing: Argumentative Writing - Poster Making - Recommendations - Dialogue Writing - Informal Letters **(7)**

LISTENING

Importance of Listening & Empathy in Communication - Reasons for Poor Listening - Traits of a Good Listener - Listening mode - Note Taking - Listening to Short Dialogues - Listening to Long Conversations **(5)**

SPEAKING

Describing Places - Giving Opinions - Narration - Introducing Ideas - Justifying Opinions - Formal Conversations - Telephonic Skill - Debating - Apologizing - Extempore - Effective Presentation Strategies - Planning - Outlining & Structuring - Nuances of Delivery - Controlling Nervousness & Stage Fright - Visual Aids in Presentation - Applications of MS Power Point **(6)**

PRACTICAL SESSIONS BASED ON THE ABOVE SYLLABUS (30)

Total : 30 + 30 = 60

TEXT BOOK

1. *Dr. K. Elango, "Resonance", Cambridge University Press, New Delhi, 2013.*

REFERENCE BOOKS

1. *Meenakshi Raman, Sangeeta Sharma, "Technical Communication - English Skills for Engineers", Oxford University Press, New Delhi, 2012.*
2. *Simon Sweeney, "English for Business Communication", Cambridge University Press, 2010.*
3. *Nagaraj Geetha, "A Course in Grammar and Composition", Cambridge University Press, 2012*
4. *Samson T, "Innovate with English", Cambridge University Press, 2012.*
5. *Mark Ibbotson. "Cambridge English for Engineering" Cambridge University Press, 2012.*
6. *B. Sai Lakshmi. "Poly Skills- A Course in Communication and Life Skills" Cambridge University Press, 2012.*

14MSS12 - MATHEMATICS I

L	T	P	C
3	1	0	4

PRE-REQUISITES

Consent of the Instructor

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *The objective is to develop the basic Mathematical problem solving skills in the areas of Matrices, Solution of equations and Calculus for computer technology students that are imperative for effective understanding of their subjects.*
- *The topics introduces will serve as basic tools for specialized studies in many computer science fields.*

COURSE OUTCOME

- *At the end of the course the students will be familiar in the areas of matrices, solutions of equations and calculus*
- *Will be able to solve engineering problems.*

ALGEBRA

Matrices : Eigenvalues and eigenvectors-Cayley Hamilton theorem (without proof)- Application to find the inverse and higher powers of a matrix - Diagonalisation - Quadratic forms - Orthogonal reduction to Canonical form. **(12)**

SOLUTION OF EQUATIONS

Algebraic and transcendental equations - Newton Raphson method. Polynomial equations - Grafae's root squaring method.

Linear system of equations - Gauss elimination, Gauss seidal methods. **(8)**

CALCULUS

Differential Calculus: Curvature - Envelopes - Evolutes, Functions of two variables - Expansions and extreme values, Integral Calculus : Double and triple integrals - changing the order of integration. **(15)**

ORDINARY DIFFERENTIAL EQUATIONS

Second and higher order linear differential equations with constant coefficients - Linear simultaneous equations

NUMERICAL SOLUTIONS TO ORDINARY DIFFERENTIAL EQUATIONS

Taylor's series - Modified Euler's - Runge-Kutta fourth order methods - Milne's predictor-corrector method **(10)**

Total : 45 + 15 = 60

TEXT BOOKS

1. *Kandasamy, P.et al., "Engineering Mathematics", Volume - I & II (9th Fully Revised Edition), S. Chand & Co, 2014.*
2. *Kandasamy .P et al., "Numerical Methods", (for first year), (Third Revised Edition) Tata Mc Graw Hill Publishing company Ltd., (2015).*
3. *Veerarajan T, "Engineering Mathematics (For First Year)", (First revised Edition), Tata Mc Graw Hill Publishing company Ltd , 2008.*
4. *Venkataraman. M.K., "Engineering Mathematics", (First year), The National Publishing Company , (2008).*

REFERENCE BOOKS

1. *Erwin Kryszig, "Advanced Engineering Mathematics", 8th Edition John Wiley & Sons (Asia) Pvt. Ltd., 2008.*
2. *Grewal, B.S., "Higher Engineering Mathematics", (40th Edition), Khanna Publishers, 2007.*

14MSS13 - PROBLEM SOLVING AND PROGRAMMING IN C

L	T	P	C
3	1	0	4

PRE-REQUISITES

Consent of the Instructor

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *To make the students understand and write algorithms for problems*
- *To make them understand modular programming approach.*
- *To learn various programming constructs/syntax and semantics of Cprogramming language.*

COURSE OUTCOME

- *Students are able to develop and implement algorithms.*
- *Students are able to write efficient structured programs fluently in C .*
- *To analyze and solve complex computer applications in C.*
- *To write, compile, run and debug a program in C.*

INTRODUCTION TO PROBLEM SOLVING

Algorithms : Role of algorithms, Algorithms as a technology, Insertions Sort, Pseudo code Conventions, Analyzing algorithms, Designing algorithms - Properties and Operations on Matrices- Solving systems of linear equations. **(6)**

INTRODUCTION TO C

Overview of C - The C Character Set - Basic data types - Constants, Variables and keywords -Operators - Expressions. **(4)**

DATATYPES, STORAGE CLASSES AND PREPROCESSOR

Data types: Integers, Chars, Floats and Doubles - Storage Classes: auto, static, register and extern - C Preprocessor: Macro Expansion, File Inclusion, Conditional Compilation, #if, #elif and Miscellaneous directives. **(6)**

CONTROL STRUCTURES

Decision Control Structures: if, if-else and nested if-elses statements, Conditional Operators - Loop Control Structures: while, do-while, for, break and continue statements - Case Control Structures: switch and goto statements. **(7)**

POINTERS, FUNCTIONS, ARRAYS AND STRINGS

Pointers: Declaration, Assignment, Initialization, Expressions and simple operations - Functions: Function Declaration and Prototypes, Call by Value, Call by Reference, Recursion, and Pointers to functions - Arrays: Declaration, Initialization, 1-D, 2-D and n-D arrays, Passing array elements to a Function, Pointer to an Array and Array of pointers - String Operations. **(10)**

STRUCTURES, UNION, ENUMERATIONS AND TYPEDEF

Structures: Declaration, Accessing elements - Array of Structures - Passing Structures to a Function - Structure pointer - Self Referential Structures - Unions - Enumerations - Typedef. **(5)**

CONSOLE I/O AND FILE I/O

Console I/O functions: Formatted, Unformatted functions - File I/O: File opening modes, Writing into a file, Reading from a file and Closing a file, Text and Binary Files, Programs for Counting Vowels and Spaces in a file and Copying contents of a file. **(7)**

Total : 45 + 15 = 60

TEXT BOOKS

1. *Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", PHI Publications, 2nd Edition, 2001.*
2. *Yashavant P. Kanetkar, "Let Us C", BPB Publications, 13th Edition, 2012.*

REFERENCE BOOKS

1. *Herbert Schildt, "C- The Complete Reference", McGraw Hill, 4th Edition, 2009.*
2. *Schaum's outline series, "Programming with C", Tata McGraw Hill Publication., 2nd Edition, 2010.*
3. *R.G. Dromey, "How to solve it by Computer", Prentice Hall of India, 8th Edition, 2003.*
4. *Kernighan B.W. and Ritchie D.M., "C Programming Language (ANSI C)", Pearson Education, 2004*
5. *Yashawant Kanetkar, "Working with C", BPB, 5th Edition, 2008.*
6. *Herbert Schildt, Jean Paul Tremblay, Richard B Bunt, "Introduction to Computer Science - An Algorithmic Approach", McGraw Hill, 2nd Edition, 1985.*
7. *Terrence W Pratt, "Programming language - Design and Implementation", Prentice Hall of India, 4th Edition, 2001.*

14MSS14 - BASICS OF INFORMATION SYSTEMS

L	T	P	C
3	0	0	3

PRE-REQUISITES

Consent of the Instructor

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *To introduce the components of computer and types of software system.*
- *To give an exposure on data organization, management and system development.*
- *To provide knowledge on functions of internet, web applications and various software systems.*

COURSE OUTCOME

- *Students comprehend the components of hardware and types of software system.*
- *Students acquire knowledge in usage of data modeling in software development.*
- *Students can describe the basic communication models and enterprise applications.*

INTRODUCTION TO INFORMATION SYSTEMS

Information concepts - System concepts - Information System definition - Business Information Systems - Organizations and Information Systems - Careers in Information Systems - Case study **(8)**

INFORMATION TECHNOLOGY

HARDWARE : Computer Systems - Processing and Memory devices - Secondary storage - Input and Output devices.

SOFTWARE : An overview - Systems Software - Application Software - Programming Language - Software issues and trends. **(8)**

ORGANIZING DATA AND INFORMATION

Data Management - Data Modeling and Relational Database Model - Database Management Systems - Database Applications **(10)**

SYSTEMS DEVELOPMENT

Overview of Systems Development - Systems Development Life cycle - System Investigation - System Analysis - System Design - Systems Information - Systems Operation and Maintenance. **(8)**

NETWORKS AND DISTRIBUTED PROCESSING

Functionality of the Internet - The World Wide Web - Internet and Web Application -Introduction to Electronic Commerce - Introduction to Mobile Commerce - Enterprise Systems : Overview of ERP, SCM, CRM - Overview of MIS - Overview of AI - Overview of Expert Systems. **(11)**

Total : 45

TEXT BOOK

1. *Ralph M. Stair and George N. Reynolds, "Principles of Information Systems - A Managerial Edition", Eighth Edition, Thomson India, 2007.*

REFERENCE BOOKS

1. *James A. O' Brier, "Introduction to Information Systems", Tata McGraw - Hill Publishers, Twelfth Edition, 2005.*
2. *S.A. Kelbar, "Information Systems - A Concise Study", PHI Learning, 2009.*

14MSS15 - DIGITAL ELECTRONICS

L	T	P	C
3	0	0	3

PRE-REQUISITES

Consent of the Instructor

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *To make the students to understand common forms of number representation in digital circuits and be able to convert between different representation.*
- *To make the students to understand the construction of Digital Electronic Circuits from large assemblies of Logic Gates.*
- *To provide knowledge to design Combinational and Sequential Digital Circuits.*

COURSE OUTCOME

- *The students will be able to convert between different number representations.*
- *The students will be able to design Digital Systems based on Combinational and Sequential Circuits.*
- *The students will gain a strong knowledge on various types of Storage Devices used in Computer Systems.*

NUMBER SYSTEMS AND CODES

Decimal, Binary, Octal and Hexadecimal Systems - BCD codes - Conversions of Binary, Decimal and BCD numbers - Excess 3, Gray and Johnson's codes - Concept of Parity - ASCII code. **(8)**

BINARY ADDITION AND SUBTRACTION

Direct method, 1's Complement Notation, 2's Complement Notation - Binary Multiplication - Binary Division **(8)**

LOGIC GATES AND BOOLEAN ALGEBRA

AND, OR, NOT, NAND, NOR, XOR Gates and Truth Tables - NAND and NOR Implementation - Basic Theory and Properties - Canonical and Standard forms - Logical Operations - Simplifications of Boolean function using Karnaugh Maps(including Don't Care conditions) - Quine Mc-Cluskey Method. **(10)**

COMBINATIONAL LOGIC CIRCUITS

Half Adder, Full Adder, Half Subtractor, Full Subtractor - Binary Adder and Subtractor - Encoders and Decoders - Multiplexers and Demultiplexers. Synchronous Sequential Logic: RS, JK, Master-Slave, D and T Flip-Flops. **(10)**

SHIFT REGISTERS AND COUNTERS

Parallel / Serial In / Out Shift Registers - Ring Counter - Synchronous and Asynchronous Counters. Memory Unit: ROM, PROM, EPROM, RAM, Memory decoding, Error Correcting Codes, Hamming Code **(9)**

Total : 45

TEXT BOOK

1. *Morris Mano.M., "Digital Logic and Computer Design", PHI, 2001.*

REFERENCE BOOKS

1. *Malvino PA and Leach BP, "Digital Principles and Applications", McGraw Hill book company, 5th Edition, 1994*
2. *Thomas C Bartee, "Digital Computer Fundamentals", McGraw Hill book company, 6th Edition, 1997.*
3. *Thomas L Floyd, "Digital Fundamentals", UBS, 10th Edition, 2008.*

14MSS16 - PROGRAMMING LAB IN C

L	T	P	C
0	0	4	2

PRE-REQUISITES

Consent of the Instructor

ASSESSMENT : PRACTICAL

COURSE OBJECTIVE

- *To understand the concepts of data types, conditional statements, looping statements, the use of arrays.*
- *To work with pointers, functions, structures.*
- *To work with file related functions.*

COURSE OUTCOME

- *Students will have the ability to write programs to solve specified problems*
- *To prepare students mind setup to learn new computer languages on their own.*
- *To prepare students to design and code various projects using C*

LIST OF PROGRAMS

1. Simple programs to understand the concepts of data types.
2. Writing programs to get familiarity on using conditional, control and repetition statements.
3. Defining and creating one and two dimensional arrays- Matrix operations
4. Solving Systems of Linear Equations
5. Working with pointers.
5. Functions - call by value and call by reference
6. String manipulations.
7. Solving Recursive problems
8. Solving iterative problems - Trigonometric series evaluation.
9. Use dynamic memory allocation functions for storage allocation.
10. Defining and handling structures, array of structures, structure pointers, union and enumeration type.
11. Defining functions with structure.
12. Application Programs using file operations.

14MSS17 - DIGITAL ELECTRONICS LAB

L	T	P	C
0	0	3	2

PRE-REQUISITES

Consent of the Instructor

ASSESSMENT : PRACTICAL

COURSE OBJECTIVE

- *Students will gain basic experimental experiences in the operation of various families of digital circuits.*
- *Students will gain knowledge to learn testing and characterizing of circuit behaviour with digital ICs.*
- *Students will be able to design Combinational and Sequential Digital Circuits.*

COURSE OUTCOME

- *Ability to understand and analyse digital electronic circuits.*
- *Ability to understand sequential digital circuits like flip-flops, registers, counters.*
- *Ability to understand the design of combinational digital circuits.*

CONCEPTS TO BE COVERED

1. Study of logic gates
2. Study of Flip-Flops
3. Design of binary counter & decade counter
4. Construction of Half-adder & Full-adder
5. Implementation of basic Logic gates using Universal gates.
6. Testing Left shift, Right shift and Parallel-In, Parallel-Out operation of the Shift registers.

14MSS18 - COMPUTING LAB I

L	T	P	C
0	0	4	2

PRE-REQUISITES

Consent of the Instructor

ASSESSMENT : PRACTICAL

COURSE OBJECTIVE

- *To make students aware of the functioning EXCEL.*
- *Covers the development and execution of structured shell programs including scripts, menus, I/O redirection, pipes, variables, and other UNIX commands.*
- *To develop an understanding of how to write shell script programming in UNIX*
- *To solve mathematical problems with MATLAB*

COURSE OUTCOME

- *Will be able to work with EXCEL*
- *Define common commands in UNIX and their usage.*
- *Will be able to write scripts to be run with bash in UNIX operating system.*
- *Will have the abilities to use MATLAB for solving mathematical problems*

LIST OF EXERCISES TO BE GIVEN FOR

1. Introducing the features of EXCEL.
2. Arranging and formatting the set of elements using EXCEL.
3. Performing simple arithmetic and logical calculations using EXCEL.
4. Creating graphical charts using EXCEL.
5. Working with vi Editor in UNIX.
6. Learn the use of basic UNIX commands.
7. Learn the use of redirection and File access permissions.
8. Working with filters.
9. Working with commands such as find, cmp, comm, uniq.
10. Simple Shell Programs.
11. Solving numerical problems using MATLAB tool.
12. Solving linear equations using MATLAB tool.
13. Solving matrices using MATLAB tool.

14MSS21 - PROFESSIONAL ENGLISH

L	T	P	C
3	0	0	3

PRE-REQUISITES

14MSS11

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *To enhance vocabulary and gain knowledge in grammatical patterns.*
- *To read different genres and write effectively to construct standard, meaningful documents.*
- *To utilize their technical skills and improve their ability to communicate effectively in English.*

COURSE OUTCOME

At the end of the semester the students will:

- *Produce appropriate and accurate language for transactions of various kinds.*
- *Listen and Comprehend different spoken discourse in different accents and also read different genres of text adopting various reading strategies.*
- *Participate actively in writing activities that model effective scientific and technical communication in workplace*
- *Speak clearly, confidently, and communicate using appropriate communicative strategies and participate constructively in conversations.*

FOCUS ON LANGUAGE

Scientific Terminology - Homonyms - Homophones - Formal Vocabulary - Confusing Words - Idiomatic Expressions - Collocations - Regular and Irregular Verbs - Gerund - Voice - Infinitive - Modal Verbs - Phrasal Verbs - If Conditionals - Cause and Effect - Numerical Adjectival Phrases - Conjunctions - Clauses - Definitions - SMS Language. **(10)**

READING

Summarizing - SQ3R Reading Technique - Note Making: Outline/Linear Method- Sentence Method - Schematic Method - Understanding Discourse Coherence - Non-Verbal Signals - Cloze Comprehension - Mind Mapping **(9)**

WRITING

Business Letters - Article Writing - Review of a Newspaper Report - Emails - Report Writing - Recommendations - Vacancy Advertisements - Resume - Meetings: Agenda and Minutes of the Meeting - Writing Book Reviews - Memorandum - Essay Writing **(10)**

LISTENING

Types of Listening- Barriers to Effective Listening- Intensive Listening - Listening to Podcast, Negotiation, Job Interviews, Group Discussions and Filling Gaps **(8)**

SPEAKING

Interviews : Objectives of Interviews - Types of Interviews - Group Discussions - Organizational GD - GD as a Part of Selection Process - Role Play - Negotiation. **(8)**

Total : 45

TEXT BOOK

Dr. K. Elango, "Resonance", Cambridge University Press, New Delhi, 2013.

REFERENCE BOOKS

1. *Meenakshi Raman, Sangeeta Sharma, "Technical Communication - English Skills for Engineers", Oxford University Press, New Delhi, 2012.*
2. *Nagaraj Geetha, "A Course in Grammar and composition", Cambridge University Press, 2012*
3. *Samson T, "Innovate with English", Cambridge University Press, 2012.*
4. *Mark Ibbotson. "Cambridge English for Engineering" Cambridge University Press, 2012.*
5. *B. Sai Lakshmi. "Poly Skills- A Course in Communication and Life Skills" Cambridge University Press, 2012.*

14MSS22 - MATHEMATICS II

L	T	P	C
3	1	0	4

PRE-REQUISITES

Consent of the Instructor

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *The objective is to develop the basic Mathematical problem skills in the area of Fourier Series and Applied statistics for computer technology students that are imperative for effective understanding of their subjects. The topics introduced will serve as basic tools for specialized studies in many computer science fields.*

COURSE OUTCOME

- *At the end of this course the students will be familiar in the areas of fourier series, numerical methods and applied statistics which are important to solve engineering problems.*

FOURIER SERIES

Dirichlet's conditions - Full range series - Half range series - Complex form of fourier series - Parseval's identity - Practical Harmonic analysis. **(10)**

EXPERIMENTAL DATA ANALYSIS

Curve Fitting: Method of least square - method of group averages.

Interpolation : Finite differences - Newton's and Lagrange's interpolation method.

Numerical differentiation based on Newton's and Lagrange's method.

Numerical integration - Trapezoidal rule and Simpson's 1/3 rule. **(15)**

APPLIED STATISTICS

Sampling Theory : Elements of Sampling - Large Sample - Test for mean - proportion - Standard Deviation. Small Sample - t, F and Chi Square tests- Contingency table - tests for independence.

