KONGU ENGINEERING COLLEGE, PERUNDURAI, ERODE – 638 052
(An Autonomous Institution Affiliated to Anna University of Technology Coimbatore)

B.Sc. DEGREE IN SOFTWARE ENGINEERING (3 YEARS)

CURRICULUM
(For the candidates admitted from academic year 2011 - 2012 onwards)

SEMESTER – I

Course Code	Course Title	Hours / Week			Credit	Maximum Marks		
		L	T	P		CA	ESE	Total
	THEORY							
11BC101	Technical English	3	0	0	3	50	50	100
11BC102	Applied Mathematics I	3	1	0	4	50	50	100
11BC103	Digital Principles	3	1	0	4	50	50	100
11BC104	Office Automation	3	1	0	4	50	50	100
11BC105	Programming in C	3	1	0	4	50	50	100
	PRACTICAL							
11BC106	Digital Laboratory	0	0	3	1	50	50	100
11BC107	Office Automation Laboratory	0	0	3	1	50	50	100
11BC108	C Programming Laboratory	0	0	3	1	50	50	100
				Total	**22**			

CA – Continuous Assessment, ESE – End Semester Examination

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CURRICULUM
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SEMESTER – II

Course Code	Course Title	Hours / Week			Credit	Maximum Marks		
		L	T	P		CA	ESE	Total
	THEORY							
11BC201	Functional English	3	0	0	3	50	50	100
11BC202	Applied Mathematics II	3	1	0	4	50	50	100
11BC203	Object Oriented Programming using C++	3	1	0	4	50	50	100
11BS201	Introduction to Software Engineering	3	1	0	4	50	50	100
11BC205	Data Structures	3	1	0	4	50	50	100
	PRACTICAL							
11BS202	Software Engineering Laboratory	0	0	3	1	50	50	100
11BC206	Object Oriented Programming Laboratory	0	0	3	1	50	50	100
11BC208	Data Structures Laboratory	0	0	3	1	50	50	100
				Total	**22**			

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CURRICULUM
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SEMESTER – III

Course Code	Course Title	Hours / Week			Credit	Maximum Marks		
		L	T	P		CA	ESE	Total
	THEORY							
11BC301	Numerical Methods	3	1	0	4	50	50	100
11BC302	Java Programming	3	1	0	4	50	50	100
11BC303	Computer Architecture	3	1	0	4	50	50	100
11BC304	Database Management Systems	3	1	0	4	50	50	100
11BC305	Object Oriented Analysis and Design	3	0	0	3	50	50	100
	PRACTICAL							
11BC306	Java Programming Laboratory	0	0	3	1	50	50	100
11BC307	Database Management Systems Laboratory	0	0	3	1	50	50	100
11BC308	Communication Skills and Career Development Laboratory	0	0	3	1	50	50	100
				Total	**22**			

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CURRICULUM
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SEMESTER – IV

Course Code	Course Title	Hours / Week			Credit	Maximum Marks		
		L	T	P		CA	ESE	Total
	THEORY							
11BC401	Operations Research	3	1	0	4	50	50	100
11BC402	Microprocessors and Interfacing	3	1	0	4	50	50	100
11BC403	Computer Networks	3	1	0	4	50	50	100
11BC404	Operating Systems	3	1	0	4	50	50	100
	Elective I	3	0	0	3	50	50	100
	PRACTICAL							
11BC405	Microprocessors and Interfacing Laboratory	0	0	3	1	50	50	100
11BS401	CASE Tools and UML Laboratory	0	0	3	1	50	50	100
11BC407	Operating Systems Laboratory	0	0	3	1	50	50	100
				Total	**22**			

CA – Continuous Assessment, ESE – End Semester Examination

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B.Sc. DEGREE IN SOFTWARE ENGINEERING (3 YEARS)

CURRICULUM
(For the candidates admitted from academic year 2011 – 2012 onwards)

SEMESTER – V

Course Code	Course Title	Hours / Week			Credit	Maximum Marks		
		L	T	P		CA	ESE	Total
	THEORY							
11BS501	Software Testing	3	1	0	4	50	50	100
11BS502	Software Architecture	3	0	0	3	50	50	100
11BC501	Web Technology	3	1	0	4	50	50	100
11BC502	Visual Programming	3	1	0	4	50	50	100
	Elective II	3	0	0	3	50	50	100
	PRACTICAL							
11BS503	Software Testing Laboratory	0	0	3	1	50	50	100
11BC505	Web Programming Laboratory	0	0	3	1	50	50	100
11BC506	Visual Programming Laboratory	0	0	3	1	50	50	100
				Total	**21**			