Analysis of Variance : One way and two way classification. Completely randomized block - Randomized block design - latin square design, fore casting and time series analysis - calculation of trend by different methods

Quality control : Control chart for variables - X - chart , R Chart - ? Chart. Control Chart for attributes - P - Chart, np - Chart.c- Chart. Acceptance Sampling by Attributes - Single sampling plan - O.C Curve, A.O.Q Curve - A.S.N. Curve. Double Sampling Plan - Advantages and Disadvantages. **(20)**

Total : 45 + 15 = 60

TEXT BOOKS

1. *Kandasamy. P. et al ., "Engineering Mathematics", Volume - II & III S.Chand&Co , 2004*
2. *Prof. Veerarajan T. "Engineering Mathematics", (III Semester), 3rd Edition (Fifth Reprint) Tata Mc Graw Hill publishing company Ltd, 2008*
3. *Venkataraman. M.K., "Engineering Mathematics III", (for B.E. Third Semester), (Revised and Enlarged Fourteenth Edition), The National Publishing Company , 2008*
4. *Venkataraman. M.K., "Engineering Mathematics III-A", (Eleventh Edition), The National Publishing Company , 2008*
5. *Kandasamy. P.et al ., "Probability Statistics and Random process", S.Chand&Co , 2008.*
6. *Veerarajan T. "Probability Statistics and Random process", (Third Edition) Tata Mc Graw Hill publishing company Ltd, 2007.*

REFERENCE BOOKS

1. *Erwin Kreyszig, "Advanced Engineering Mathematics", 8th Edition, John Wiley & Sons Pvt Ltd., 2008.*
2. *Grewal B.S., "Higher Engineering Mathematics", 40th Edition, KHANNA Publishers, 2007.*
3. *Kapoor.J.N and Saxena.H.C."Mathematical Statistics", (12th Edition) S.Chand&Co, 2003.*
4. *Trivedi K.S., "Probability ans Statistics with Reliability, Queuing and Computer Science Applications", Prentice Hall Inc., 2003.*

14MSS23 - FUNDAMENTALS OF WEB TECHNOLOGY

L	T	P	C
3	0	0	3

PRE-REQUISITES

14MSS13

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *Understand the need for Internet Platform and its benefits over other technologies*
- *Describe the basic principles of web and how data and information can be moved on web*
- *Give theoretical and programming knowledge on various technologies under Web*
- *Analyze the required system environment to apply suitable technologies of development*

COURSE OUTCOME

The student will be able to

- *Differentiate the software development under traditional and internet based technologies*
- *Develop simple client/server based applications*
- *Plan for the data movement on the web.*
- *Establish connectivity to various External entities like Database Server and Active-X Controls*

INTRODUCTION

History of Internet: need for internet - W3C - Internet Languages - Browser Features - Internet Accounts - shell, PPP, SLIP - Web Server: Http Request Types - Accessing the server - Server Architecture - Client and Server side Scripting - server type - Requesting document under web.

HTML

Document Structure: Basic Tags - contents of header section - page formatting tags, text formatting tags - frames - tables - lists - image - Anchors - Forms - Hidden data in forms. **(9)**

XHTML AND CSS

XHTML Definition, Specifications, difference between HTML and XHTML - image maps - Meta elements. CSS: Web Typography - Page elements - Links and Navigation - Lists - Forms - Tables - Page Layouts - Box format - positioning - filters and alpha properties **(8)**

JAVA SCRIPT & DHTML

Introduction- Memory Concepts, Arithmetic, Decision Making, Control Structures - Functions - Arrays - Objects - Math, String, Date, Boolean and Number. DHTML - Object Model and Collections - Event Models. **(10)**

XML

Introduction - File Structure - XML Namespaces - XML Document Type Definition - XML Schema - need for schema - W3C Schema Documents - XML Vocabularies - Math ML - CML - Extended Style sheet. Parsers - DOM and SAX parsers. **(8)**

PHP

Introduction - Working with Strings, Numbers, Date and Time, Arrays. Php Functions and classes, HTML and Web pages, Forms, Sessions and Cookies, Form Input validation using Regular Expressions - Handling Databases. **(10)**

Total : 45

TEXT BOOKS

1. *Paul Deitel, Harvey Deitel, Abbey Deitel, "Internet and World Wide Web How To Program", 5th Edition, Pearson Education, 2011. (Para I - IV)*
2. *Vikram Vaswani "PHP Programming Solutions", Tata McGraw-Hill 2007(Para V).*

REFERENCE BOOKS

1. *Christopher Schmitt, "CSS Cookbook", Third Edition, 2009.*
2. *Paul Deitel, Harvey Deital, "JAVA How To Program" 9th Edition Pearson Education, 2011.*
3. *William R. Stanek, James O'Neill, Jeffrey Rosen, "Microsoft® PowerShell, VBScript, and JScript® Bible" Copyright © 2009 by Wiley Publishing, Inc.*

14MSS24 - DATA STRUCTURES

L	T	P	C
3	1	0	4

PRE-REQUISITES

14MSS13

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *To introduce concepts of primitive and non primitive data structures and ADT.*
- *To familiarize the concepts of stacks, linked lists, trees, graphs and to know their application domains.*
- *To disseminate knowledge of searching and sorting techniques.*

COURSE OUTCOME

- *Ability to solve problems using data structures such as stacks, queues, linked list, trees and graphs.*
- *Understanding the working principle of recursion, searching and sorting techniques.*
- *Ability to compare different data structures and appropriate usage in applications.*

INTRODUCTION TO DATA STRUCTURES

Primitive data structures - ADT

Arrays in C: Arrays as ADT, one dimensional array, two dimensional array, multidimensional array, representation. **(6)**

STACK

Definition - stack as ADT - sequential representation - operations, Applications: conversion & evaluation of expression.

Recursion : Definition, properties, examples, writing recursive program. **(6)**

QUEUE

Definition - queue as ADT, sequential representation - operations - circular queue - priority queue. **(5)**

LINKED LISTS

Definition - operations - linked representation of stacks & queue - circular lists - operations - doubly linked list - Application: addition of polynomial. **(9)**

TREES

Terminologies - binary tree: operations, traversals, representation - threaded binary tree - properties. **(6)**

GRAPHS

Representation - breadth first search- depth first search - Topological sort. **(5)**

SORTING & SEARCHING

Efficiency considerations - bubble sort - quick sort - heap sort - insertion sort - radix sort - Searching: linear search, binary search. **(8)**

Total : 45 + 15 = 60

TEXT BOOKS

1. *Yedidyah Langsam, Moshe.J.Augenstein, Aaron.M.Tenenbaum, "Data structures using C & C++" Second Edition , PHI Publications, 1996.*
2. *Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivert , Clifford Stein "Introduction to Algorithms", Second Edition, PHI Publications, 2004. (Graphs)*

REFERENCE BOOKS

1. *Ellis Horowitz & Sartaj Sahni "Fundamentals of Data Structures", Galgotia Publications, 2004*
2. *Richard F. Gilbery, Behrouz A.Forouzan, "Data structures - A Pseudocode Approach with C", 2002 Edition, Thomson Asia Pvt Ltd.*
3. *Krishnamoorthy.R, "Data Structures using C", Mc Graw-Hill Education(India) Pvt. Ltd, 2010.*

14MSS25 - OBJECT ORIENTED PROGRAMMING IN C++

L	T	P	C
3	0	0	3

PRE-REQUISITES

14MSS13, 14MSS16

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *To make the students understand the need for object-oriented paradigm.*
- *To give an exposure on object-oriented principles.*
- *To provide knowledge on implementation of object-oriented principles in C++.*

COURSE OUTCOME

- *The students will be able to identify and define objects using object model.*
- *The students will be able to relate the objects and pass interaction messages among them.*
- *The students can develop the object oriented software using C++.*

INTRODUCTION

Introduction to C++ - Programming Paradigms - Procedural Programming - Modularity - Separate compilation - Exception Handling - Data Abstraction- User Defined Types - Concrete Types - Abstract Types - Virtual Function - Object Oriented Programming - Generic Programming **(6)**

BASIC FACILITIES IN C++

Overview of C++ - Types and Declarations - Arrays, Pointers, Structures, REFERENCE BOOKS and Functions - Function Overloading - Name spaces - Source Files and Programs.

ABSTRACT DATA TYPE IN C++

Class - Class members and Access control - Constructors- Static members - Default copy constructor - Const member functions - this pointer - Structs - Inline function definition - Concrete classes - Destructors - new and delete - Member objects. **(11)**

OPERATOR OVERLOADING

Operator functions - Binary and unary operators - Member and non member operators - Friend functions - Large objects - Function call -Increment and Decrement - A string class - Dereferencing. **(8)**

INHERITANCE

Derived Classes - Class Hierarchies - A virtual functions - Abstract classes. Templates: Function templates - Derivation and Templates. **(10)**

EXCEPTION HANDLING AND LIBRARY CLASSES

Grouping of exceptions - Catching exceptions - Exceptions that are not errors - Uncaught Exceptions - Standard exceptions - The standard library - I/O streams - File streams. **(10)**

TOTAL : 45

TEXT BOOK

1. *Bjarne Stroustrup, "The C++ Programming Language", 3rd edition, Pearson Education, 2000.*

REFERENCE BOOKS

1. *Ira Pohl, "Object Oriented Programming Using C++", 2nd Edition, Pearson Education, 2006*
2. *Herbert Schildt, "The Complete Reference C++", 4th Edition, Tata McGraw Hill, 2003.*
3. *Stanley B Lippman, Jove Lajoie, and Barbara Moo "C++ Primer", 5th Edition, Addison Wesley, 2012.*

14MSS26 - DATA STRUCTURES LAB USING C

L	T	P	C
0	0	4	2

PRE-REQUISITES

14MSS13, 14MSS16, 14MSS24

ASSESSMENT : PRACTICAL

COURSE OBJECTIVE

- *To become familiar with proper implementation of elementary data structures in appropriate problems.*
- *To develop the ability to choose suitable data structure and optimal algorithm for a given scenario.*
- *To understand different searching and sorting techniques and their applications.*

COURSE OUTCOME

- *Ability to define and apply various data structures like stack, queue, linked list , trees and graphs for real time applications.*
- *Implementing self referential structure.*
- *Analyze differences between recursive and iterative methods.*
- *Ability to implement various sorting and searching techniques in various application.*

CONCEPTS TO BE COVERED:

1. Applications of 2D, 3D arrays.
2. Evaluation of expression using stack.
3. Recursion - Towers of Hanoi, Ackermann's function, Fibonacci series.
4. Implementation of basic queue operations, priority queue, circular queue.
5. Implementation of self referential structures (FIFO, LIFO).
6. Applications of circular linked list.
7. Applications of doubly linked list.
8. Traversals of binary tree.
9. Traversals of graph.
10. Implementation of sorting and searching techniques.

14MSS27 - OBJECT ORIENTED PROGRAMMING LAB USING C++

L	T	P	C
0	0	4	2

PRE-REQUISITES

Consent of the Instructor

ASSESSMENT : PRACTICAL

COURSE OBJECTIVE

- *To familiarize with Abstract Data Type.*
- *To implement object oriented concepts in C++*
- *To create and access files.*

COURSE OUTCOME

Upon Completion of the course, the students should be able to,

- *identify and define objects using object model.*
- *write software systems using C++ and can make the objects interact together to obtain the required result.*

EXCERCISES TO COVER THE FOLLOWING TOPICS :

1. Identification, construction and destruction of objects
2. Overloading
3. Friend functions
4. Inheritance
5. Polymorphism
6. Exception handling
7. Using I/O Streams
8. File Operations
9. Generic Programming

14MSS28 - SCRIPTING LAB

L	T	P	C
0	0	4	2

PRE-REQUISITES

Consent of the Instructor

ASSESSMENT : PRACTICAL

COURSE OBJECTIVE

- *Understand the basic concepts of development under web technology*
- *Get guided on the development of static and dynamic web pages and enhance the pages using CSS properties*
- *Provide ability to write processing codes for client and server side.*
- *Get trained for data movement on the web*

COURSE OUTCOME

- *Students will have the ability to create interactive, enhanced web pages.*
- *Add functionalities to web pages on client and server side with cookies, regular expressions, database connectivity and ActiveX controls.*
- *Write codes for data movement on the web.*

CONCEPTS TO BE COVERED :

1. Simple HTML programs with formatting tags, tables, images, lists and frames
2. Interactive pages using anchors, image maps and forms
3. XHTML representation of web pages.
4. Cascading Style Sheets - Dynamic properties for individual, group and random elements
5. JScript Programs for Simple Arithmetic , String processing, Arrays, built in and user defined functions, client side validations
6. XML - Database, DTD, XSD, XSL representation, DOM parser
7. PHP / Apache Tomcat- simple programs for embedding html and Php, Arrays, String Processing
8. Server side Validations, Cookies, Database Connectivity.

14MSS31 - MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

L	T	P	C
3	0	0	3

PRE-REQUISITES

14MSS15

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *To introduce Mathematical logic, Finite state system, Grammars and Turing machine*
- *To impart discrete knowledge in computer engineering through finite automata and Context free grammars.*
- *To solve problems using mathematical induction.*

COURSE OUTCOME

Students will be able to

- *Acquire the basic knowledge of relations and functions needed for designing and solving problems.*
- *Acquire the knowledge of logical operations and predicate calculas needed for computing skill.*
- *Apply the knowledge of finite automata theory and discrete problems to solve by computers.*

LATTICES

Lattices - Properties of lattice - Lattice as algebraic system. Relations: Properties of relations - Closure operations on relations. Functions : injective , subjective and objective functions. **(8)**

MATHEMATICAL LOGIC

Propositional Logic - Statements - Logical Connectives - Truth tables - Tautologies and contradiction - Equivalence and Implications - Normal forms- Predicate Calculus. **(9)**

FINITE STATE MACHINE

Basic definition - Finite Automata - DFA & NDFA- Regular Expressions- Equivalence of NFA & NDFA - Equivalence of finite automata and regular expressions - Minimization of DFA. **(9)**

GRAMMARS

Phrase structure grammar - types - Context free grammars and languages - Derivations - Ambiguity - Simplification of CFG.

Push Down Automata : Definitions - Moves - Types - Acceptance by Empty stack and final state. **(10)**

TURING MACHINE

Definitions- Representations of TM - Classifications of TM : Multi head, offline, multiple, deterministic, universal TM - Rice Theorem - Halting problem **(9)**

Total : 45

TEXT BOOKS

1. *David Makinson , " Sets , Logic and Maths for Computing ", Springer Indian Reprint , 2011.*
2. *Hopcroft J.E., Motwani R. and Ullman J.D, " Introduction to Automata Theory, Languages and Computations" , Second Edition , Pearson Education , 2008*
3. *J.P Tremblay and R. Manohar , "Discrete mathematical Structures with Applications to Computer Science ",TataMcGraw Hill Publishing Company , New Delhi, 2003*

REFERENCE BOOKS

1. *John C Martin, "Introduction to Languages and the Theory of Computation", Third Edition , TataMcGraw Hill Publishing Company , New Delhi, 2007.*
2. *Kamala Krithivasan and Rama . R. "introduction to formal languages, Automata theory and Computation", Pearson Education 2009.*
3. *Kenneth H. Rosen " Discrete Mathematics and its Applications", TataMcGraw Hill , Fourth 2011.*

14MSS32 - COMPUTER ARCHITECTURE

L	T	P	C
3	0	0	3

PRE-REQUISITES

14MSS15

ASSESSMENT : THEORY

COURSE OBJECTIVE

To equip the students with

- *Architectural insights, which can help them design future systems*

COURSE OUTCOME

Students are expected to

- *know how a system works and why it performs as it is.*
- *have the ability to analyze the hardware and software issues related to computers*

BASIC COMPUTER ORGANIZATION

Stored program organization - registers - instructions Timing and control - Instruction cycle - Memory reference instructions - input/output and interrupt - Design of Basic computer - design of accumulator logic - Programming the basic computer **(9)**

MICROPROGRAMMED CONTROL

Control memory - Address sequencing - Microprogram example- Design of control unit.

CENTRAL PROCESSING UNIT : General register organization - stack organization - Instruction formats - Addressing modes - Data transfer and manipulation - Program control- Reduced Instruction Set computer **(9)**

COMPUTER ARITHMETIC

Addition - subtraction - multiplication and division algorithms - Floating point Arithmetic operations - Decimal arithmetic unit and operations **(9)**

I/O ORGANIZATION

Peripheral devices - Input/output interface - Asynchronous Data Transfer - Modes of Transfer- Priority interrupt - Direct Memory Access - Input-output processor - Serial communication **(9)**

MEMORY ORGANIZATION

Memory Hierarchy - Auxiliary memory -Associative memory - Cache memory - Virtual Memory - Memory management hardware **(9)**

TOTAL : 45

TEXT BOOK

1. *M Morris Mano, "Computer system Architecture", Pearson Education, 2007.*

REFERENCE BOOKS

1. *John L Hennessy and David A Patterson, "Computer Architecture - A Quantitative Approach", 5th Edition, Morgan Kaufmann, 2007.*
2. *Carl Hamacher, Zuonko Uranesic & Safwat Zoky, "Computer Organization", 5th Edition, McGraw Hill, 2002*

14MSS33 - OPERATING SYSTEMS

L	T	P	C
3	0	0	3

PRE-REQUISITES

14MSS14

ASSESSMENT : THEORY

COURSE OBJECTIVE

The objective is to make the students clearly understand

- *process management, memory management,*
- *I/O Management*
- *file management as done by an operating system.*

COURSE OUTCOME

The student will be able to

- *clearly delineate the functions of an operating system*
- *understand the management of various resources by the Operating System*

INTRODUCTION

System Software - Macro Processor - Loader - Linker - Operating systems -objectives and functions. Evolution of Operating system - serial processing, simple batch systems, multi- programmed batch system, time sharing systems.

PROCESS DESCRIPTION AND CONTROL

Process status, Process description, Process control - Processes and threads. **(10)**

CONCURRENCY

Principles of concurrency, mutual exclusion - software support, Dekker's Algorithm - mutual exclusion - hardware support, mutual exclusion - Operating System support - Semaphore - Monitors - Implementation - Message Passing. Deadlock - deadlock prevention, deadlock detection, deadlock avoidance. An integrated deadlock strategy. **(8)**

MEMORY MANAGEMENT

Memory management requirements. Fixed partitioning, placement algorithm. Dynamic partitioning placement algorithm. Replacement algorithm. Relocation. Simple paging - Simple segmentation.

VIRTUAL MEMORY

Paging - address translation in a paging system. Segmentation - organization. Address translation in a segmentation system. Combined paging and segmentation. Virtual memory - Operating System software - fetch policy, placement policy and replacement policy. Page buffering. Resident set management.**(12)**

SCHEDULING

Types of scheduling, scheduling algorithms, scheduling criteria, FIFO, Round Robin, Shortest process next, Shortest remaining time, Highest response ratio and Feedback scheduling. Performance comparison. Fair - share scheduling. **(6)**

I/O MANAGEMENT AND DISK SCHEDULING

Organization of the I/O function - evaluation of the I/O function. Logical structure of the I/O function, I/O buffering. Disk I/O - Disk scheduling algorithms. Disk cache.

FILE MANAGEMENT

Files, File management systems, File system architecture, Functions of File management - File directories - File sharing - secondary storage management. File allocation. **(9)**

Total : 45

TEXT BOOKS

1. *William Stallings, "Operating Systems", 4th Edition, PHI, 2001.*
2. *Silberschatz A., Galvin P. and Gagne. G "Operating System Principles", JohnWiley Publishing Company, 2002.*

REFERENCE BOOKS

1. *H.M.Deital, " An introduction to Operating System", Pearson Education, 2001*
2. *Charles Crowley, "Operating System a Design Oriented Approach", Tata McGraw Hill, 2000.*
3. *Milankovic M, "Operating System Concepts & Design", McGraw Hill,1999.*
4. *Armass Danesl, "Mastering Linux", Premium Edition, BPB Publications, 1999*
5. *Robert Cowart, Boyd waters "Windows NT 4 ", BPB Publications, 1997.*

14MSS34 - DATABASE MANAGEMENT SYSTEMS

L	T	P	C
3	1	0	4

PRE-REQUISITES

14MSS13, 14MSS24

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *To make the students understand the need for database management system*
- *To familiarize the students with the components of three schema architecture of database management system*
- *To familiarize the students with the design principles to be followed*

COURSE OUTCOME

At the end of the course the students will be able to,

- *Design a database and normalize it*
- *Reduce the design into relational database tables*
- *Write relational algebraic and SQL queries to retrieve the required data*

INTRODUCTION

Database System Applications, Purpose of Database Systems, View of Data, Database Languages, Relational Databases, Database Architecture, Database Users and Administrators. **(4)**

RELATIONAL MODEL

Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages, Relational Operations. **(6)**

INTRODUCTION TO SQL

Overview of the SQL Query Language, SQL Data Definition, Basic Structure of SQL Queries, Additional Basic Operations, Set Operations, Null Values, Aggregate Functions, Nested Subqueries, Modification of the Database.

INTERMEDIATE SQL

Join Expressions, Views, Transactions, Integrity Constraints, SQL Data Types and Schemas, Authorization

ADVANCED SQL

Accessing SQL from a Programming Language, Functions and Procedures, Triggers

FORMAL RELATIONAL QUERY LANGUAGES

The Relational Algebra, The Tuple Relational Calculus **(12)**

DATABASE DESIGN

Database Design and the E-R Model, Overview of the Design Process, The Entity-Relationship Model, Constraints, Removing Redundant Attributes in Entity Sets, Entity-Relationship Diagrams, Reduction to Relational Schemas, Entity-Relationship Design Issues, Extended E-R Features.

FEATURES OF GOOD RELATIONAL DESIGN

Atomic Domains and First Normal Form, Decomposition Using Functional Dependencies, Functional-Dependency Theory, Algorithms for Decomposition, Decomposition Using Multivalued Dependencies **(11)**

DATA STORAGE AND INDEXING

Storage and File Structure, Overview of Physical Storage, Media, Magnetic Disk and Flash Storage, RAID, Tertiary Storage, File Organization, Organization of Records in Files, Data-Dictionary Storage, Database Buffer Indexing and Hashing: Basic Concepts, Ordered Indices, B+-Tree Index Files, B+-Tree Extensions, Multiple-Key Access, Static Hashing, Dynamic Hashing, Comparison of Ordered Indexing and Hashing, Bitmap Indices, Index Definition in SQL **(12)**

Total : 45 + 15 = 60

TEXT BOOK

1. *Abraham Silberschatz, Henry F.Korth and S.Sudarshan, "Database System Concepts", Sixth Edition, McGraw Hill, 2010.*

REFERENCE BOOKS

1. *Ramez Elmasri, Shamkant B. Navathe Durvasula, V.L.N. Somayajulu, Shyam K. Gupta, "Fundamentals of Database Systems", Fourth Edition, Pearson Education, 2006.*
2. *Christopher Allen, Simon Chatwin, Catherine A. Creary, "Introduction to Relational Databases and SQL Programming", Tata McGraw-Hill.*

14MSS35 - UNIX SYSTEM PROGRAMMING

L	T	P	C
3	0	0	3

PRE-REQUISITES

14MSS13, 14MSS18

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *To learn principles of problem solving using UNIX*
- *To provide knowledge on writing shell scripts and AWK programming.*
- *To Understand the File Subsystem and Process Subsystem*

COURSE OUTCOME

- *To understand the unique capabilities of UNIX operating system.*
- *The student will be able to work with Shell scripts and AWK programming*
- *To understand the file system calls and process controls in UNIX*

UNIX FILE SYSTEM

Internal and External commands - File and directory commands, Security features - FAP, Hard links and soft links, find command. **(4)**

SHELL, PROCESS AND ENVIRONMENT

SHELL - Shell's interpretive cycle, shell offerings, pattern matching, escaping and quoting, redirection, /dev/null and /dev/tty facilities, pipes, tee, command substitution. Shell variables, Shell Programming - interactive shell scripts - positional parameters, set command, shift command, read command, command line arguments, exit command, expr command, export command - Looping statements - for loop, while and until loops -conditional statements - if statement, case statements - test command, expr command, while true command, break and continue command.

PROCESS - Basics, ps, system processes, mechanism of a process creation, internal and external commands, running jobs in background, nice, killing processes with signals, job control, at and batch, cron, time.

ENVIRONMENT - variables, aliases, command history, in-line command editing, miscellaneous scripts.

FILTERS - Sample database, pr, head, tail, cut, paste, sort, uniq, tr, grep, Stream editor - sed **(12)**

AWK PROGRAMMING

Features of AWK - Simple awk Filtering, Splitting a Line into Fields, printf, Comparison operators, number processing, variables, -f option, BEGIN and END sections, built-in variables, arrays, functions, control flow, Looping with for and while. **(8)**

FILE SUBSYSTEM

Internal representation of files : Inodes - Structure of a regular file - Directories - Conversion of a path name to an Inode - Super block - Inode assignment to a new file - Allocation of disk blocks.

System Calls: Open - Read - Write - File and record locking - Adjusting the position of file I/O - Lseek - Close - File creation - Creation of special files - Changing directory, root, owner, mode - stat and fstat - Pipes - Dup - Mounting and un mounting file systems - link - unlink. **(12)**

PROCESSES

Process states and transitions - Layout of system memory - The context of a process - Saving the context of a process - Manipulation of the process address space - Sleep.

Process Control : Process creation - Signals - Process termination - Awaiting process termination - Invoking other programs - user id of a process - Changing the size of a process - Shell - System boot and the INIT process- Process Scheduling **(9)**

Total : 45

TEXT BOOKS

1. *Sumitabha Das, "UNIX Concepts and Applications", Third Edition, Tata McGraw-Hill Publishing Company limited, New Delhi, 2005. [ISBN: 0-07-053475-6]*
2. *Kochan and Wood, "UNIX Shell Programming", Sams, Third Edition, 2003 [ISBN: 0-07-252042-6]*
3. *Molay, "Understanding Unix/Linux Programming", Prentice Hall, 2003.*
4. *Maurice J. Bach, "The Design of the Unix Operating System", First Edition, Pearson Education, 1999*

REFERENCE BOOKS

1. *Haviland and Salama, "UNIX System Programming", Addison Wesley, 2/e, 1999.*
2. *Mark G. Sobell, "A Practical Guide to the UNIX System" - Third Edition, [ISBN: 0-8053-7565-1]*
3. *Uresh Vahalia, "UNIX Internals: The New Frontiers", Pearson Education, 1996.*

14MSS36 - DATABASE MANAGEMENT SYSTEMS LAB

L	T	P	C
0	0	4	2

PRE-REQUISITES

14MSS34

ASSESSMENT : PRACTICAL

COURSE OBJECTIVE

- *To make the students learn designing a database and creating the tables in it*
- *To familiarize the students in writing SQL queries*
- *To make the students create PL/SQL blocks*

COURSE OUTCOME

At the end of the course students will be able to,

- *Design a database and represent it as ER diagram*
- *Write the appropriate SQL queries for an application*
- *Develop a database application*

LAB PROBLEMS TO BE GIVEN ON THE FOLLOWING:

1. Designing a database for an application and representing it through ER diagram
2. Creating and managing tables
3. Basic SQL SELECT statements
4. Restricting and sorting data
5. Single row functions
6. Displaying data from multiple tables
7. Aggregating data using Group function - Group By
8. Subqueries
9. Views, Sequence, Index, Synonym
10. SET operators, Date and Time functions
11. PL / SQL Programs
12. Exception Handling, Cursors, Functions, Procedures, Package, Triggers

14MSS37-VISUAL PROGRAMMING LAB

L	T	P	C
0	1	3	2

PRE-REQUISITES

14MSS16, 14MSS27

ASSESSMENT : PRACTICAL

COURSE OBJECTIVE

To understand and create GUI based event driven programs using VB.NET language.

COURSE OUTCOME

The students will be able to:

- *Understand the fundamentals of DOT NET framework.*
- *Build simple GUI based Windows applications*
- *Build Web applications*

CONCEPTS TO BE COVERED

1. Introduction to VS.NET IDE and framework components
2. Simple Windows applications using standard tool box (Button, Label, Text, Drop Down List, etc) with event handling
3. Windows application using advanced controls (FileDialog, ProgressBar, etc)
4. Design and develop database applications using ADO.NET library
5. Design web GUI applications using ASP.NET Server controls
6. Web applications with database

14MSS38 - OPERATING SYSTEMS LAB

L	T	P	C
0	0	4	2

PRE-REQUISITES

14MSS33, 14MSS35

ASSESSMENT : PRACTICAL

COURSE OBJECTIVE

- *To make students implement Shell Programming.*
- *To make students implement Advanced Shell scripting techniques.*
- *To make students to implement various CPU Scheduling Algorithms.*

COURSE OUTCOME

- *The students will be able to write Shell scripts.*
- *The student will be able to write programs to solve Real Time Scheduling problems.*
- *To solve concurrency issues*

LIST OF PROGRAMS

1. Shell Basics
    a. Types of shells
    b. Shell functionality
    c. Environment
2. Writing first script
    a. Writing script and executing basic script
    b. Debugging script
    c. Making interactive scripts
    d. Variables(default variables)
    e. Mathematical expressions
3. Conditional Statements
    a. if -else-elif
    b. test command
    c. Logical operators - and, or, not
    d. case - esac
4. Loops
    a. while
    b. for
    c. until
    d. break and continue

5. Command Line arguments
    a. Positional parameters
    b. set and shift
    c. IFS
6. Functions and file manipulations
    a. Processing file line by line
    b. Functions
7. Regular Expression & Filters
    a. grep, cut, sort
    b. grep patterns
8. SED & AWK
9. Processes
    a. Concept of process in Unix
    b. Background processes
    c. Scheduling processes - At, batch & cron
10. Misc
    a. Trapping signals
    b. String substitutions / manipulations
11. Advanced Scripting Techniques
    a. Providing command line options to scripts
    b. Shell and Sub shells
    c. Exporting variables
    d. Arrays
12. Implement CPU Scheduling Algorithms
13. Implement Bankers Algorithm to avoid deadlock
14. Implement the Producer - Consumer problem using semaphores
15. Implement Page Replacement algorithms

14MSS41 - DESIGN AND ANALYSIS OF ALGORITHMS

L	T	P	C
3	1	0	4

PRE-REQUISITES

14MSS24

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *Aims to introduce the basic concepts of advanced tree concepts, heap structures and hashing techniques and to familiarize the techniques for designing algorithms and to apply them to solve practical problems efficiently.*

COURSE OUTCOME

- *Students will have knowledge about various advanced tree structures, heaps and hashing.*
- *Ability to analyze the efficiency of different algorithm design techniques and their proper usage in application problems.*

TREES

Binary search tree : Definition, operations - AVL Tree: Balancing trees, node operations. **(6)**

MULTIWAY TREES

Definition - m-way search trees - B-trees - Red Black tree - operations - Trie Structures - B+ trees. **(11)**

HEAP

Definition - heap data structures - heap algorithms - applications. **(6)**

HASHING

Basic concepts - hashing methods - hashing algorithms - collision resolution methods. **(7)**

ALGORITHM DESIGN TECHNIQUES

ALGORITHM ANALYSIS : Performance analysis - Asymptotic notations.

DIVIDE & CONQUER : General method - Merge sort.

REEDY METHOD : General method - Knapsack problem -Prim's & Kruskal's algorithm.

DYNAMIC PROGRAMMING : General method - Multistage graph- Travelling Salesperson Problem.

BACK TRACKING : General method - Eight queen's problem. **(15)**

Total : 45 + 15 = 60

TEXT BOOKS

1. *Richard F. Gilbery, Behrouz A.Forouzan, "Data structures - A Pseudocode Approach with C", 2002, Thomson Asia Pvt Ltd. (Trees, Multiway trees, Heap, Hashing)*

2. *Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, "Fundamental of Computer Algorithms", Galgotia Publications, 1998. (Algorithm Design Techniques)*
3. *Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivert, Clifford Stein "Introduction to Algorithms", Second Edition, Prentice Hall of India, Publications, New Delhi, 2007. (Red Black Trees).*

REFERENCE BOOKS

1. *Anany Levitin , " Introduction : The Design & Analysis of Algorithm", 2003 Edition, Pearson Education Inc.*
2. *S.K.Basu, "Design Method & Analysis of Algorithm", PHI, 2005.*

14MSS42 - MICROPROCESSORS AND ASSEMBLY LANGUAGE PROGRAMMING

L	T	P	C
3	0	0	3

PRE-REQUISITES

14MSS15, 14MSS32

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *To create the comprehension of microprocessor structure: CPU, memory and input/output peripherals*
- *To expose to the students to the instruction set of a 16-bit processor*
- *To provide the knowledge on how 80386 helps in solving the issues in building a multitasking operating system*

COURSE OUTCOME

Students are expected to have the

- *Ability to design, debug and test a small scale microprocessor based system*
- *Knowledge on HW and operating system interaction.*
- *Ability to write system programs*

INTRODUCTION

Computer architecture and advances - classes of computers

8086/8088 Microprocessor : Internal architecture - addressing modes - assembler directives - instruction format- instruction set and assembly language programming. **(9)**

MEMORY INTERFACING

Types of Memories - ROM and static RAM Interfacing Techniques - Dynamic Memories - DRAM Interfacing - Error detecting and correcting in DRAM arrays. **(9)**

PERIPHERAL DEVICES AND THEIR INTERFACING

Data transfer schemes - Input and Output modes - 8086 interrupts and interrupt responses - 8259 programmable interrupt controller - 8254 programmable counter/interval timer - Direct Memory Access mode I/O - 8237 programmable DMA controller. **(9)**

DIGITAL INTERFACING : programmable Parallel ports (8255) - interfacing simple devices

ANALOG INTERFACING : Sensors and Transducers - Case Study: A microcomputer based scale. **(9)**

HIGH END PROCESSORS

Issues in building a multitasking operating system - Architecture of 80386 processor - Operating modes - 80386 segment privilege levels protection - interrupt and exception handling - Task switching - Architecture of Pentium processor - operating modes. **(9)**

Total : 45

TEXT BOOK

1. *Douglas V Hall, SSSP Rao, "Microprocessors and its Interfacing", 3rd Edition, TMH, 2012.*

REFERENCE BOOKS

1. *Yn-cheng Liu,Glenn A.Gibson, "Microcomputer systems: The 8086 / 8088 Family architecture, Programming and Design", second edition, Prentice Hall of India , 2006.*
2. *Barry B. Brey, "The Intel Microprocessors 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, and Pentium Pro Processor Architecture, Programming, and Interfacing", Seventh Edition, 2006, Prentice Hall.*

14MSS43 - JAVA PROGRAMMING

L	T	P	C
3	1	0	4

PRE-REQUISITES

14MSS25

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *Introducing Object Oriented Concepts*
- *Gaining Knowledge about Event Handling, Exception Handling*
- *Understand about Java Collections and Multithreading*

COURSE OUTCOME

- *Students can develop applications in Java using Basic Windows, Swing Framework, Multi threaded Applications and Database Connectivity*
- *Students can learn to apply the Object Oriented Concepts in Java Programming for real world problems.*

INTRODUCTION

The Object Model - The Evolution of the Object Model - Elements of the Object Model - Applying the Object Model

An Introduction to Java - The Programming Environment - Fundamental Programming Structures in Java - Static fields and methods - Method Parameters - Object Construction - Packages - The Class Path. **(7)**

BASICS

INHERITANCE : Classes, Super Classes and Subclasses Objects - The Cosmic superclass - Generic Array Lists - Object Wrappers and AutoBoxing - Methods with a variable number of parameters - Enumeration Classes.

INTERFACES AND INNER CLASSES - Interfaces - Object Cloning - Interfaces and callbacks - InnerClasses.

DEPLOYING APPLICATION : JAR Files - EXCEPTIONS - Dealing with Errors - Catching Exceptions. **(10)**

USER INTERFACE COMPONENTS WITH SWING

Swing - Introduction to Layout Management - Text Input - Text Fields - Labels and Labelling Components - Password fields - Text areas - Scroll Panes. Choice Components - check boxes, Radio Buttons and combo boxes. Dialog Boxes - Option Dialogs and Creating Dialogs. **(6)**

APPLETS

Types of Applets- Applet Basics - The applet Class - Applet Architecture - An applet Skeleton- Applet Initialization and Termination - Display Methods- Requesting Repainting - Using the Status Window -

Passing parameters - Applet Context and Show document **(5)**

COLLECTIONS - Collection Interface - Concrete collections - The Collections Framework - Legacy Collections - The Hashtable Class **(9)**

MULTITHREADING - Threads - Interrupting Threads - Thread states.

Database Connectivity : JDBC **(8)**

Total : 45 + 15 = 60

TEXT BOOKS

1. Grady Booch "Object - Oriented Analysis and Design with Applications", Second Edition, Pearson Education, 2004
2. Gary Cornell and Cay S.Horstmann, "Core Java Volume1", Eighth Edition, Pearson Education 2013
3. Y.Daniel Liang "JAVA PROGRAMMING", 7th Edition, Pearson Education 2009.

REFERENCE BOOKS

1. Herbert Shiltz, "Java: The Complete Reference", Seventh Edition, Tata McGraw Hill, 2007.
2. SCHAUM'S OUT LINES " PROGRAMMING WITH JAVA", Second Edition, Tata McGrawHill, 2004

14MSS44 - INTERNETWORKING PROTOCOLS

L	T	P	C
3	0	0	3

PRE-REQUISITES

Consent of the Instructor

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *To provide a detailed view on the various protocols of TCP/IP protocol suite*
- *To make students know the features of IPv6*
- *To make the students know the various attacks and their counter measures related to various non secure protocols.*

COURSE OUTCOME

The students will be able to

- *develop communication software*
- *Work with IPv6 networks*
- *Develop secure protocols*

INTRODUCTION

Architectural Principles - Design and Implementation- The Architecture and Protocols of the TCP/IP Suite.

The Internet Address Architecture: Basic IP Address Structure - CIDR and Aggregation - Special-Use Addresses - Unicast Address Assignment- Attacks Involving IP Addresses. **(9)**

LINK LAYER

Ethernet - Full Duplex, Power Save, Auto-negotiation, and 802.1X Flow Control - Bridges and Switches - Wireless LAN- Point-to-Point Protocol - Loopback - tunneling - Attacks on the Link Layer. **(8)**

INTERNET LAYER

Address Resolution Protocol : Operation and frame Format - Internet Protocol: Introduction - IPv4 and IPv6 Headers - IPv6 Extension Headers - IP Forwarding - Attacks Involving IP - System configuration : DHCP and Auto configuration.

Internet control Message Protocols: ICMPv4 and ICMPv6

Broadcasting and Local Multicasting **(9)**

TRANSPORT LAYER

User Datagram Protocol: Header - checksum - UDP and IPv6 - UDPLite - Translating UDP/IPv4 and UDP/IPv6 Datagrams

Transmission Control Protocol: Introduction - connection management - TCP Timeout and Retransmission - TCP data flow and window management - classic congestion control algorithms. **(8)**

APPLICATION LAYER

HTTP - DNS - E-Mail- FTP- SNMP. **(11)**

Total : 45

TEXT BOOKS

1. *Kevin R. Fall, W. Richard Stevens, "TCP/IP Illustrated, Volume 1", Pearson Education, 2nd Edition, 2012.*
2. *James F. Kurose, Keith W. Ross, "Computer Networking, A Top-Down Approach Featuring the Internet", Third Edition, Pearson Education, 2006*

REFERENCE BOOKS

1. *Behrouz A. Forouzan, "TCP/IP Protocol Suite", Tata McGRAW-HILL edition, 4th Edition, 2009*
2. *Ed Tittel, Laura Chappell, Guide to TCP/IP, Cengage Learning, Third Edition 2006.*
3. *Douglas E. Comer, "Internetworking with TCP/IP- Volume One", 6th Edition, Addison-Wesley, 2013.*

14MSS45 - SOFTWARE ENGINEERING

L	T	P	C
3	0	0	3

PRE-REQUISITES

14MSS14

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *To introduce software engineering and to explain its importance in building large Programs.*
- *To help students to develop skills that will enable them to construct software of high quality.*
- *To guide the students to learn and gain practical experience with software engineering principles and techniques.*

COURSE OUTCOME

- *Ability to apply knowledge of software engineering.*
- *Ability to analyze, interpret data and design solutions.*
- *Ability to use techniques and skills for Software development.*

SOFTWARE ENGINEERING OVERVIEW

Introduction -Computer-based System Engineering-Project Management :Activity Oraganization-Project Scheduling. **(8)**

REQUIREMENTS AND SPECIFICATION

Requirements Engineering- Requirements Analysis-System Models:Data-flow Models-Semantic data models-Data Dictionaries- Requirements Definition and Specification-Software Prototyping. **(12)**

SOFTWARE DESIGN

Software Design -Concepts- Architectural Design- Function Oriented Design **(10)**

VERIFICATION and VALIDATION

Verification and validation- Defect Testing. **(8)**

EVOLUTION

Software Maintenance-Configuration Management. **(7)**

Total : 45

TEXT BOOKS

1. *Ian Somerville,"Software Engineering ", 9th edition ,Pearson,2010.*
2. *Roger S.Pressman "Software Engineering -A Practitioner's approach", 7th edition ,McGraw Hill International edition 2010.*

3. *Pankaj Jalote,"An integrated approach to software Engineering", 3rd Edition Narosa publishing house, reprint 2013.*

REFERENCE BOOKS

1. *Ilene Burnstein "Practical Software Testing", Springer International Edition, First Indian reprint, 2004.*
2. *Nina S Godbole,"Software Quality Assurance, Principles and Practice", Narosa Publishing House, 2004.*

14MSS46 - MICROPROCESSORS LAB

L	T	P	C
0	0	4	2

PRE-REQUISITES

14MSS42

ASSESSMENT : PRACTICAL

COURSE OBJECTIVE

To make the students

- *Familiarize with Instruction Set Architecture*
- *Understand the usage of assembler directives*
- *Understand the use of software interrupts*

COURSE OUTCOME

The students will be able to

- *to write system programs*
- *analyze an assembly program*

STUDENTS MUST BE TRAINED FOR

- Using DOS and BIOS interrupts
- Using Assembler Directives
- Writing programs exploiting all instructions of 80X86
- Writing macros
- Writing interrupt service routines
- Writing FAR and NEAR procedures
- Writing Terminate and Stay Resident programs

14MSS47 - JAVA PROGRAMMING AND ALGORITHMS LAB

L	T	P	C
0	0	4	2

PRE-REQUISITES

14MSS24, 14MSS26

ASSESSMENT : PRACTICAL

COURSE OBJECTIVE

- *To become familiar with proper implementation of trees and its variants in appropriate problems.*
- *To understand different design technique.*
- *To develop the ability to choose suitable design techniques for a given scenario.*

COURSE OUTCOME

- *Ability to define and apply tree data structures and its variants for real time applications.*
- *Implementing Heap and Hash Table for a given application.*
- *Ability to implement various design techniques for various applications.*

LIST OF EXERCISES TO BE GIVEN FOR

1. Inheritance and Polymorphism
2. Interface and abstract class
3. Threads and multithreading
4. AWT, Swing and Applet
5. JDBC connectivity
6. Operations on binary search tree.
7. Operations on AVL tree
8. Hash Table implementation
9. Construction of heap & its operation
10. Implementation of Divide & Conquer Method
11. Implementation of Greedy Method
12. Implementation of Dynamic Method
13. Implementation of Back tracking Method.