CA – Continuous Assessment, ESE – End Semester Examination

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B.Sc. DEGREE IN SOFTWARE ENGINEERING (3 YEARS)

CURRICULUM
(For the candidates admitted from academic year 2011 – 2012 onwards)

SEMESTER – VI

Course Code	Course Title	Hours / Week			Credit	Maximum Marks		
		L	T	P		CA	ESE	Total
	THEORY							
11BS601	Software Project Management	3	0	0	3	50	50	100
11BS602	Software Quality Assurance	3	1	0	4	50	50	100
	Elective III	3	0	0	3	50	50	100
	Elective IV	3	0	0	3	50	50	100
	PRACTICAL							
11BS603	Project Work	0	0	8	8	100	100	200
				Total	**21**			

CA – Continuous Assessment, ESE – End Semester Examination

Total Credits: 130

LIST OF ELECTIVES FOR B.Sc. SOFTWARE ENGINEERING						
Course Code	**Course Name**	**Pre-Requisite**	**L**	**T**	**P**	**C**
11BC601	Data Warehousing and Data Mining	Database Management Systems	3	0	0	3
11BC012	Cloud Computing	Computer Networks	3	0	0	3
11BC013	Enterprise Resource Planning	Not Required	3	0	0	3
11BC014	Professional Ethics and Human Values	Not Required	3	0	0	3
11BC015	Environmental Science and Engineering	Not Required	3	0	0	3
11BC016	Component Based Technology	Java Programming	3	0	0	3
11BC017	E-Commerce	Not Required	3	0	0	3
11BC018	Network Security	Computer Networks	3	0	0	3
11BI501	Mobile Computing	Computer Networks	3	0	0	3
11BI602	XML and Web Services	Web Technology	3	0	0	3
11BI011	Service Oriented Architecture	Web Technology	3	0	0	3
	COMMON ELECTIVE					
11BS011	Software Estimation	Software Engineering	3	0	0	3
11BS012	Software Reliability	Software Engineering	3	0	0	3
11BS013	Requirement Engineering	Software Engineering	3	0	0	3
11BS014	Personal Software Process and Team Software Process	Software Engineering	3	0	0	3
11BS015	Software Reuse	Software Engineering	3	0	0	3

11BC101 TECHNICAL ENGLISH

(Common to Computer Technology, Information Technology and Software Engineering)

3 0 0 3

Objective:

- To impart the basic knowledge of English for technical communication.
- To understand the use of language components such as grammar for technology.
- To enhance the LSRW skills needed for day – to – day communication.

MODULE – I **15**

Focus On Language: Affixes and roots – prefixes and suffixes – word formation and derivation – subject – verb agreement – tenses – impersonal passive – using numbers and approximations – redundant words – making adjectives, adverbs and prepositions – gerund and infinitives – imperatives.

MODULE - II **15**

Listening and Speaking: Types of listening – implications of effective listening – gap filling activity while listening-listening to a discourse and filling up gaps in a worksheet – comprehension tasks based on listening-note taking –listening for specific details. Making oral presentations – planning a presentation –different kinds of presentation – adapting a speaker's ideas to audience – planning the use of visual and other devices to involve audience - asking and giving advice – group discussion – organizing content – role play.

MODULE – III **15**

Reading and Writing: Comprehending a complex text – understanding relations between part of a text – reading comprehension – dictionary skills – identifying main idea. Transferring information into charts and tables – writing descriptions of buildings and people – essay writing and report writing – vocabulary – defining specific scientific terms.

TOTAL: 45

TEXT BOOKS

1. Aysha Viswamohan, "English for Technical Communication", Tata McGraw Hill Publishing Company limited, New Delhi, 2008.
2. Steven M Gerson and Sharon J Gerson, "Technical Writing – Process and Product" , Third edition, Pearson Education (Singapore) Pvt. Ltd., New Delhi, 2008.

REFERENCE BOOKS

1. Aruna Koneru, "Professional Communication" , Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
2. Krishna Mohan and Meera Banerjee, "Developing Communication Skills", Macmilan India Ltd, Reprinted 2007.
3. Andrea J. Rutherford, "Basic Communication Skills for Technology", Second Edition, Pearson Education, 2007.

11BC102 APPLIED MATHEMATICS I

(Common to Computer Technology, Information Technology and Software Engineering)

3 1 0 4

Objective:

- To bestow the knowledge of basic mathematic skills.
- To improve the problem solving skills applying the Mathematical concepts while doing computer programming in engineering field.