14MSS48 - NETWORK PROGRAMMING LAB

L	T	P	C
0	0	4	2

PRE-REQUISITES

14MSS16

ASSESSMENT : PRACTICAL

COURSE OBJECTIVE

To make the students

- *Expertise in Socket API*
- *Understand the operation of various internetworking protocols*
- *Understand the features of NS-2*

COURSE OUTCOME

The students will be able to

- *Develop network applications*
- *use NS-2 to understand and test new protocols*
- *develop debug tools*

THE STUDENTS MUST BE TRAINED TO DEVELOP

- TCP and UDP applications by exploiting Socket API - concurrent and iterative
- Applications making use of the various socket options
- Debugging and maintenance tools with the help of RAW sockets and SOCK_PACKET
- Programs using SIGALRM, SO_RCVTTIMEO, non-blocking sockets
- I/O multiplexing
- Simple scenarios using NS-2 and study the operation of various Internet work protocols

14MSS51 - RESOURCE MANAGEMENT TECHNIQUES

L	T	P	C
3	1	0	4

PRE-REQUISITES

Consent of the Instructor

ASSESSMENT : THEORY

COURSE OBJECTIVE

This subject introduces

- *The concepts of mathematical modeling of decision problems,*
- *Design of optimization techniques to solve the mathematical models*
- *Decision making based on the obtained solutions.*

COURSE OUTCOME

The knowledge of operations research /RMT will help

- *The decision makers to analyze any decision situation and offer solutions for the best utilization of limited resources*
- *To improve the efficiency and productivity of any organization*

LINEAR PROGRAMMING

Linear programming problem - canonical and standard forms- formulation - graphical solution - simplex method. **(9)**

DUALITY

Definition of duality, primal - dual relationships - assignment model - Hungarian Technique. Transportation model - Vogels approximation method - degeneracy - unbalanced problems. **(9)**

SEQUENCING AND REPLACEMENT

Sequencing - Basic assumptions - sequencing n jobs on 2 machines (Johnson's procedure)

Replacement - need for replacement of equipments - failure mechanism of items - Replacement policy - Replacement of items that deteriorates gradually - Replacement of items that fail suddenly. **(9)**

INVENTORY

Need for the inventory - Costs involved in inventory - Concepts of average inventory, economic order quantity - Deterministic model: Fixed ordering quantity models - EOQ model with uniform demand, finite/ infinite replacement with / without shortages -EOQ with one price break. Inventory control - Buffer stock - Determination of optimum buffer stock - EOQ system of ordering - Multi item order model - ABC analysis. **(9)**

QUEUING THEORY AND SIMULATION

Characteristics of queuing systems, steady state M/M/1 model. Simulation-Monte Carlo method-applications to queuing and inventory problems

PERT & CPM NETWORKS

Critical path method- network calculations - floats - critical path.

PERT- Network - critical path. Probability of meeting a scheduled date of completion of the project- cost analysis-crashing-Least cost schedule algorithm. **(9)**

Total : 45 + 15 = 60

TEXT BOOK

1. *Hamdy, A Taha, "Operations Research - An introduction", Pearson Education India ,2004.*

REFERENCE BOOKS

1. *S. D. Sharma "Operations Research ", Kedar Nath ram Nath & co publishers, 10th edition, 1995.*
2. *Kanti Swarup, P.K. Gupta, Mani Mohan, "Operations Research", Sultan Chand & Sons, 2001.*
3. *Hillier & Lieberman, "Operations Research - An Introduction", Tata McGrawHill, 2004*

14MSS52 - OBJECT ORIENTED SOFTWARE ENGINEERING

L	T	P	C
3	0	0	3

PRE-REQUISITES

14MSS25, 14MSS45

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *To introduce the iterative and incremental software development using unified process.*
- *To perform each activity in the process using object oriented methodology.*
- *To specify the artifacts of the system using UML.*
- *To design the objects and architecture of a systems using patterns.*

COURSE OUTCOME

- *Students can describe the software development as use case driven process*
- *Students will be able to represent object oriented software models using UML.*
- *Students can develop quality software systems using patterns.*

THE UNIFIED PROCESS

Use-Case Driven, Architecture-Centric, Iterative and Incremental - Phases of Unified Process - Modeling with UML **(7)**

REQUIREMENTS ELICITATION

Introduction - Overview - Concepts - Activities - Managing Requirements Elicitation **(6)**

ANALYSIS : Introduction - Overview - Concepts - Activities - Managing Analysis **(8)**

SYSTEM DESIGN : Decomposing the System - Addressing Design Goals **(8)**

OBJECT DESIGN : Reusing Pattern Solutions - Specifying Interfaces - Mapping Models to Code **(12)**

TESTING : Introduction - Overview - Concepts - Activities - Managing Testing **(4)**

Total : 45

TEXT BOOKS

1. *Bernd Bruegge & Allen H. Dutoit," Object-Oriented Software Engineering Using UML, Patterns, and Java", Prentice Hall, Third Edition, 2010*
2. *Ivar Jacobson, Grady Booch, James Rumbaugh, "The Unified Software Development Process", Pearson Education, Sixth Impression, 2011.*

REFERENCE BOOK

1. *Grady Booch, James Rumbaugh and Ivar Jacobson, "The Unified Modeling Language User Guide", Addison Wesley, Eighth Printing, 2001.*

14MSS53 - COMPUTATIONAL INTELLIGENCE

L	T	P	C
3	1	0	4

PRE-REQUISITES

Consent of the Instructor

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *To examine work at the frontiers of research in computing where ideas from biology are inspirations to build truly intelligent computer systems*
- *create an understanding of the fundamental Computational Intelligence models*

COURSE OUTCOME

Upon completion of the subject, students shall be able to

- *Gain a working knowledge of knowledge-based systems*
- *Apply intelligent systems technologies in a variety of engineering applications;*
- *Students gain the ability of understanding various techniques and their usage in artificial neural networks*

INTRODUCTION TO COMPUTATIONAL INTELLIGENCE

Computational Intelligence Paradigms -Computational Intelligence history **(6)**

KNOWLEDGE AND REASONING AND KNOWLEDGE REPRESENTATION

LOGICAL AGENTS : Knowledge-Based - The Wumpus World - Logic - Propositional Logic: A Very Simple - Propositional Theorem Proving - Effective Propositional Model -Agents Based on Propositional Logic. **(6)**

FIRST-ORDER LOGIC

Representation Revisited -Syntax and Semantics of First-Order Logic -Using First-Order Logic -. Knowledge Engineering in First-Order Logic. **(6)**

INFERENCE IN FIRST-ORDER LOGIC

Propositional vs. First-Order Inference - and Lifting - Forward Chaining -Backward Chaining -Resolution **(6)**

ARTIFICIAL NEURAL NETWORKS

Artificial Neuron : Calculating the Net Input Signal - Activation Functions - Artificial Neuron Geometry- Artificial Neuron Learning **(6)**

Supervised Learning Neural Networks : Neural Network Types - Supervised Learning Rules - Functioning of Hidden neurons - Ensemble Neural Networks **(7)**

Unsupervised Learning Neural Networks: Background - Hebbian Learning Rule - Principal Component Learning Rule - Learning Vector Quantizer-I - Self-Organizing Feature Maps **(8)**

Total : 45 + 15 = 60

TEXT BOOKS

1. *Andries P. Engelbrecht, Computational intelligence: an introduction, editon 2, John Wileyand Sons, 2007.*
2. *Stuart Russell, Peter Norvig, "Artificial Intelligence- A modern Approach", Pearson Education, 3rd Edition, 2010,*

REFERENCE BOOKS

1. *Elaine Rich, Kevin Knight, Shivashankar B. Nair "Artificial Intelligence", Tata McGraw Hill, 3rd Edition.*
2. *Dan W.Patterson, "Introduction to Artificial Intelligence and Expert Systems", Prentice-Hall of India, 2008*

14MSS54 - DISTRIBUTED SYSTEMS

L	T	P	C
3	1	0	4

PRE-REQUISITES

14MSS35, 14MSS43, 14MSS44

ASSESSMENT : THEORY

COURSE OBJECTIVE

The students will be able to understand,

- *The need for distributed systems*
- *The communication models, OS support, Naming services with respect to distributed model.*
- *Synchronization and maintaining consistent replicas*

COURSE OUTCOME

- *The students will be able to realize the changes required in the OS*
- *The students can implement the Java RMI*
- *Design the distributed applications using the necessary services*

INTRODUCTION

Definition, Goals, Hardware Concepts, Software Concepts, The Client-Server Model **(4)**

COMMUNICATION - Layered Protocols, Remote Procedure Call, Remote Object Invocation - Java RMI - Distributed Objects - The Roles of Client and Server, Remote Method Calls, The RMI Programming Model, Parameters and Return Values in Remote Methods, Remote Method Activation. Message-Oriented Communication, Stream-Oriented Communication. **(12)**

PROCESSES - Threads, Clients, Servers, Code Migration, Software Agents.

Naming - Naming Entities, Locating Mobile Entities, Removing Unreferenced Entities **(10)**

SYNCHRONIZATION - Clock Synchronization, Logical Clocks. Distributed Transactions. Consistency and Replication - Introduction, Distributed Protocols. **(12)**

EXAMPLES OF DISTRIBUTED SYSTEMS - CORBA, Sun Network File System, Jini **(7)**

Total : 45 + 15 = 60

TEXT BOOKS

1. *Distributed Systems - Principles and Paradigms, Andrew S. Tanenbaum, Maarten van Steen, Prentice Hall of India, 2007*
2. *Core Java - Volume II - Advanced Features, Cay S.Horstmann, Gary Cornell, Eighth Edition, Prentice Hall, 2008*

14MSS55 - ENTERPRISE APPLICATION DEVELOPMENT

L	T	P	C
3	0	0	3

PRE-REQUISITES

14MSS23, 14MSS43

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *To describe the key architectural and design issues in enterprise application.*
- *To explore the features of J2EE platform technologies.*
- *To introduce web 2.0 technologies for creating rich internet applications.*

COURSE OUTCOME

- *Students get knowledge on technologies used for implementing client, web and enterprise business logic tiers.*
- *Students can develop, integrate and deploy enterprise applications in J2EE platform.*
- *Students can develop different types of web based application using web2.0.*

USING J2EE PLATFORM

INTRODUCTION

Challenges of Enterprise Application Development - The Platform for Enterprise Solutions - Enterprise Application Scenario - J2EE platform Technologies: Component Technologies, Platform Roles, Platform Services, Service Technologies, Communication Technologies - Java Database Connectivity Framework - Java Naming and Directory Interface. **(9)**

THE CLIENT TIER

Client Considerations - Design Issues and Guidelines for Browser Clients - Design Issues and Guidelines for Java Clients.

THE WEB TIER

Web Tier Technologies - Web Tier Application Structure - Web Tier Application Framework Design - Programming Servlets. **(10)**

THE ENTERPRISE JAVA BEAN TIER

Business Logic and Business Objects - Enterprise Beans as J2EE Business Objects - Remote and Local Client Views - Entity Beans - Session Beans - Message Driven Beans - Design Guidelines - Portability Guidelines - Programming Enterprise Java Beans. **(10)**

INTEGRATING WITH THE ENTERPRISE INFORMATION SYSTEM TIER

Integration Scenarios - J2EE Integration Technologies - Application Integration Design Approaches - Developing an Integration Layer- Packaging and Deployment: Roles and Tasks - Packaging J2EE Application - Deployment Description - Deployment Tools. **(6)**

USING WEB 2.0

Introduction to Web 2.0: Web 2.0 Definition - Web 2.0 Versions and Generations - Characteristics and Memes of Web 2.0.

USER GENERATED CONTENTS

Wikis - Blogs - Communities - Collaborations and Collaborative Technologies.

RICH INTERNET APPLICATIONS

Practices, Technologies and Frameworks - Content Aggregation, Syndication and Federations using RSS and Atom - Web 2.0 Architecture Case Studies. **(10)**

Total : 45

TEXT BOOKS

1. *Sing.I, Stearns. B, Johnsons. M and The Enterprise Team, "Designing Enterprise Applications with the J2EE Platform", Addison Wesley, Boston, 2002.*
2. *Stephen Asbury and Scott R.Weiner, "Developing Java Enterprise Applications", Wiley Publications, Second Edition, Reprint, 2008.*
3. *Krishna Sankar and Susan A Bouchard, "Enterprise Web 2.0 Fundamentals", Cisco Press, First Edition, 2009.*

14MSS56 - OBJECT ORIENTED SOFTWARE DEVELOPMENT LAB

L	T	P	C
0	0	4	2

PRE-REQUISITES

14MSS47, 14MSS52

ASSESSMENT : PRACTICAL

COURSE OBJECTIVE

- *To facilitate the students to practice the activities in object oriented software development methodology*
- *To familiarize the students with Rational tools*

COURSE OUTCOME

- *Students can analyze and manage the requirements using usecase approach. Students gain knowledge in managing requirement documents using Requisite Pro.*
- *Students get experience in creating analysis and design models using Rational Rose*
- *Students can realize the mapping between usecase, analysis and design models.*

LAB PROBLEMS TO COVER THE FOLLOWING :

1. Determining the scope of the problem.
2. Requirement Analysis and generating usecase model *
    a. Identifying actors
    b. Identifying usecases
    c. Writing usecase description (detailed usecase)
3. Analysis class/object identification and generating analysis model **
    a. using noun phrase analysis
    b. use case realization(using sequence or collaboration diagram for usecases)
    c. Finding attributes
    d. Performing classification(generalization/specialization)
    e. Relating classes/objects (links, association)
4. Design class model creation **
    a. Finding methods
    b. Refining attributes and associations
    a. Generating behavioral model **
5. Writing JAVA code to implement the above model.

* Using Rational Requisite Pro

**Using Rational Rose

14MSS57 - COMPUTATIONAL INTELLIGENCE LAB

L	T	P	C
0	0	4	2

PRE-REQUISITES

14MSS53

ASSESSMENT : PRACTICAL

COURSE OBJECTIVE

- *To understand and implement computational intelligent systems technologies including knowledge-based systems and neural networks.*
- *To practice in integration of intelligent systems technologies for various real time scenarios.*

COURSE OUTCOME

Upon completion of the subject, students shall be able to

- *Students will be able to use software tools and MATLAB to develop simple computational intelligence systems.*
- *Gain a working knowledge of knowledge-based systems and neural networks.*
- *Apply intelligent systems technologies in a variety of applications*

CONCEPTS TO BE COVERED :

1. Write a Prolog program containing some facts related some predicates
2. Write a Program for Usage of rules in Prolog.
3. Write programs to study usage of logical , arithmetic ,string operators in Prolog
4. Write a program for studying usage of Dynamic database in Prolog
5. Implement Computational Intelligence algorithms in MATLAB for the following:
    a. Learning Algorithms: Supervised Learning, Unsupervised Learning and Reinforcement Learning
    b. Artificial Neural Network Algorithms: Back propagation Networks, Hopfield Neural Networks, Radial Basis, and Learning Vector Quantisation

14MSS58 - ENTERPRISE APPLICATION DEVELOPMENT LAB

L	T	P	C
0	0	4	2

PRE-REQUISITES

14MSS55

ASSESSMENT : PRACTICAL

COURSE OBJECTIVE

- *To develop enterprise application using multitier architecture*
- *To practice J2EE technology behind each tier*
- *To enhance the enterprise application with rich internet features using web 2.0.*

COURSE OUTCOME

- *Students can design and implement the web logic using Servlets, application logic using SessionEJB and entity objects using EntityEJB.*
- *Student can establish the connection between the database and application using JDBC.*
- *Students can create rich client application through RSS Feeds and Tags.*

THE FOLLOWING TO BE PRACTICED IN THE LAB SESSIONS:

- Understand and design the generic business process model of an enterprise.
- Design and implement online business processing through Servlet components.
- Develop reusable business logics using Session EJB components.
- Develop persistent entity objects using Entity EJB components.
- Improve the business through developing enterprise blogs.
- Improve the user accessibility of the application by creating web feeds.

14MSS61 - DATA WAREHOUSING

L	T	P	C
3	0	0	3

PRE-REQUISITES

14MSS34

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *To provide a systematic introduction to basic concepts and requirements of data warehousing.*
- *To introduce the concepts of building a data warehouse and performing OLAP and ETL operations on it.*
- *To introduce the concept of NoSQL databases and its implementation.*

COURSE OUTCOME

The student will

- *know how to model and develop a data warehouse and performs OLAP and ETL processes on it.*
- *acquire knowledge in NoSQL databases and its usage on various applications..*

INTRODUCTION

Need for Data warehousing - Data warehouse building blocks - Planning and Project Management - Defining business requirements - Requirements as driving force. **(9)**

ARCHITECTURE AND INFRASTRUCTURE

Architectural Components - Infrastructure as foundation - significant role of metadata **(7)**

DATA DESIGN AND DATA PREPARATION

Principles of dimension modeling - Advanced concepts - Data Extraction, Transformation and Loading - Data quality. **(11)**

INFORMATION ACCESS AND DELIVERY

Classes of users - OLAP in the data warehouse - Implementation - Physical design process. **(6)**

NoSQL

Need - Aggregate Data Models - More Details on Data Models - Distribution Models - Consistency - Version Stamps - Map-Reduce. Implementation: Key-Value Databases - Document Databases **(12)**

Total : 45

TEXT BOOKS

1. *Paulraj Ponniah, "Data Warehousing Fundamentals - A Comprehensive Guide for IT Professionals", Wiley-India Edition, John Wiley & Sons Publications, 2011.*
2. *Pramodkumar J. Sadalage and Martin Fowler." NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence", AddisonWesley Professional,1st Edition, 2012.*

REFERENCE BOOK

1. *Sam Anahory and Dennis Murray, "Data Warehousing in the Real World: A Practical Guide for Building Decision Support Systems", Addison-Wesley Longman Publishing Company, 1997*

14MSS62 - SOFTWARE ARCHITECTURE

L	T	P	C
3	1	0	4

PRE-REQUISITES

14MSS45, 14MSS52

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *To specify the need of software architecture*
- *To introduce the architectural patterns and their applicability.*
- *To describe the activities involved in creating architecture for software system.*

COURSE OUTCOME

- *Students get knowledge on software architecture and architectural patterns.*
- *Students can choose and apply patterns for designing the architecture of the software systems.*
- *Students can formalize the architecture using z-notation.*

INTRODUCTION TO SOFTWARE ARCHITECTURE

Software Architecture Definition and Needs - Architectural Patterns - Reference Models - Reference Architecture - Architectural Structures and Views **(8)**

ARCHITECTURAL PATTERNS

From Mud to Structure : Layers, Pipes and Filters and Object-Oriented- Database Systems: Blackboard - Distributed Systems: Broker - Interactive Systems: Model View Controller and Presentation Abstraction Control - Adaptive Systems: Microkernel and Reflection- Case Studies: Key Word in Context and Instrumentation Software. **(12)**

THE ARCHITECTURAL BUSINESS CYCLE

Creating an Architecture-Understanding Quality Attributes - Achieving Qualities - Designing the Architecture **(10)**

ARCHITECTURE DOCUMENTATION AND EVALUATION

Documenting Architectures - Analyzing Architectures: ATAM - Software Product Lines - Case Study in Product Line Development. **(8)**

FORMAL SPECIFICATION

The Value of Architectural Formalism - Introduction to z-notation - Formalizing the Architecture of a Specific System - Formalizing the Architectural Style. **(7)**

Total : 45 + 15 = 60

TEXT BOOKS

1. *Frank Buschmann, Regine Meunier, Hans Rohnex, Peter Sommerland & Michael, "Pattern - Oriented Software Architecture - A Systems of Patterns Volume - I", (Reprint 2010) (Para - II)*
2. *Mary Shaw, David Garlan, "Software Architecture - Perspectives on an Emerging Discipline", PHI,1996 (Para V)*
3. *Len Bass, Paul Clements, Rick Kazman, "Software Architecture in Practice", 2nd Edition, Pearson Education, First Indian Reprint, 2003. (Para I, III & IV)*

14MSS63 - MOBILE COMPUTING

L	T	P	C
3	0	0	3

PRE-REQUISITES

14MSS44

ASSESSMENT : THEORY

COURSE OBJECTIVE

To provide an understanding on

- *Impact of mobility on the Internet Protocol stack*
- *Working Principles of mobile phone systems work*
- *Mobile phone processors*

COURSE OUTCOME

The students will be able to understand

- *the issues and techniques used in the design of Medium Access Protocols for wireless networks*
- *the Systems, protocols, and mechanisms to support mobility for mobile Internet users.*
- *Challenges in developing mobile applications*

INTRODUCTION

Vision of Next generation Mobile computing - Challenges.

LAYER 1 AND 2 :

Wireless Communication : Frequency Spectrum - Signal propagation - Modulation - Multiplexing - Spread Spectrum

Medium Access Control : Motivation for a specialized MAC - Accessing the medium: SDMA - FDMA - TDMA - CDMA. **(9)**

WIRELESS TECHNOLOGIES

GSM: Services - architecture - radio interface - Protocols - Localization - Handover - Security - Data Services - 3G cellular systems: UMTS **(9)**

WIRELESS LAN TECHNOLOGIES

Infrastructure and ad-hoc networks - IEEE 802.11: Architecture - Physical Layer - MAC layer - MAC Management - Newer developments- Security in wireless LAN.

Bluetooth: Architecture - Protocols - Security **(9)**

HIGHER LAYERS

Mobile Network Layer : Mobile IP - Dynamic host configuration Protocol - Mobile ad-hoc networks - ad-hoc network security.

Mobile Transport Layer: Traditional TCP -Classical TCP Improvements to support mobility- TCP over 2.5G/3G wireless networks. **(9)**

MOBILE APPLICATION DEVELOPMENT

Mobile hardware - Software Platforms - Comparison of software platforms - mobile development supporting tools

Mobile Application Challenges : Location Aware mobile computing - Mobile messaging **(9)**

Total : 45

TEXT BOOKS

1. *Jochen Schiller, "Mobile Communications", Addison-Wesley, 2004.*
2. *Pei Zheng and Lionel Ni, "Smart Phone and Next Generation Mobile Computing", Elsevier Inc, 2006.*

REFERENCE BOOKS

1. *Asoke K Talukder and Roopa R Yavagal, " Mobile computing : technology, applications, and service creation", Tata Mcgraw Hill, 2005.*
2. *Raj Kamal, Mobile Computing, Oxford university press, 2nd edition, 2012.*

14MSS64 - SOFTWARE TESTING AND QUALITY ASSURANCE

L	T	P	C
3	0	0	3

PRE-REQUISITES

14MSS45

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *To guide the students in systematic way to the testing concepts & techniques*
- *To reflect an orderly evolution of testing process on both individual and organization level.*
- *To utilize the testing skills & knowledge efficiently for organizational growth*

COURSE OUTCOME

- *Ability to solve testing problems.*
- *Ability to apply the gained knowledge to practical situations.*
- *Students gain experience in applying multiple strategies towards a common problem.*

INTRODUCTION

The Role of Process in Software Quality - Testing as a Process - Overview of the Testing Maturity Model (TMM)-Basic definitions-Software Testing Principles-Origin of Defects-Defect Classes, the Defect Repository, and Test Design-Defect example: the Coin Problem. **(8)**

TESTING STRATEGIES

Test case design strategies-Black Box Approach-Random Testing - Equivalence Class Partitioning-Boundary Value Analysis-Cause and Effect Graphing-State Transition Testing - Error Guessing - White Box Approach-Test Adequacy Criteria-Coverage and Control Flow Graphs-Covering Code Logic-Data Flow and White Box Test Design-Loop Testing-Mutation Testing. **(10)**

LEVELS OF TESTING

Unit Test : Functions, Procedures, Classes and Methods as Units-Unit Test Planning - Designing The Unit Tests - The Class as a Testable Unit - The Test Harness - Integration Test : Goal - Integration Strategies for Procedures and Functions - Integration Strategies for Classes - Designing Integration Test. **(10)**

SYSTEM TEST AND TESTING ARTIFACTS

System Test- The Different Types-Regression Testing -Alpha, Beta and Acceptance Test-Test Planning - Test Plan Components-Test Plan Attachments-Reporting Test Results. **(9)**

SOFTWARE QUALITY

Defining Quality-Importance of Quality- Quality Assurance at each Phase of Sdlc-Managing Software Quality in an Organization-Quality Management System-Product Quality and Process Quality. **(8)**

Total : 45

TEXT BOOKS

1. *Ilene Burnstein, "Practical Software Testing ",Springer International Edition ,First Indian reprint ,2004.*
2. *Nina S Godbole "Software quality Assurance, Principles and Practice", Narosa Publishing House,2004*

REFERENCE BOOKS

1. *C.Jorgensen,"Software Testing-A Craftman's Approach",CRC press,1995.*
2. *Boris Beizer,Van Nostrand Reinhold."Software Testing Techniques", 2nd Edition ,1990.*
3. *Glenford J.Myers,"The Art of Software Testing", Wiley; 3rd edition, 2011.*

14MSS66 - SOFTWARE TESTING LAB

L	T	P	C
0	0	4	2

PRE-REQUISITES

14MSS45, 14MSS64

ASSESSMENT : PRACTICAL

COURSE OBJECTIVE

- *To guide the students in various tools of software testing.*
- *To enable students to get a clear understanding of various testing techniques.*
- *To prepare students to be leaders in software testing.*

COURSE OUTCOME

- *Ability to solve testing problems.*
- *Students get the possibility to perform various types of testing effectively.*
- *Students gain experience on working with various open source testing tools.*

1. INTRODUCTION AND PROJECT DEFINITION

Introduction of tools used in the lab-Discussion on various projects and learn to write project definition .

2. SOFTWARE REQUIREMENT SPECIFICATION

Learn how to write requirements and specifications-Gain exposure to requirements management using Requisite pro.

3. RATIONAL SUITE

Benefits of using Rational suite-Rational Administrator-Rational Test Manager-Rational Clear Quest-Rational Pure Coverage-Rational Purify-Rational Requisite pro-Rational Robot.

4. WIN RUNNER

Identifying GUI objects-Spying on GUI Objects-choosing GUI Map mode-The GUI Map File per Test Mode-The Global GUI Map File Mode-Creating Data Driven Test-Creating Batch Test-Running the test-Analyzing test results-Recording the test-Synchronizing the test-Running the synchronized test .

Open source testing softwares to be used.

14MSS67- MOBILE APPLICATION DEVELOPMENT LAB

L	T	P	C
0	0	4	2

PRE-REQUISITES

14MSS23

ASSESSMENT : PRACTICAL

COURSE OBJECTIVE

- *To explore the Platforms and tools available for developing mobile applications*
- *To realize the difference between the development of conventional applications and mobile applications*
- *To understand and appreciate the features of Android, HTML5*

COURSE OUTCOME :

The students can

- *Optimize web sites for mobile devices using HTML5*
- *Build a fully functional store-worthy Android app*
- *Design the mobile application that is aware of the resource constraints of mobile devices.*

TOPICS TO BE COVERED IN THE TUTORIAL:

Mobile devices vs. desktop devices - ARM and Intel architectures - Android Architectures - Native, hybrid and web applications

HTML5 - Mobile-specific enhancements (touch interfaces, screen orientation, geolocation, etc) - Android APIs

Students must be trained for

HTML5

Creation of fully functional HTML5 app

Android

Building a basic UI-driven App

Using PhoneGap to package HTML5 apps into native apps

Creating Android services

Applications carrying out data management with SQLite3

Basic Networking using WebKit

Image manipulation

Proximity and Location services (Android NFC, Bluetooth, GoogleMaps)

14MSS68 - DATA WAREHOUSING LAB

L	T	P	C
0	0	4	2

PRE-REQUISITES

14MSS34, 14MSS61

ASSESSMENT : PRACTICAL

COURSE OBJECTIVE

- *To train students to use tools to implement data warehousing techniques*
- *To understand the suitability of NoSQL and MongoDB in various domains.*

COURSE OUTCOME

The student will be

- *able to construct data warehouse, perform operations on data warehouses..*
- *able to develop applications using NoSQL and MongoDB.*

PROBLEMS

1. Constructing a Data Warehouse using schemas.
2. Perform OLAP operations for a Data Warehouse.
3. Application development using NoSQL.
4. Application development using MongoDB.

14MSS69 - COMMUNICATION SKILLS & PERSONALITY DEVELOPMENT

PRE-REQUISITES

Consent of the Instructor

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *To enable the students to acquire proficiency in communication skills for various professional purposes.*
- *To acquire the intricacies of soft skills.*
- *To develop the knowledge in the key areas of profession viz., personality development, telephoning skills and negotiations.*

COURSE OUTCOME

At the end of the semester the students will:

- *Utilize the critical ability to communicate effectively*
- *Equip themselves with soft skills required for a professional.*
- *Enhance their awareness about work ethics and work culture.*

INTRODUCTION

Introduction - Code and Content - Stimulus and Response: Source - The Encoding Process - The Channel - The Decoding Process - The Receiver - Speaking Skills - Effective Speaking Guidelines - Communicating Soft Skills: A Self-assessment - Closing Tips **(6)**

SOFT SKILLS

Introduction to Soft Skills - Lessons from the Three Case Studies - Change in Today's Workplace: Soft Skills as a Competitive Weapon - Antiquity of Soft Skills - Classification of Soft Skills: Time Management - Attitude - Responsibility - Ethics, Integrity, Values and Trust - Self-confidence and Courage - Consistency and Predictability - Teamwork and Interpersonal Skills - Communication and Networking - Empathy and Listening Skills - Problem Solving, Troubleshooting and Speed reading - Leadership - Body Language **(9)**

TELEPHONING SKILLS & NEGOTATIONS

Preparing to make a telephone call - Receiving calls - Taking and leaving messages - Asking for and giving repetition - The secretarial barrier - Cross-cultural communication on the telephone - Setting up appointments - Changing arrangements - Ending a call - Cross-cultural communication on the telephone - Problem-solving on the telephone - Complaints - Negotiations: Types of negotiation - Preparation for a negotiation - Making an opening statement - Bargaining and making concessions - Accepting and confirming - Summarizing and looking ahead - Types of negotiator - Dealing with conflict - Rejecting - Ending the negotiation **(10)**

WRITING SKILLS

Introduction- Fifteen Principle to Increase Clarity in Communication - Edit-Edit-Edit: The Reader's Perspective - Clarity of Thought - Clarity of Text. **(7)**

PERSONALITY DEVELOPMENT

One's Personality Sends Out a Signal That Others Read - Same Person: Consciously Different Personalities can be Powerful - There isn't One Right Personality; It Differs by Role - Learning about Personality Development from the Three Cases - Personality Analysis - Freudian Analysis of Personality Development - Swami Vivekananda's Concept of Personality - Development: Physical Self - Energy Self - Intellectual Self - Mental Self - Blissful Self - Personality Begets. **(9)**

LEADERSHIP QUALITIES & INTERPERSONAL SKILLS

Resolving Conflict - A Smiling Face - Appreciative Attitude - Assertive Nature - Communication Skills - Listening Skills - Developing Empathy - The Personality Attribute of Taking Bold Decisions - Personality Types and Leadership Qualities - Mapping the Different Personality Types - Personality Tests: Example of a Personality Test: Jung Typology Test - Personality Assessment **(9)**

ETIQUETTE

Social Etiquette - Corporate Etiquette - Personal Grooming - Using minimal Body Language - Leadership and Entrepreneurship : Corporate Training - Professionalism - Self awareness - Creativity skills - Cognitive Development - Assertiveness - Positive Thinking and Attitude. **(10)**

Total : 60

REFERENCE BOOKS

1. *Mitra K.Barun, "Personality Development and Soft Skills", Oxford University Press, 2011.*
2. *Krishna Mohan, Meera Banerji. "Developing Communication Skills" Mac Million Publishers, 2012.*
3. *Sai Lakshmi. B, "Poly Skills- A Course in Communication and Life Skills" Cambridge University Press, 2012.*

14MSS81 - SOFTWARE PROJECT MANAGEMENT

L	T	P	C
3	0	0	3

PRE-REQUISITES

14MSS45

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *To understand the process of managing information system project.*

COURSE OUTCOME

- *Should possess the skills needed by a project manger, professional and a successful individual*
- *Shall able to perform new ways to improve costing ,estimation ,scheduling, monitoring and control of projects*

INTRODUCTION TO SOFTWARE PROJECT MANAGEMENT

project initiation management : Define project scope, define project objective, Estimate initial project size, estimate effort and cost, estimate project schedule, create initial project plan, project initiation in iterative model. **(9)**

SOFTWARE PROJECT EFFORT AND COST ESTIMATION

Effort estimation techniques - function point analysis, wide band Delphi , COCOMO, effort estimation for iterations model based planning - Cost estimation: cost factor analysis, activity based cost estimation, cost estimation for iterations based planning, schedule estimation **(9)**

RISK MANAGEMENT

Causes of risk, risk categories, risk analysis, artifacts of project risk management. Configuration Management : configuration management techniques , artifacts of configuration management **(9)**

PROJECT PLANNING

Project planning fundamentals, project planning techniques - critical path method, Goldratt's critical chain method, planning at project management office **(9)**

PROJECT MONITORING AND CONTROL

Project monitoring, project control techniques, project monitoring and control artifacts, project monitoring and control in iterative model. **(9)**

Total : 45

TEXT BOOKS

1. *"Software Project Management : A process Driven Approach ", Ashfaque Ahmed, CRC Press, 2011.*
2. *"Applied Software Project Management", Andrew Stellman and Jennifer Greene, OReilly Media Inc., Indian Reprint , Sep 2010.*

REFERENCE BOOK

1. *"Introduction to Information System Project management", David L. Olson, Mc Graw Hill 2nd, 2003*

14MSS82 - SOA and WEB SERVICES

L	T	P	C
3	0	0	3

PRE-REQUISITES

14MSS43, 14MSS55, 14MSS62

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *To understand service-orientation and web services.*
- *To provide a knowledge on modeling and composition of services.*
- *To implement web services using Java.*

COURSE OUTCOME

- *Students can define reusable, autonomous, composable and discoverable services.*
- *Students can implement web services with Java-ws.*
- *Students can create RESTful services.*

INTRODUCTION TO SOA

Fundamental SOA - Common Characteristics of Contemporary SOA - Evolution of SOA **(7)**

WEB SERVICES AND SOA

The Web Service Framework - Services - Service Descriptions - Messaging - Message Exchange Patterns - Service Activity: Coordination; Atomic Transactions; Business Activities; Orchestration; Choreography. **(10)**

SOA AND SERVICE-ORIENTATION

Anatomy of a Service-Oriented Architecture - Common Principles of Service-Orientation and Their Inter-Relationships - Service Layers **(8)**

BUILDING SOA

Service Oriented Analysis: Introduction, Guidelines - Service Oriented Design: Introduction, WSDL-Related XML Schema Language, WSDL Language Basics, SOAP Language Basics, SOA Composition Guidelines, Service Design Overview, Business Process Design: WS-BPEL Languages Basics, WS-Coordination Overview, Service-Oriented Business Process Design-WS-Security Language Basics. **(10)**

WEB SERVICES IN JAVA

Building Web Services with JAX-WS - Binding between XML Schema and Java Classes - Streaming API for XML - SOAP with Attachments API for Java - Generating Client-Support Code from a WSDL - Building RESTful Web Service with JAX-RS. **(10)**

Total : 45

TEXT BOOKS

1. *Thomas Eri, "Service-Oriented Architecture- Concepts, Technology and Design", Pearson Education, Second Edition, 2008.*
2. *Eric Jendrock, Jennifer Ball, Debbie Carson, Ian Evans and Kim Haase, "The Java EE5 Tutorial", Oracle Corporation Press, 2010.*
3. *Eric Jendrock, Ricardo Cervera-Navarro, Ian Evans, Devika Gollapudi, Kim Haase, William Markito and Chinmayee Srivarthsa, "The Java EE6 Tutorial", Oracle Corporation Press, 2013.*
4. *Martin Kalin,"Java Web Services : Up and Running", O'Reily Media Inc., First Edition, 2009.*

14MSS83 - DATA MINING

L	T	P	C
3	0	0	3

PRE-REQUISITES

14MSS61

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *Introduce the basics of data mining techniques and how they can be applied to extract relevant business intelligence.*

COURSE OUTCOME

The student will

- *Be able to identify and apply data mining techniques in various real time business intelligence projects.*
- *Know the basic concepts of business intelligence and how to approach business problems to derive business data using data mining techniques.*

INTRODUCTION

Definition and need of data mining - Kinds of data and patterns - Applications and issues. Types of data : Data objects and attribute types - Measuring data similarity and dissimilarity. Data Preprocessing:Overview - data cleaning - data integration - data reduction - data transformation and data discretization. **(16)**

DATA MINING TECHNIQUES :

Mining Frequent Patterns and Associations : Basic concepts - Frequent itemset mining methods.

Classification and Prediction : Basic concepts - Decision tree induction - Bayes classification methods. Prediction: Linear and Non-linear regression - Accuracy and error measures.

Cluster Analysis : Basic concepts and methods - Partitioning methods - Hierarchical methods: agglomerative and divisive hierarchical clustering and BIRCH. **(10)**

DATA MINING TRENDS

Mining Sequence data - Mining other kinds of data - Visual and Audio data mining - Web mining. **(6)**

DATA MINING FOR BUSINESS INTELLIGENCE APPLICATIONS

BI-definition-Effective and timely decisions-data, information and knowledge-role of mathematical models-BI architectures. Applications: Balanced Scorecard, Fraud Detection, Clickstream Mining, Market Segmentation, retail industry, telecommunications industry, banking & finance and CRM etc. **(13)**

Total : 45

TEXT BOOKS

1. *Jiawei Han, Micheline Kamber and Jian Pei, "Data Mining - Concepts and Techniques", 3rd Edition, Elsevier Publications, 2012.*

2. *Efraim Turban, Ramesh Sharda, Dursun Delen and Janine E. Aronson, "Business Intelligence - A Managerial Approach", 2nd Edition, Pearson Prentice Hall, 2010.*

REFERENCE BOOKS

1. *Arun K Pujari, " Data Mining Techniques", Universities Press.*
2. *Carlo Vercellis, "Business Intelligence: Data mining and Optimization for Decision Making", John Wiley and Sons, 2009.*

14MSS86 - DATA MINING LAB

L	T	P	C
0	0	4	2

PRE-REQUISITES

14MSS34, 14MSS61, 14MSS68, 14MSS83

ASSESSMENT : PRACTICAL

COURSE OBJECTIVE

- *To train students to use tools to implement data Preprocessing techniques*
- *To make students familiar with data mining techniques and related tools for different business domain.*

COURSE OUTCOME

The student will be

- *able to construct data warehouse, implement preprocessing techniques of data mining.*
- *able to explore the effect of tools to mine data in real time environment.*

PROBLEMS :

1. Perform data cleaning techniques for a given data test.
2. Perform Data Normalization using min-max, z-score and normalization by decimal scaling methods.
3. Extract Frequent Item Sets using candidate generation and without using candidate generation.
4. Calculate Information Gain measure to select the test attribute in the decision tree.
5. Perform Decision Tree Induction for a given training data.
6. Develop a model to apply Linear Regression for prediction.
7. Implementing clustering techniques (k-means, k-medoids)
8. Find the outliers using various Outlier Detection method.
9. Evaluation of measures for text retrieval.
10. Classification of Web documents.

14MSS87 - SOA AND WEB SERVICES LAB

L	T	P	C
0	0	4	2

PRE-REQUISITES

14MSS47, 14MSS58

ASSESSMENT : PRACTICAL

COURSE OBJECTIVE

- *To realize the role of WSDL and SOAP in web service.*
- *To create and access web services using JAX-WS.*
- *To implement web services as RESTful services.*

COURSE OUTCOME

- *Students can model the services.*
- *Student can implement web services using Java.*
- *Students can create RESTful services.*

THE FOLLOWING TO BE PRACTICED IN THE LAB SESSIONS:

- Modeling the business services.
- Implement the Service Interface and Service Implementation Classes with Java-ws.
- Write WSDL document to describe services.
- Publish web service in Jav-ws platform.
- Create Java Web Service Client with Java-ws.
- Create and send messages using SOAP Attachment API for Java (SAAJ).
- Accessing the message content and Adding elements to the message using SAAJ.

14MSS91 - DESIGNING INTERNET OF THINGS

L	T	P	C
3	0	0	3

PRE-REQUISITES

14MSS44, 14MSS63,14MSS82

ASSESSMENT : THEORY

COURSE OBJECTIVE

The course provides the insight of

- *the main architectures and paradigms for the Internet of Things*
- *the technologies and protocols at the access layer and network layer*
- *the technologies and protocols that enable the integration of embedded devices in a web based distributed applications*

COURSE OUTCOME

The students will acquire the knowledge for

- *Designing full connected-product by integrating Internet services and physical objects*
- *Analyzing, designing, and developing prototypes of Internet-connected products using appropriate tools.*
- *Identifying, classifying and describing different kinds of Internet-connected product concepts.*

INTRODUCTION

Smart Objects - Challenges for Smart Objects - IP for Smart Objects: motivation and main challenges - Security for Smart objects - Web services for Smart Objects - Connectivity models for Smart Object Networks - Introduction to the Internet of Things: application scenarios, current solutions. **(9)**

SMART OBJECTS AND LLNS

Hardware and Software - Energy Management - Communication for Smart Objects : IEEE 802.15.4: main features, topologies, addressing and MAC frame format - Low Power and Lossy Networks (LLN): Introduction to 6LoWPAN - 6LoWPAN architecture: simple, extended and ad-hoc networks - 6LoWPAN adaptation layer -Issues in determining IPv6 links in LLNs - IPv6 addressing in 6LoWPAN- 6LoWPAN forwarding: route-over and mesh under approaches - Neighbor Discovery optimizations and extensions to the ND protocol for 6LoWPAN networks **(11)**

ROUTING IN LOW POWER AND LOSSY NETWORKS

Mesh-under and route-over solutions - Routing Requirements - Routing metrics - The IPv6 Routing Protocol for LLNs (RPL)- Protocol operation - use of destination oriented directed acyclic graphs - DODAG formation - RPL Messages **(9)**

CoAP

Interaction model - Messages and Request/Response Model - Resource observing - Service discovery - Resource discovery - CORE Link Format **(9)**

APPLICATIONS

Smart Cities and Urban automation - Home Automation - Building Automation - Structural Health Monitoring **(7)**

Total : 45

TEXT BOOK

1. *J.-P. Vasseur, A. Dunkels, "Interconnecting Smart Objects with IP: The Next Internet", Morgan Kaufmann, 2010.*

REFERENCE BOOKS

1. *Z. Shelby, C, "Bormann. 6LoWPAN: The Wireless Embedded Internet", Wiley, 2009*
2. *Z. Shelby, K. Hartke, K. Hartke, "The Constrained Application Protocol (CoAP)", RFC 7252, 2014.*

14MSS92 - INFORMATION SECURITY

L	T	P	C
3	0	0	3

PRE-REQUISITES

14MSS34, 14MSS44, 14MSS83, 14MSS33

ASSESSMENT : THEORY

COURSE OBJECTIVE

To introduce the core concepts and principles of information security and management, security issues and countermeasures for modern communication and information systems

COURSE OUTCOME

The students shall:

- *understand fundamental concepts of security threats, attacks and controls on information security*
- *identify and assess threats facing programs, operating systems, database systems and networks*
- *gain knowledge on defensive measures and management issues in protecting infrastructure and information*

INTRODUCTION

Security : Goal, Vulnerabilities, threats, attacks, and controls, Methods of Defense; Cryptography: Terminology and Background, Substitution Ciphers, Transpositions, Encryption Algorithms, Data Encryption Standard, AES Encryption Algorithm, Public Key Encryption, Uses of Encryption **(9)**

PROGRAM SECURITY AND TRUSTED OPERATING SYSTEMS DESIGN

Program Security: Secure Programs, Non-malicious Program Errors, Viruses and Other Malicious Code, Controls against Program Threats

Designing Trusted Operating Systems: Trusted System, Security Policies, Models of Security, Trusted Operating System Design **(9)**

DATABASE AND DATA MINING SECURITY

Security Requirements, Reliability and Integrity, Sensitive data, Inference, Multilevel Databases -Security Issues, Data Mining - Privacy and Sensitivity, Data Correctness and Integrity, Availability **(9)**

SECURITY IN NETWORKS

Threats in networks, Network Security Controls: Encryption: Virtual Private Networks- PKI-SSH - SSL - IPSec, Content Integrity, Access Controls, Wireless Security, Honeypots, Traffic Flow Security, Firewalls - Intrusion Detection Systems - Secure e-mail. **(9)**

ADMINISTRATION, LEGAL AND ETHICAL ISSUES

Security Planning: Contents of a Security Plan, Risk Analysis

Legal and Ethical Issues: Protecting Programs and Data, Information and the Law, Computer Crime, Case Studies of Ethics **(9)**

Total : 45

TEXT BOOK

1. *Charles P. Pfleeger, Shari Lawrence Pfleeger, "Security in Computing", Fourth Edition, Pearson Education, 2007.*

REFERENCE BOOKS

1. *Michael Whitman, Herbert J. Mattord, "Management of Information Security", Third Edition, Course Technology, 2010.*
2. *Matt Bishop, "Introduction to Computer Security", Addison-Wesley, 2004.*
3. *William Stallings, "Cryptography and Network Security: Principles and Practices", Fifth Edition, Prentice Hall, 2010.*
4. *William Stallings, Network Security Essentials, Applications and Standards, 3rd Edition, Pearson Education, 2007.*

14MSS93 - SOFTWARE USER INTERFACE DESIGN

L	T	P	C
3	0	0	3

PRE-REQUISITES

14MSS45

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *To provide knowledge and experience on interface design, representations and models of work, scenarios and high and low fidelity prototyping.*
- *Guide on designing for heterogeneous vs. homogeneous user populations, design supporting existing work or redesigning legacy systems*
- *To understand the objected vs. task-oriented interfaces and the issues surrounding user-centered design of software applications.*

COURSE OUTCOME

The students

- *will be able to enhance themselves as an experienced interface designer.*
- *will be capable of creating models for any scenarios and be able to design from prototypes.*
- *will be able to design UI frameworks for both object and task based interfaces as a User- Centred design*

Good Interface Design - The Gap - Bridge the Gap - Bridging User Needs to Object Oriented GUI Prototype - Introduction - Pervasive Techniques (PANDA) - Explicit Steps - Mapping Task Flows to Task Objects - steps - Mapping Task Objects to GUI Objects. **(10)**

Gap - Representations in User Centered Design - Links Among Representation - Psychology of the Designer - Decision Making - Heuristics and Meta Heuristics - UI Design. Models and Transformations - the Essential and User Model - the User Interface Design. **(9)**

Light Weight Techniques - design context - Representing top-level concerns, work as objectives - Problems and Interruptions - Scenarios - Need for Dialogue Model. Interaction Design - Bridging the gap - Design Context - bubbling Technique **(8)**

Surviving the dangers of UI design - delta method - TSS 2000 case study - Before crossing the gap - Conceptual design - User interface design - after the bridge. Redesign of complex legacy systems - characteristics of projects - planning the construction of bridge - Laying the foundation - Building - Documenting. **(10)**

Bridge Gap in Software Development Process - the problem - the gap - systematic creativity - interview, using the systematic creativity - bridge the gap - directions. New generation products - examples - exploratory design stage - refinement and analysis stage - design stage - documenting and iterative process. **(8)**

Total : 45

TEXT BOOK

1. *Larry E. Wood, "User Interface Design - Bridging the Gap from User Requirements to Design", CRC Press, First Edition, 1997*

REFERENCE BOOKS

1. *Allen Cooper, Robert Reimann, "The Essentials of Interaction Design", Willey, Fifth Edition, 2007.*
2. *Jenifer Tidwell, "Designing Interfaces", Second Edition, O'Reilly Media, 2011.*
3. *Steven Hoober, Eric Berkman "Designing Mobile Interfaces" O'Reilly Media, First Edition, 2011.*

14MSS96 - INTERNET OF THINGS LAB

L	T	P	C
0	0	4	2

PRE-REQUISITES

Consent of the Instructor

ASSESSMENT : PRACTICAL

COURSE OBJECTIVE

To Make the students understand the features and operation of

- *6LoWPAN*
- *Contiki*
- *Cooja Simulator*
- *Galileo board*

COURSE OUTCOME

The students will be able to

- *Design a Fully connected smart object and test its functionality using Cooja*
- *Design and test any new extensions to Contiki*
- *Design applications using Galileo board*

THE STUDENTS MUST BE TRAINED FOR

- Simulating 6LoWPAN Using Cooja
- Programs for exploring the features of Contiki such as protothreds, timers, networking primitives by using Cooja simulator
- Deploying CoAP servers on motes
- Developing applications using Galileo board, exploiting all features of the board.

14MSS97- INFORMATION SECURITY LAB

L	T	P	C
0	0	4	2

PRE-REQUISITES

14MSS36, 14MSS48

ASSESSMENT : PRACTICAL

COURSE OBJECTIVE

- *To understand the fundamental concepts of security threats and counter measures.*
- *To understand different kinds of security algorithms and security tools.*
- *To implement suitable security algorithms for different applications.*
- *To deploy and work with various security tools.*

COURSE OUTCOME

- *Ability to define security threats, attacks and controls on information security.*
- *Ability to implement different security algorithms for various applications.*
- *Ability to deploy security tools and depict the defensive measures.*

LIST OF PROGRAMS

1. Implementing Substitution cipher
2. Implementing Transposition cipher
3. Implementing DES, BLOWFISH, AES algorithms
4. Implementing RSA, DIFFIE-HELLMAN key exchange algorithm, ECC algorithm
5. Implementing MAC, SHA, MD5 algorithms
6. Learning to install and work with Packet capturing tool Wireshark
7. Learning to install and work with Port scanning tool Nmap
8. Learning to install and work with Packet filtering firewall Retina
9. Learning to install and work with Intrusion Detection tool Snort
10. Learning to install and work with MAC Spoofing tool Smac
11. Learning to install and work with Disk encryption software TrueCrypt / VeraCrypt
12. Mini project on - Steganography, Visual Cryptography

14MSSE1- PROFESSIONAL ETHICS

L	T	P	C
3	0	0	3

PRE-REQUISITES

Consent of the Instructor

ASSESSMENT : THEORY

COURSE OBJECTIVE

The Objectives of this course are to make the student identify the core values that shape the ethical behavior of an engineer, to create awareness on professional ethics and Human Values and to appreciate the rights of others

COURSE OUTCOME

- *Upon completion of this course, students should have*
- *Understood the core values that shape the ethical behavior of an individual*
- *Exposed awareness on professional ethics and human values through theories.*
- *Known their role in technological development and have a balanced outlook on law*
- *A clear understanding of his rights and responsibilities in a work place as well as in the society*
- *Awareness of global issues and role of computer engineers in all walks of life*

HUMAN VALUES

Morals, Values and Ethics - Integrity - Work Ethic - Honesty - Courage -Empathy - Self-Confidence - Character. **(8)**

ENGINEERING ETHICS

Senses of 'Engineering Ethics' - variety of moral issues - types of inquiry - moral dilemmas - moral autonomy - Kohlberg's theory - Gilligan's theory - Consensus and Controversy - Models of Professional Roles - Theories about Right Action - Self-interest - Customs and Religion - uses of ethical theories. Valuing Time - Co-operation - Commitment **(10)**

ENGINEERING AS SOCIAL EXPERIMENTATION

Engineering as experimentation - engineers as responsible experimenters - codes of ethics - a balanced outlook on law - the challenger case study **(8)**

SAFETY, RESPONSIBILITIES AND RIGHTS

Safety and risk - assessment of safety and risk - risk benefit analysis and reducing risk - Collegiality and Loyalty - Respect for Authority - Collective Bargaining - Confidentiality - Conflicts of Interest - Occupational Crime - Professional Rights - Employee Rights - IPR - Discrimination. **(10)**

GLOBAL ISSUES

Multinational corporations - Environmental Ethics - Computer Ethics - Weapons Development - Engineers as Managers-Consulting Engineers-engineers as expert witnesses and advisors -moral leadership - sample code of conduct. **(9)**

Total : 45

TEXT BOOKS

1. *Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw-Hill, New York 1996.*
2. *Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2004.*

REFERENCE BOOKS

1. *M. Govindarajan, S. Natarajan, V. S. Senthilkumar, "Professional Ethics and Human Values", Prentice Hall, 2013*
2. *Charles D. Fleddermann, "Engineering Ethics", Pearson Education / Prentice Hall, New Jersey, 2004*
3. *Charles E Harris, Michael S. Protchard and Michael J Rabins, "Engineering Ethics - Concepts and Cases", Wadsworth Thompson Learning, United States, 2000*
4. *John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003.*

14MSSE2 - ADVANCED DATABASE CONCEPTS

L	T	P	C
3	0	0	3

PRE-REQUISITES

14MSS34

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *To make the students learn the concepts of parallel and distributed databases*
- *To familiarize the students with other data models*
- *To make the students understand the concepts of unstructured databases*

COURSE OUTCOME

At the end of the course students will be able to,

- *Appreciate the new data models*
- *Analyze and decide the appropriate data model for an application*
- *Design NoSQL database for an application*

DATABASE-SYSTEM ARCHITECTURES

Centralized and Client -Server Architectures, Server System Architectures, Parallel Systems, Distributed Systems, Network Types

Parallel Databases : Introduction, I/O Parallelism, Interquery Parallelism, Intraquery Parallelism, Intraoperation Parallelism, Interoperation Parallelism, Query Optimization, Design of Parallel Systems, Parallelism on Multicore Processors **(6)**

Distributed Databases : Homogeneous and Heterogeneous Databases, Distributed Data Storage, Distributed Transactions, Commit Protocols, Concurrency Control in Distributed Databases, Availability Heterogeneous Distributed Databases, Cloud-Based Databases **(6)**

SPECIALITY DATABASES

Object-Based Databases - Overview, Complex Data Types, Structured Types and Inheritance in SQL, Table Inheritance, Array and Multiset Types in SQL, Object-Identity and Reference Types in SQL, Implementing O-R Features, Persistent Programming Languages, Object-Relational Mapping, Object-Oriented versus Object-Relational **(9)**

XML- Motivation, Structure of XML Data, XML Document Schema, Querying and Transformation, Application Program Interfaces XML, Storage of XML Data, XML Applications **(5)**

SPATIAL AND TEMPORAL DATA AND MOBILITY

Motivation, Time in Databases, Spatial and Geographic Data Multimedia Databases, Mobility and Personal Databases **(6)**

NoSQL : Why NoSQL?, Aggregate Data Models, More Details on Data Models, Distribution Models, Consistency, Version Stamps, Map-Reduce **(8)**

Implementation : Key-Value Databases, Document Databases **(5)**

Total : 45

TEXT BOOKS

1. *Abraham Silberschatz, Henry F.Korth and S.Sudarshan, "Database System Concepts", Sixth Edition, McGraw Hill, 2010.*
2. *Pramodkumar J. Sadalage and Martin Fowler." NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence", AddisonWesley Professional,1st Edition, 2012.*

REFERENCE BOOK

1. *Ramez Elmasri, Shamkant B. Navathe Durvasula, V.L.N. Somayajulu, Shyam K. Gupta, "Fundamentals of Database Systems", Fourth Edition, Pearson Education, 2006.*

14MSSE3 - CLOUD COMPUTING

L	T	P	C
3	0	0	3

PRE-REQUISITES

14MSS23, 14MSS32, 14MSS33

ASSESSMENT : THEORY

COURSE OBJECTIVE

To provide a comprehensive overview on principles of cloud computing, its convergence with high performance computing and distributed computing, and to create an awareness of application and technology trends that are shaping the future of computing through various case studies

COURSE OUTCOME

The students shall be able to:

- *understand how data centers facilitate management, debugging, migration and disaster recovery through virtualization*
- *design innovative applications of parallel, distributed and cloud computing systems*
- *identify appropriate tools and techniques for the development of high-performance, scalable and reliable systems using evolving technology*

DISTRIBUTED SYSTEM MODELS AND ENABLING TECHNLOGIES

Scalable Computing over the Internet - Technologies for Network-based Systems - System Models for Distributed and Cloud Computing - Software Environments for Distributed Systems and Clouds - Performance, Security, and Energy Efficiency **(9)**

CLUSTERS, VIRTUALIZATION AND DATA CENTERS

Clustering for Massive Parallelism - Computer Clusters and MPP Architectures - Design Principles of Computer Clusters - Implementation Levels of Virtualization - Virtualization Structures/Tools and Mechanisms - Virtualization of CPU, Memory, and I/O Devices - Virtual Clusters and Resource Management **(9)**

CLOUD PLATFORM ARCHITECTURE

Cloud Computing and Service Models - Architectural Design of Compute and Storage Clouds - Public Cloud Platforms: GAE, AWS and Azure - Inter-cloud Resource Management - Cloud Security and Trust Management **(9)**

SOFTWARE ENVIRONMENTS FOR CLOUD PROGRAMMING

Services and Service-Oriented Architecture - Message Oriented Middleware -Features of Cloud and Grid Platforms - Parallel and Distributed Programming Paradigms - Programming Support of Google App Engine - Programming on Amazon AWS and Microsoft Azure - Emerging Cloud Software Environments **(9)**

UBIQUITOUS CLOUDS AND INTERNET OF THINGS

Case Studies: Cloud Trends in Supporting Ubiquitous Computing - Performance of Distributed Systems and the Cloud - Enabling Technologies for the Internet of Things - Innovative Applications of the Internet of Things - Online Social and Professional Networking **(9)**

Total : 45

TEXT BOOK

1. *Kai Hwang, Geoffrey C.Fox, Jack J Dongarra, "Distributed and Cloud Computing", Morgan Kaufmann Publishers, Elsevier, 2012.*

REFERENCE BOOKS

1. *Chris Wolf, Erick M. Halter, "Virtualization: From the Desktop to the Enterprise", Apress Series 2005.*
2. *James E. Smith, Ravi Nair, "Virtual Machines: Versatile Platforms for Systems and Processes", Elsevier/Morgan Kaufmann, 2005.*
3. *Anthony T. Velte, Toby J. Velte, and Robert Elsenpeter, "Cloud Computing - A practical Approach", Tata McGrawHill, 2010*

14MSSE4 - BIG DATA ANALYTICS

L	T	P	C
3	0	0	3

PRE-REQUISITES

14MSS34, 14MSS61, 14MSS83

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *To know the fundamental concepts of big data, analytics and their financial value, research that requires the integration of large amount of data.*
- *To understand tools, frameworks and techniques of data streams, predictive analytics, visualization.*

COURSE OUTCOME

The student will be able to

- *Work with big data platform and apply analysis techniques for use cases from various business domains.*
- *Design efficient algorithms for mining the data from large volumes and use different frameworks and tools to gain faster insights.*

INTRODUCTION TO BIG DATA

Analytics - Big data characteristics - Volume, Veracity, Velocity, Variety Value - Issues - Case for Big data - Big data options. Team challenge - Big data sources - Acquisition - Nuts and Bolts of Big data. Features of Big data - security, compliance, auditing and protection - Evolution of Big data - Best practices for Big data analytics. **(10)**

DATA ANALYSIS

Evolution of analytic scalability - Convergence - Parallel processing systems - Cloud computing -Grid computing - Enterprise analytic sand box - Analytic data sets - Analytic methods -analytic tools - Cognos - Microstrategy - Pentaho. Analysis approaches - Statistical significance -Business approaches - Analytic innovation - Traditional approaches - Iterative approaches **(9)**

STREAM COMPUTING

Introduction to Streams Concepts - Stream data model and architecture - Stream computing, Sampling data in a stream - Filtering streams - Counting distinct elements in a stream - Estimatingmoments - Counting oneness in a window - Decaying window. Case studies: Real time sentiment analysis, Stock market predictions. **(9)**

PREDICTIVE ANALYTICS

Predictive analytics - Supervised - Unsupervised learning - Mining Frequent itemsets - Market based model - Apriori algorithm - Handling large data sets in Main memory - Limited pass algorithm - Counting frequent itemsets in a stream - Clustering techniques - Hierarchical - K- Means - Clustering high dimensional data. **(9)**

FRAMEWORKS AND VISUALIZATION

MapReduce - Hadoop, Hive, MapR - Sharding - NoSQL Databases - S3 - Hadoop Distributed File Systems - Visualizations - Visual data analysis techniques - Interaction techniques **(8)**

Total : 45

TEXT BOOKS

1. *Frank J Ohlhorst, "Big Data Analytics: Turning Big Data into Big Money", Wiley and SAS Business Series, 2012.*
2. *Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", John Wiley & sons, 2012.*
3. *Anand Rajaraman, Jeffrey David Ullman, "Mining of Massive Datasets", Cambridge University Press, 2012.*

REFERENCE BOOKS

1. *Jiawei Han, Micheline Kamber and Jian Pei, "Data Mining - Concepts and Techniques", 3rd Edition, Elsevier Publications, 2012.*
2. *Michael Minelli, Michelle Chambers, and Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley, 2013.*
3. *P. J. Sadalage and M. Fowler, "NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence", Addison-Wesley Professional, 2012.*
4. *Tom White, "Hadoop: The Definitive Guide", Third Edition, O'Reilley, 2012.*
5. *E. Capriolo, D. Wampler, and J. Rutherglen, "Programming Hive", O'Reilley, 2012.*

14MSSE5 - BUSINESS PROCESS MANAGEMENT

L	T	P	C
3	0	0	3

PRE-REQUISITES

14MSS55, 14MSS62

ASSESSMENT : THEORY

COURSE OBJECTIVE

To introduce business process management(BPM) as interdisciplinary field and provide an overview of the BPM lifecycle, from identifying processes to analyzing, redesigning, implementing and monitoring these processes.

COURSE OUTCOME

- *Students can define the process using business management and IT aspects.*
- *Students can analyze, design the business process.*
- *Students can implement the process model using BPMN.*

INTRODUCTION TO BUSINESS PROCESS MANAGEMENT

Business Process Definition - Origin and History of BPM - The BPM Lifecycle **(7)**

PROCESS IDENTIFICATION AND MODELING

Focusing on Key Processes - Designing a Process Architecture - BPMN Initiation - Branching and Merging - Information Artifacts - Resources. **(9)**

ADVANCED PROCESS MODELING

Process Decomposition - Process Reuse - Rework and Repetition - Handling Events - Handling Exceptions - Processes and Business Rules. **(10)**

PROCESS DISCOVERY

The Setting of Process Discovery - Discovery Methods - Process Modeling Method - Process Model Quality Assurance. **(9)**

PROCESS ANALYSIS AND REDESIGN

Qualitative Process Analysis: Value-Added Analysis - Root Cause Analysis - Issue Documentation and Impact Assessment. Quantitative Process Analysis: Performance Measures - Flow Analysis - Queues - Simulation. Redesign: Definition and Need - Heuristic Process Redesign - The Case of a Health Care Institution - Product-Based Design. **(10)**

Total: 45

TEXT BOOK

1. *Marlon Dumas, Marcello La Rosa, Jan Mendling and Hajo A. Reijers, "Fundamentals of Business Process Management", Springer-Verlag Publication, 2013.*

REFERENCE BOOK

1. *Forrest W. Breyfogle III, " The Business Process Management Guidebook: An Integrated Enterprise Excellence BPM System", Citius Publishing, 2013.*

14MSSE6 - IT INFRASTRUCTURE AND MANAGEMENT

L	T	P	C
3	0	0	3

PRE-REQUISITES

14MSSE2, 14MSSE3, 14MSSE13

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *To understand the importance of the Infrastructure of IT Companies with respect to Storage, Service and Security*
- *To provide knowledge on the Ethics of IT Companies*
- *To learn the emerging trends in IT.*

COURSE OUTCOME

- *Students are able to understand about the Infrastructure on the basis of Storage, Service and Security*
- *Students are able to gain knowledge about Ethics of IT Companies*
- *Students are able to understand the emerging trends in IT*

INTRODUCTION

Computing Resources - Information Technology - IT Infrastructure Management. IT Infrastructure: IT Infrastructure Management - Challenges - Design Issues of IT Organizations and IT Infrastructure - Determining Customers' Requirements - IT Systems Management Process - IT Service Management Process - Information Systems Design Process - Patterns of IT Systems Management - IT Infrastructure Library **(13)**

Service Delivery Process: Service Level Management - Financial Management - IT Service Continuity Management - Capacity Management - Availability Management. Service Support Process : Configuration Management - Incident Management - Problem Management - Change Management - Release Management

Storage Management: Backup and Storage - Archive and Retrieve - Disaster Recovery - Space Management - Database and Application Protection - Bare Machine Recovery - Data Retention. **(12)**

SECURITY MANAGEMENT

Computer Security - Internet Security - Physical Security - Identity Management - Access Control Systems - Intrusion Detection.

IT Ethics - Intellectual Property - Privacy and Law - Computer Forensics - Ethics and Internet - Cyber Crimes. **(10)**

Emerging Trends in IT : E- Commerce - Electronic Data Interchange - Global System for Mobile Communications - Bluetooth - Infrared Technology **(10)**

Total : 45

TEXT BOOK

1. *"IT infrastructure and its management" by Phalguni Gupta, Surya Prakash, Umarani Jayaraman, Tata McGraw Hill, Second Print 2010.*

14MSSE7 - SOFTWARE LANGUAGE ENGINEERING

L	T	P	C
3	0	0	3

PRE-REQUISITES

14MSS24, 14MSS32

ASSESSMENT : THEORY

COURSE OBJECTIVE

To introduce the major programming paradigms, and the principles and techniques involved in design and implementation of modern programming languages and frameworks for specifying and reasoning about programming languages.

COURSE OUTCOME

Upon Completion of the course, the students should be able to:

- *To understand the syntax and semantics of programming languages.*
- *To understand the features of functional and imperative languages.*
- *To describe the features of Lambda calculus.*

Notions of syntax and semantics of programming languages, introduction to operational/natural semantics of functional and imperative languages **(9)**

Data abstractions and control constructs; block-structure and scope, principles of abstraction, qualification and correspondence **(9)**

Parameter passing mechanisms; runtime structure and operating environment; practical and implementation issues in run-time systems and environment **(9)**

Abstracts machines; features of functional and imperative languages; the untyped and simply-typed **(9)**

Lambda calculus, type systems for programming languages including simple types and polymorphism; objects, classes and inheritance in object-oriented languages **(9)**

Total : 45

TEXT BOOKS

1. *Michael Scott, Morgan Kaufmann, Programming Language Pragmatics, 2000.*
2. *Friedman, Wand and Haynes, Essentials of Programming Languages, Prentice-Hall International, 1998*
3. *Tennant, Principles of Programming Languages, Prentice-Hall International, 1981*

14MSSE8 - BIOINFORMATICS

L	T	P	C
3	0	0	3

PRE-REQUISITES

Consent of the Instructor

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *To introduce a new scientific discipline Bioinformatics, the combined power of biology, mathematics and computers.*
- *To impart knowledge in computer science with biology to unite raw data with powerful software tools and mathematical models.*
- *It represents a frontier in biological research and the best path towards finding meaning in a world of complex data.*

COURSE OUTCOME

- *Developing tools for representing and analyzing sequences similarity and variations in medical science*
- *Able to create mechanisms to support effective approaches for producing robust, exportable software that can be widely shared.*
- *Acquire knowledge in bioinformatics with database creation, data analysis and modeling.*

INTRODUCTION

System approach in molecular biology, Central dogma of molecular biology, Important definitions, bioinformatics approach, Applications, European molecular biology network - national center for bio technology information **(7)**

CODING

Common health care language, coding techniques - coded and quasi-coded data - Medical vocabulary - industry wide communication standards HL7 - unified medical language system - quality of care paradigms, risk management bioethics **(8)**

PATIENT RECORD MAINTENANCE

Electronic patient record - models or ERP - environmental services - metrics - telemedicine - community networks - telemedicine peripherals and equipment selection - anatomy of video conferencing technology **(8)**

PROTEIN INFORMATION RESOURCES

Biological data basics - primary secondary data basics - protein pattern data basics - DNA sequences data basics, DNA analysis, Genes structure and DNA sequences - interpretation of EST structures - different approach to EST analysis **(8)**

ALIGNMENT TECHNIQUES

Data base searching, comparison of two sequences - identity and similarity - global and global similarity - global and local alignment, multiple sequence alignment - data basis of multiple alignments - secondary database **(7)**

PROBLEM SOLVING IN BIOINFORMATICS

Gnome analysis for DNA sequences, protein sequences, Strategies and options for similarity search, Practical considerations in sequence analysis, Flow chart for protein structure prediction -Illustrations

(7)

Total : 45

TEXT BOOK

1. *Teresa Attwood, David Parry-Smith, "Introduction to Bioinformatics", Pearson Education, New Delhi, 2001.*

REFERENCE BOOKS

1. *Arthur M. Lesk, "Introduction to Bio-Informatics", Oxford Press, New Delhi, 2004.*
2. *Pierre Baldi, Soren Brunak, "Bioinformatics - The Machine Learning Approach", East-West Press, New Delhi, 2003.*
3. *Rastogi.S.C, Namita Mendiratta, Parag Rastogi, "Bioinforamtics - Concepts, Skills, Applications", CBS Publications & Distributors, New Delhi, 2003.*

14MSSE9 - AGILE PROCESS MODELS

L	T	P	C
3	0	0	3

PRE-REQUISITES

14MSS45, 14MSS52

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *To get exposure on iterative, evolutionary and adaptive software development process models*
- *To understand the principles and practices of agile methodologies*
- *To get an exposure on test driven development using JUnit framework*

COURSE OUTCOME

- *Students can apply the agile methodologies to the project based on its scope, team and complexity.*
- *Students will be equipped with test first programming skill.*

INTRODUCTION TO AGILE DEVELOPMENT

Agile and Self Adapting: The Cooperative Game Principle - Agile Overview-Evolution of Agile Methodologies-Agile outside Software Development. **(9)**

AGILE SOFTWARE DEVELOPMENT ECOSYSTEMS(ASDE)

The Scrum Process - Scrum's Contributions - Dynamic Systems Development Method(DSDM) Principles - The DSDM Process - DSDM's Contributions-Crystal Methodology Design Principles - The Crystal Framework - Crystal Method - Crystal's Contributions. **(9)**

The Feature Driven Development(FDD) Process Model - Beyond the FDD process Description - Conceptual Similarities and Differences - FDD's Contributions - Extreme Programming(XP) Basics - XP values and Principles - XP's Contributions - Adaptive Software Development Life Cycle - Leadership-Collaboration Management - ASD's Contributions. **(9)**

DEVELOPING AN ASDE

Articulating Ecosystem - Designing Agile Methodology - The Agile Metamorphosis. **(8)**

J UNIT FRAMEWORK

Automatic Tests - Goal -Fixtures-Testing Exceptions - Junit's Implementation - Junit API - Test First Programming - Stub - Other Uses for Tests - Extending Junit - Junit and Ant - Running Junit Standalone - Junit and IDEs. **(10)**

TOTAL : 45

TEXT BOOKS

1. Alistair Cockburn, "Agile Software Development: The Cooperative Game", Addison-Wesley, Second Edition, 2007.

2. Jim Highsmith, "Agile Software Development Ecosystems", Addison Wesley, 2002.
3. Kent Beck, "Junit Pocket Guide", O'Reilly Media, First Edition, 2004.

REFERENCE BOOK

1. Craig Larman, "Agile & Iterative Development - A Manager's Guide", Pearson Education, 2004.

14MSSE10 - ACCOUNTING AND FINANCIAL MANAGEMENT

L	T	P	C
3	0	0	3

PRE-REQUISITES

Consent of the Instructor

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *Help students to understand the basics of accounting procedures*
- *Give elaborate knowledge on interpretation of the accounting results using various techniques.*
- *Guide them on how software industry can help to solve the accounting problems*

COURSE OUTCOME

The student will be able to

- *write accounts for any small business or manufacturing concerns.*
- *can work out problems on various cost and financial analytical techniques for decision making.*
- *can create software codes for solving such problems in Excel*

FINANCIAL ACCOUNTING

Introduction - Definition, need, merits, demerits, stakeholders. Principles of financial accounting - concepts, conventions. Types of Accounting - Financial, Cost, Management. Types of Accounts - Principles of Double Entry book keeping. Procedure for accounting - Journal - Ledger - Trial Balance **(10)**

FINAL ACCOUNTS

Final Accounts - method of preparation - Manufacturing/Trading Account - Profit and Loss Account - Balance sheet format - classification of Assets and Liabilities. Final accounts - without and with adjustments - adjustments for provision. Depreciation - theory - methods of calculating depreciation. **(8)**

COSTING AND ANALYSIS OF COSTING

Introduction - definition - costing methods - techniques - Classification of costs - Cost curves - Cost sheet analysis - statement of cost - specimen format. Marginal costing and Cost Volume Profit Analysis - meaning - objectives - marginal cost equation - contribution - break even point - break even chart - P/V Ratio - Margin of Safety - Combined break even point - Cash break even point. **(8)**

BUDGETING AND BUDGETARY CONTROL

Definition - Essentials - difference between budgeting and forecasting. Budgetary Control - objectives - scope - requisites for effective Budgetary Control. Organization for budgetary control - Budget officer - Budget chart - Budget Committee - Budget Manual - Budget Period - advantages - limitations. Basis of classification of budgets. Functional Budgets - material purchase, labour, Overhead, flexible overhead

rate budget, fixed overhead budgets, production and production cost, sales budget, cash budget, budget ratios. **(8)**

FINANCIAL STATEMENTS ANALYSIS AND INTERPRETATION

Financial statements - nature - objective - limitations. Methods and Analysis of Financial Statements - Ratio analysis - Profitability ratios - turnover ratios - Liquidity ratios - leverage ratios - Working capital Management - theory - Capital Budgeting - Methods of Investment Decision - ARR - pay-back period - IRR - NPV. **(11)**

Total : 45

TEXT BOOK

1. *Dr. S.N. Maheshwari, "Principles of Management Accounting Vol I and II", S. Chand & Company Ltd, Seventeenth Revised Edition 2012.*

REFERENCE BOOKS

1. *I M Pandey "Financial Management", 10th Edition Vikas Publishing House Pvt. Ltd.*
2. *Sharma R K, Shashi K Gutpa, "Management Accounting and Financial Management", Kalyani Publishers, 1996.*

14MSSE11 - HUMAN RESOURCE MANAGEMENT

L	T	P	C
3	0	0	3

PRE-REQUISITES

Consent of the Instructor

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *Give foundation knowledge to students about Human Resource Management*
- *Provide them with thorough knowledge on various areas of HRM and the realities in an organization on managing people.*
- *Help the students to face certain challenges on HRM.*

COURSE OUTCOME

The students will be able to

- *Understand the need for managing people in an organization.*
- *Follow the procedures of HRM to achieve best utilization of Human Resource.*
- *Can understand the current issues and trends in the field of Human Resource Management.*

INTRODUCTION

HRM - definition, features, Model, Objectives, Importance, System Approach. History - Origin and growth of personnel functions in India - Factors impeding the growth of HR Management - Role of HR professional - Future HTM in India. **(6)**

PLANNING, RECRUITMENT AND TRAINING

Need for HR planning, Integrated Strategic vs HR planning - Significance - Nature - planning at different levels - Process- Limitations - Guideline for making planning effective - Responsibilities - HRIS - HR forecast. Recruitment - definition, sources, policy. Selection - definition, steps in selection procedure - interview process. Training - meaning and purpose, importance - benefits to - organization, employees - types of training. Executive development - need, importance, objective, methods. **(10)**

PERFORMANCE

Appraisal - definition, objectives, use, purpose, process and essentials of good appraisal system. Methods or Techniques of Performance Appraisal. Post appraisal analysis. Counselling and Monitoring - definition, characteristics, need, causes, functions - Mentoring. Motivation - nature, importance, types. Requirements for a sound motivation system. Morale - wage incentive schemes. **(10)**

INFORMATION SYSTEM AND AUDITING

HR Records - objective, significance, purpose. Essentials of Good HR Record. Fundamental Principles of Record Keeping. Essentials of Good Report. Human Resource Information System - information needs in HRM - objectives - Personnel Inventory. Definition of HR Accounting - objectives - methods of HR

valuation - Human Capital Reporting - controlling costs. **(9)**

RESEARCH AND POLICIES

Personnel Research - Meaning and Characteristics - objectives - techniques and tools.

Developing HR policies - Factors influencing HR Policies - Essential Characteristics of Sound HR Policies - principles and types. Employee welfare - Employee Discipline - grievances handling - Collective Bargaining. Current Issues and Trends in HRM. **(10)**

Total : 45

TEXT BOOK

1. *P.G Aquinas "Human Resource Management - Principles and Practice" Reprint, Vikas Publishing House Pvt. Limited, 2011.*

REFERENCE BOOKS

1. *M N Mishra "Organizational Behaviour", Vikas Publishing House Pvt. Limited, 2010.*
2. *Alan Price, "Principles of Human Resource Management: An Active Learning Approach" Paperback (June 2000) Blackwell (Oxford)*

14MSSE12 - PARALLEL COMPUTING

L	T	P	C
3	0	0	3

PRE-REQUISITES

14MSS32

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *To make the students understand the terminologies of parallel computing, such as efficiency and speedup*
- *To provide them the knowledge on algorithm design and parallel programming*

COURSE OUTCOME

The students will be able to:

- *Justify the need for parallel program and algorithm development*
- *Given a problem, develop an efficient parallel algorithm to solve it.*
- *Construct simple applications using MPI*
- *Calculate performance metrics related to the parallelization of elementary programs*

PARALLEL COMPUTING: Motivation - Scope

PARALLEL PROGRAMMING PLATFORMS

Implicit Parallelism - Limitations of Memory System Performance - Dichotomy - Physical Organization - Communication Costs - Routing Mechanisms for Interconnection Networks - Impact of Process-Processor Mapping and Mapping Techniques **(9)**

PRINCIPLES OF PARALLEL ALGORITHM DESIGN

Decomposition Techniques - Characteristics of Tasks and Interactions - Mapping Techniques for Load Balancing - Methods for Containing Interaction Overheads - Parallel Algorithm Models **(9)**

BASIC COMMUNICATION OPERATIONS

One-to-All Broadcast and All-to-One Reduction - All-to-All Broadcast and Reduction - All-Reduce and Prefix-Sum Operations - Scatter and Gather - All-to-All Personalized Communication - Circular Shift - Improving the Speed of Some Communication Operations **(9)**

ANALYTICAL MODELING OF PARALLEL PROGRAMS

Sources of Overhead - Performance Metrics - Scalability of Parallel Systems - Execution Time and Cost-Optimal Execution Time - Asymptotic Analysis of Parallel Programs - Other Scalability Metrics. **(9)**

PROGRAMMING USING THE MESSAGE-PASSING PARADIGM

Principles of Message-Passing Programming - MPI: the Message Passing Interface - Topologies and Embedding - overlapping communication and computation - Collective communication and computation operations. **(9)**

Total : 45

TEXT BOOK

1. *Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar, "Introduction to Parallel computing", Pearson Education, 2012.*

REFERENCE BOOKS

1. *M.J. Quinn, "Parallel Programming in C with MPI and OpenMP", McGraw-Hill, 1st Edition, 2003.*
2. *Peter S. Pacheco, "An Introduction to Parallel Programming", Morgan Kaufmann, 2011.*

14MSSE13 - IMAGE PROCESSING

L	T	P	C
3	0	0	3

PRE-REQUISITES

Consent of the Instructor

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *To introduce the student to various image processing techniques.*

COURSE OUTCOME

- *Students can apply the image fundamentals and mathematical transforms necessary for image processing.*
- *Students can apply the image enhancement techniques*
- *Students can apply image restoration procedures.*
- *Students can apply the image compression procedures.*
- *Students can apply the image segmentation and representation techniques.*

FUNDAMENTALS OF IMAGE PROCESSING

Introduction - Elements of visual perception, Steps in Image Processing Systems - Image Acquisition - Sampling and Quantization - Pixel Relationships - Colour Fundamentals and Models, File Formats. Introduction to the Mathematical tools. **(9)**

IMAGE ENHANCEMENT AND RESTORATION

Spatial Domain Gray level Transformations Histogram Processing Spatial Filtering - Smoothing and Sharpening. Frequency Domain: Filtering in Frequency Domain - DFT, FFT, DCT, Smoothing and Sharpening filters - Homomorphic Filtering, Noise models, Constrained and Unconstrained restoration models. **(9)**

IMAGE SEGMENTATION AND FEATURE ANALYSIS

Detection of Discontinuities - Edge Operators - Edge Linking and Boundary Detection - Thresholding - Region Based Segmentation - Motion Segmentation, Feature Analysis and Extraction. **(9)**

MULTI RESOLUTION ANALYSIS AND COMPRESSIONS

Multi Resolution Analysis : Image Pyramids - Multi resolution expansion - Wavelet Transforms, Fast Wavelet transforms, Wavelet Packets. Image Compression: Fundamentals - Models - Elements of Information Theory - Error Free Compression - Lossy Compression - Compression Standards - JPEG/ MPEG. **(9)**

APPLICATIONS OF IMAGE PROCESSING

Representation and Description, Image Recognition- Image Understanding - Image Classification - Video Motion Analysis - Image Fusion - Steganography - Colour Image Processing. **(9)**

Total : 45

REFERENCE BOOKS

1. *Rafael C.Gonzalez and Richard E.Woods, "Digital Image Processing", Third Edition, Pearson Education, 2008.*
2. *Milan Sonka, Vaclav Hlavac and Roger Boyle, "Image Processing, Analysis and Machine Vision", Third Edition, Third Edition, Brooks Cole, 2008.*
3. *Anil K.Jain, "Fundamentals of Digital Image Processing", Prentice-Hall India, 2007.*
4. *Madhuri A. Joshi, 'Digital Image Processing: An Algorithmic Approach", Prentice Hall India, 2006.*
5. *Rafael C.Gonzalez , Richard E.Woods and Steven L. Eddins, "Digital Image Processing Using MATLAB", First Edition, Pearson Education, 2004.*

14MSSE14 - GRAPHICS AND MULTIMEDIA TECHNOLOGIES

L	T	P	C
3	0	0	3

PRE-REQUISITES

Consent of the Instructor

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *Guide the students to identify the need for a graphical system.*
- *Help the students to understand the primitive operations of graphic design.*
- *Help the students to be aware of the latest issues on graphics design and handling multimedia features.*

COURSE OUTCOME

- *Write algorithms for any primitive and advanced graphic operations*
- *Differentiate the various multimedia file formats in view of their representation, size and usage*
- *Develop multimedia systems with various emerging technologies of graphics and animation*
- *Design with required optimized approaches.*

INTRODUCTION

Graphics hardware - raster and random scan - display devices - input devices -hard copy devices. Implementation algorithms for graphic primitives - line, poly line, circle, ellipse, curves - attributes - fill styles **(8)**

TRANSFORMATIONS AND VIEWING

Two dimensional geometric transformations - translation - scaling - rotation - reflection - shearing - composite transformations. Two dimensional viewing - window port, viewport - clipping - point - line - Cohen-Sutherland, Liang-Barsky, Nicholl-Lee-Nicholl. Three-Dimensional Geometric Transformations - Translation - Scaling - Rotation - reflection - shearing - affine transforms. **(10)**

COMPUTER ANIMATIONS

Raster methods - double buffering - raster operations - morphing - simulating accelerations - motion specifications - character animations - motion capture - OpenGL animation procedures. **(8)**

INTRODUCTION TO MULTIMEDIA

Multimedia Applications - Multimedia Systems Architecture - evolving technologies - defining objects - Compression and Decompression - Binary image compression - Color , gray scale, Still-video images - JPEG compression - video Image Compression. **(10)**

FILE FORMATS AND MULTIMEDIA I/O

Flich - text format - TIFF - RIFF - MIDI file formats , JPEG DIB, MPEG, AVI file formats. TWAIN - architecture - setting up new WAVE type. Pen Input, Video image display systems, Print output, Image Scanners, Digital Video and Audio, Video images and animation, Full-Motion video. **(9)**

Total : 45

TEXT BOOKS

1. *Donald D. Hearn, M. Pauline Baker, Warren, "Computer Graphics with Open GL" , 4th Edition, 2010, Prentice Hall.*
2. *Prabhat K. Andleigh, Kiran Thakrar " Multimedia Systems Design", Prentice - Hall of India Pvt. Ltd. 2007.*

REFERENCE BOOKS

1. *James D. Foley, Andries Van Dam, Steven K. Feiner, F. Hughes John, "Computer Graphics Principles and Practices in C", Second Edition, Pearsons publications.*
2. *Ralf Steinmetz and Klara Nahrstedt, " Multimedia: Computing, Communications and Applications", 2009, Pearson Eductions.*

14MSSE15 - DATA CENTRIC COMPUTING

L	T	P	C
3	0	0	3

PRE-REQUISITES

14MSSE2, 14MSSE3, 14MSSE12

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *To understand the importance of Data-Intensive Computing and the need for Parallel Computing.*
- *To provide knowledge on Data-Intensive architecture and techniques.*
- *To learn security in Data-Intensive Computing.*

COURSE OUTCOME

- *Students are able to understand about Data-Intensive Computing and Parallel Computing.*
- *Students are able to analyze the Data-Intensive architecture and techniques.*
- *Students are able to understand the requirements for security in Data-Intensive Computing.*

DATA-INTENSIVE COMPUTING - INTRODUCTION

A Challenge for the 21st century - Charaterizing Data-Intensive Applications - Anatomy of Data-Intensive Computing Applications **(8)**

DATA-INTENSIVE COMPUTING ARCHITECTURE

Hardware Architectures - Data Management Architecture - Overview of Cloud Computing - Large-scale Data Management Techniques in Cloud Computing Platform - Data-Intensive applications with MapReduce, High Performance Network Architecture for Data-Intensive Computing **(9)**

DATA-INTENSIVE SOFTWARE SYSTEMS

Architecting Data-Intensive Computing software systems - ECL/HPCC : A unified approach to Big Data - Scalable Storage for Data-Intensive Computing **(9)**

TECHNOLOGIES AND TECHNIQUES

Load Balancing Techniques for Data-Intensive Computing - Parallel Processing, Multiprocessors and Virtualization in Data-Intensive Computing **(9)**

SECURITY IN DATA-INTENSIVE COMPUTING

Security in Data-Intensive Computing systems - Data Security and Privacy in Data-Intensive Computing clusters - Information Security in large scale distributed systems - Privacy and Security requirements of Data-Intensive Computing Clouds **(10)**

Total : 45

TEXT BOOKS

1. *Ian Gorton, Deborah K. Gracio, "Data-Intensive Computing - Architectures, Algorithms and Applications", Cambridge Unviersity Press, 2013.*
2. *Borho Furht, Armando Escalante, "Handbook of Data-Intensive Computing", Springer*

REFERENCE BOOK

1. *Frederic Magoules, Jie Pan, Fei Teng, "Cloud Computind - Data-Intensive Computing and Scheduling", CRC Press, Taylor & Francis Group*

09MSSE16 - OPEN SOURCE SOFTWARE DEVELOPMENT

L	T	P	C
3	0	0	3

PRE-REQUISITES

Consent of the Instructor

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *To provide an overview of the historical and modern context and operation of free and open source software development techniques and associated software projects.*

COURSE OUTCOME

- *Ability to gather information about Free and Open Source Software projects from software releases.*
- *Ability to use a version control system and to interface with version control systems used by development communities.*
- *Ability to contribute software to and interact with Free and Open Source Software development projects.*

INTRODUCTION

Software source code definition-Open source definition-Examples of open source software products. History of open source software:The Berkeley software distribution-tex-the free software foundation-Linux-Apache-Mozilla-Advocasy groups-FSF and OSI-Project coordinators and hosts-OSS companies. **(9)**

OPEN SOURCE SOFTWARE PROCESS

Framework for analyzing open source software: zachman's framework for IS architecture CATNOE and soft systems method- Deriving an analytical framework for OSS. Qualification to define a software system as open source: defining open source software-categorizing open source software-Specific characteristics of open source software. Transformation: OSS developing process-Taboos and harms in OSS development-OSS development life cycle. **(9)**

OSS STAKEHOLDERS AND ENVIRONMENT

Stakeholders: OSS stake holders-OSS developers communities-OSS user communities-OSS commercial organizations-OSS non-commercial organizations. Open source development environment. **(9)**

WORLD VIEW

A framework for classifying OSS motivations-Technological micro level motivations-technological macro level motivations-economic macro level motivations-social political micro level motivations. **(9)**

OPEN SOURCE LICENSING

Contract and copyright law-Basic principles of copyright law-Contracts and copyright-open source software licensing-Issues with copy rights and patents-Examples:The Apache license V1.1 and V2.0,the academic free license and the Mozilla public license 1.1.Non opensource licence:Classic proprietary license-Sun community source license-Microsoft shared source I itiative. **(9)**

Total : 45

TEXT BOOKS

1. *Joseph Feller and Brain Filzgerald, "Understanding open source software development", Pearson education limited(Addison Wesley)1st Edition,2000.*
2. *Andrew M ST Laurent, "Understanding open source and free software licensing",O'Reilly media inc,1st Edition,2004.*

14MSSE17 - SOFTWARE REQUIREMENTS ENGINEERING

L	T	P	C
3	0	0	3

PRE-REQUISITES

Consent of the Instructor

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *To make students understand importance of requirements engineering.*
- *To make the students to learn challenges in requirements engineering.*

COURSE OUTCOME

- *The students will be able to cope with challenges in requirements engineering.*
- *The students will be able to offer solutions to the challenges.*

INTRODUCTION

Importance of Requirements Engineering, Misconceptions, Industrial Challenges, Key Success Factors, Definition, Relationship to Business Processes, Characteristics, Requirements and Project Failure, Quality and Metrics. Requirements Engineering Artifact Modeling: Re Taxonomy, Artifact Model, Templates, Artifact Model Tailoring, System Life Cycle Process. Elicting Requirements : Issues and Problems, Methods, Customer-Specific Business Rules, Managing Customer Relationship, Managing and Planning Elicitation, Cost Estimation, Customer Relationship, Elicitation for Incremental Product Development. **(10)**

REQUIREMENTS MODELING

MDRE, Advantages, Prerequisites, Processes, Elicitation and Analysis Model Heuristics, Determining Model Completeness, Analysis to Design, Model Conversion Heuristics, Design Model Structure, Tooling. **(9)**

QUALITY ATTRIBUTE REQUIREMENTS

Integrated Model, Requirements, Selecting Stakeholders, Methods, Testing Asrs, Case Study. **(8)**

RE FOR PLATFORMS AND REQUIREMENTS MANAGEMENT

Challenges, Practices, Experiences. Requirements Management: Change Management, Routine Activities, Traceability, Measurements and Metrics, Scalability, Requirements Management Process, Measuring Savings, Organizational Issues. **(9)**

REQUIREMENT DRIVEN SYSTEM TESTING AND REQUIREMENTS EVOLUTION

Inputs, Model Based Testing, Performance and Scalability, Best Practices.

REQUIREMENTS EVOLUTION TECHNIQUES : Prototyping, Practices and Experience. Distributed RE. Hazard Analysis and Threat Modeling. **(9)**

Total : 45

TEXT BOOK

1. *Brian Berenbach, Daniel J. Paulish, Juergen Kazmeier, Arnold Rusorfer, "Software and Systems Requirements Engineering in Practice", Tata McGraw Hill Edition, 2009.*

14MSSE18 - DESIGN THINKING

L	T	P	C
3	0	0	3

PRE-REQUISITES

14MSS45

ASSESSMENT : THEORY

COURSE OBJECTIVE

To present an overview of the design thinking involved at each stage of the design process and the methods used by designers to generate and refine creative ideas.

COURSE OUTCOME

- *Students can analyze the different stages of the design process.*
- *Students can apply the methods to generate creative design ideas.*
- *Students can refine, prototype and implement the design ideas.*

OVERVIEW OF DESIGN PROCESS

Stages of thinking: The design process - Define - Research - Ideate - Prototype - Select-Implement-Learn - Example project. Research-Identifying drivers - Information gathering - Target groups - Samples and feedback **(10)**

IDEA GENERATION

Basic design directions- Themes of thinking - Inspiration and REFERENCE BOOKS - Brainstorming - Value - Inclusion - Sketching -Presenting ideas. **(12)**

REFINEMENT

Thinking in images - Thinking in signs - Appropriation - Humour - Personification - Visual metaphors - Modification - Thinking in words - Words and language - Thinking in shapes - Thinking in proportions - Thinking in color. **(12)**

PROTOTYPING AND IMPLEMENTATION

Prototyping: Developing of designs - Types of prototype - Vocabulary. Implementation: Format - Materials -Finishing - Media-Scale - Series. **(11)**

Total : 45

TEXT BOOK

1. *Gavin Ambrose and Paul Haris, " Basic Design 08 Design Thinking", AVA Publishing, 2010.*

14MSSE19 - SOFTWARE RELIABILITY

L	T	P	C
3	0	0	3

PRE-REQUISITES

14MSS64

ASSESSMENT : THEORY

COURSE OBJECTIVE

- *To understand the concepts of software reliability.*
- *Helps in understanding, assessing and applying the software reliability models in software development systems.*

COURSE OUTCOME

- *To appreciate and understand scientific concepts of Software and Hardware Reliability .*
- *To apply Software Reliability Growth Models in Software Development.*
- *To emphasize the Application of Software Reliability Models.*

INTRODUCTION

Need and Concepts of Software Reliability, Failure and Faults - Prevention, Removal, Tolerance, Forecast, Dependability Concept- Failure Behavior, Characteristics, Maintenance Policy, Reliability and Availability Modeling, Reliability Evaluation **(9)**

SOFTWARE RELIABILITY MODELS

Introduction : Historical Perspective and Implementation, classification, limitations and issues, Exponential Failure Models - Jelinski moranda model, Poisson, Musa, Exponential models, Weibull Model, Musa(okumoto Model, Bayseian Model - Littlewood verral Model, Phase Based Model **(9)**

PREDICTION ANALYSIS

Model Disagreement and Inaccuracy - Short & Long Term Prediction, Model Accuracy, Analyzing Predictive Accuracy - Outcomes, PLR, U & Y Plot, Errors and Inaccuracy, Recalibration - Detecting Bias, Techniques, Power of Recalibration, Limitations in Present Techniques, Improvements. **(9)**

THE OPERATIONAL PROFILE

Concepts and Development Procedures - Customer Type, User Type, System Mode, Functional and Operational Profile, Test Selection ,Selecting Operations, Regression Test, Special Issues - Indirect Input Variables, Updating, Distributed system, CASE STUDY (Application of DEFINITY & FASTAR, Power Quality Resource System) **(9)**

TESTING FOR RELIABILITY MEASUREMENT

Software Testing - Types, White and Black Box, Operational Profiles - Difficulties, Estimating Reliability, Time/Structure based software reliability - Assumptions, Testing methods, Limits, Starvation , Coverage, Filtering, Microscopic Model of Software Risk. **(9)**

Total : 45

REFERENCE BOOKS

1. *Patric D. T.O connor, "Practical Reliability Engineering", 4th Edition, John Wesley & sons, 2003.*
2. *John D. Musa, "Software Reliability Engineering", Tata McGraw Hill, 1999.*
3. *Michael Lyu, "Handbook of Software Reliability Engineering", IEEE Computer Society Press, ISBN: 0(07(039400(8, 1996.*

14MSSE20 - GEOGRAPHICAL INFORMATION SYSTEMS

L	T	P	C
3	0	0	3

PRE-REQUISITES

Consent of the Instructor

ASSESSMENT : THEORY

COURSE OBJECTIVE

On completion of the study, the student will able to infer the basic structures, concepts, and theories of GIS.

COURSE OUTCOME

Students will be able to:

- *Understand the fundamental concepts of geographic information systems and their differences from other types of information systems.*
- *Utilize modern industry-standard GIS software for conducting basic GIS analysis and producing cartographic output*
- *Conduct studies typically carried out in GIS including site selection, analysis of spatial/temporal processes, geocoding*

INTRODUCTION

Systems, Sciences and Society - Applications **(9)**

PRINCIPLES

Nature of Geographic Data - Representing Geography - Geo referencing - Uncertainty - The GeoWeb **(9)**

TECHNIQUES

GI System software - Geographic modeling - GIS Data collection - Creating and maintaining Geographic databases- Geo Web **(9)**

ANALYSIS

Cartography and Map Production - Geovisualization - Spatial Data Analysis - Spatial Analysis and Inference - Spatial Modeling with GI System. **(9)**

MANAGEMENT AND POLICY

Managing GI Systems - Information and Decision making - The Risks **(9)**

Total : 45

TEXT BOOK

1. *Longley, P.A., Goodchild, M.F., Maguire, D.J., and Rhind, D.W., , "Geographic Information Systems and Science", New York, John Wiley & Sons,2015.*

REFERENCE BOOK

1. *Gorr & Kurland, "GIS Tutorial: Basic Workbook 1", ESRI Press, 2011.*

ELECTIVES LAB

14MSSEL1- CLOUD COMPUTING LAB

L	T	P	C
0	0	4	2

PRE-REQUISITES

14MSS33, 14MSS54

ASSESSMENT : PRACTICAL

COURSE OBJECTIVE

- *To understand concepts and theoretical aspects of virtualization and cloud computing*
- *To familiarize themselves with the cloud technologies*

COURSE OUTCOME

- *Design and implement applications on the cloud environment*
- *Able to use the state-of-art tools in cloud environment*
- *To be able to set up a private cloud*

I. Virtualization - Virtual Box

1. Create virtual machines of different configurations
2. Communication between host and virtual machine
3. Communication between virtual machine to virtual machine
4. Show the virtual machine migration from one node to the other.

II. Private Cloud

Use Eucalyptus or OpenStack or CloudStack or equivalent to set up the cloud and demonstrate:

1. Find procedure to run the virtual machine of different configuration. Check how many virtual machines can be utilized at particular time.
2. Find procedure to attach virtual block to the virtual machine and check whether it holds the data even after the release of the virtual machine.
3. Install a C compiler in the virtual machine and execute a sample program.
4. Show the virtual machine migration from one node to the other.
5. Find procedure to install storage controller and interact with it.

III. Public Cloud

1. Explore Amazon S3 and EC2
2. Create virtual machines in Amazon, run a sample java application on the EC2 instance
3. Communicate between two EC2 instances
4. Run an application in the GoogleAppEngine

IV. Simulation tool - CloudSim

14MSSEL2 - PARALLEL PROGRAMMING LAB

L	T	P	C
0	0	4	2

PRE-REQUISITES

14MSS13, 14MSS35

ASSESSMENT : PRACTICAL

COURSE OBJECTIVE

- *To introduce the students to the features of MPI*

COURSE OUTCOME

- *The students can construct simple applications using MPI*

Set Up : Building a cluster using Local Area Multicomputer (LAM)

Parallel applications exploiting the following features of MPI need to given

1. Inter-process communication in MPI
2. Communication between MPI Processes: Blocking Operation
3. MPI collective operations using synchronization, data movement, collective computation
4. Communication between MPI Processes: Non-Blocking Operation
5. Collective Communication in MPI: Broadcast and Reduce
6. Collective Communication in MPI: Scatter and Gather

14MSSEL3 - GRAPHICS AND MULTIMEDIA LAB

L	T	P	C
0	0	4	2

PRE-REQUISITES

14MSS16

ASSESSMENT : PRACTICAL

COURSE OBJECTIVE

- *To train on the basic requirements of Graphic design 2D, 3D.*
- *To work with various primitives, algorithms.*
- *Help them to understand the concept of multimedia, animations and to work on technologies relating to them.*

COURSE OUTCOME

- *The Student can implement the primitive graphics 2D and 3D algorithms on any programming languages.*
- *Can work out with object transformation on the output media.*
- *Can create simple 2D animation projects using latest animation tools.*

I Computer Graphics

1. Primitive Algorithms

   Line - Bresenham, DDA, Midpoint.

   Circle - Midpoint, Trigonometric

   Ellipse - Midpoint, Trigonometric
2. Polygon, Polygon Filling.
3. Transformations - 2D Translations, Scaling, Rotation

II Multimedia and Animations:

Flash Programming (OR) Maya

1. Creating Layers, Symbol objects, effects for objects
2. Creating scene by combining objects and layers
3. Creating Animations using various technologies
4. Creating Interactive Animation.
5. Adding audio to animations.
6. Creating small animation projects.

14MSSEL4 - IMAGE PROCESSING LAB

L	T	P	C
0	0	4	2

PRE-REQUISITES

14MSSE13

ASSESSMENT : PRACTICAL

COURSE OBJECTIVE

- *To train the student in various image processing techniques.*

COURSE OUTCOME

- *Student can implement the image fundamentals and mathematical transforms necessary for image processing.*
- *Students can apply various enhancement and Filtering techniques.*
- *Students can execute various image segmentation techniques.*

LIST OF EXPERIMENTS

1. Display of Grayscale Images.
2. Histogram Equalization.
3. Filtering in frequency domain.
4. Display of color images.
5. Conversion between color spaces.
6. Non-linear Filtering.
7. Edge detection using Operators.
8. 2-D DFT and DCT.
9. DWT of images.
10. Segmentation using watershed transform.

COIMBATORE INSTITUTE OF TECHNOLOGY

(Government Aided Autonomous Institution Affiliated to Anna University, Chennai)

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GOLDEN JUBILEE

(1956 - 2006)

M.Sc. SOFTWARE SYSTEMS

Curriculum and Syllabi

FIRST TO TENTH SEMESTER

(For the students admitted during 2014 - 2015 only)

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