MODULE – I **14**

Matrices: Characteristic Equation of a matrix – Eigen values and Eigen vectors – Properties of eigen values and eigen vectors – Cayley Hamilton theorem (without proof) –calculation of A^{-1} , $A^3$and A^4 for 3x3 matrices – Quadratic forms - Reduction of Quadratic form to Canonical form by Orthogonal reduction.

MODULE - II **16**

Ordinary Differential Equations and Complex Number: Ordinary Differential Equation:Solution of second order ODE with constant coefficients and Variable coefficients(Euler's type only) – Complementary function – Particular integrals of the type: e^{ax}, sinh(ax), cosh(ax), x^n, sin(ax), cos(ax), $e^{ax}\, x^n$, e^{ax} sin(bx), e^{ax} cos(bx).

Complex Numbers:Expansion of sin nθ, cos nθ in terms of sin θ and cos θ - Expansion of sin $^n\theta$, cos $^n\theta$ in terms of sines and cosines of multiples of θ - Hyperbolic functions, inverse hyperbolic functions- simple problems.

MODULE - III **15**

Statistical Measures & Linear Regression and Correlation: Statistical measures: Summarizations of uni and multi dimensional data – frequency distribution - Measures of central tendency: mean, median, mode.

Measures of dispersion: range, quartile deviation, mean deviation, standard deviation - simple problems.

Correlation coefficients: Karl Pearson's coefficient of correlation-Spearman's rank correlation – Regression analysis: Regression lines – regression coefficients – simple problems.

Lecture: 45, Tutorial: 15, TOTAL: 60

TEXT BOOKS

1. Veerarajan.T, "Engineering Mathematics First year", Tata McGraw-Hill, New Delhi, 2008.
2. Gupta. S.P, "Practical Statistics", S.Chand & Company Ltd, New Delhi-reprint 2008.

REFERENCE BOOKS

1. Kandasamy.P.,Thilagavathy.K and Gunavathy.K-"Engineering Mathematics", Volume - I, S.Chand & Co., New Delhi, 2001.
2 Venkatasubramanian N.K, Lakshminarayanan, Sundaram V, Balasubramanian, "Engineering Mathematics", Vikas Publishing House Pvt Ltd, NewDelhi,2000.
3. Kapur. J.N. and Saxena. H.C. "Mathematical Statistics", 12th edition, S.Chand & Company Ltd, NewDelhi, 2001.

11BC103 DIGITAL PRINCIPLES

(Common to Computer Technology, Information Technology and Software Engineering)

3 1 0 4

Objective:

- To provide an in-depth knowledge of the design of digital circuits.
- To understand different methods used for the simplification of Boolean function.
- To design and implement combinational and sequential circuits

MODULE – I **15**

Binary Systems and Boolean Algebra: Digital systems- Binary Numbers- Octal Numbers- Hexa Decimal Numbers- Number Base Conversions- Complements-1's Complement, 2's Complement, addition, subtraction- Signed numbers- Binary codes- Binary storage and registers- Binary Logic.
Boolean Algebra and Logic gates: Basic theorems and properties of Boolean Algebra- Boolean functions- Canonical and Standard Forms- Digital Logic Gates.

MODULE - II **15**

Combinational Logic and Minimization: Minimization: POS, SOP- K-Map Method: 2-variable, 3-variable, 4-variable- Don't care conditions- NAND, NOR Implementation.
Combinational circuits- Analysis Procedure- Binary Adder-Subtractor- Half Adder, Full Adder, Half Subtractor, Full Subtractor , -Decimal Adder- Binary multiplier- Magnitude comparator-Decoders-Encoders- Multiplexers-Demultiplexer.

MODULE – III **15**

Synchronous Sequential Logic, Registers and Counters: Sequential circuits- Latches- SR, D latches - Flip-Flops- D Flip-Flop, JK Flip-Flop,T Flip-Flop, characteristic table, characteristic equation -Analysis of clocked sequential circuits: Analysis of D flip-flops, Analysis of JK Flip-Flops, Analysis of T Flip-Flops.
Registers and counters: Registers, Shift Registers- Ripple counters-Binary Ripple counters, BCD Ripple counters- Synchronous counters- Binary, BCD counter- Ring counters-Johnson counter.

Lecture: 45, Tutorial: 15, TOTAL: 60

TEXT BOOK

1. Mano, M Morris. "Digital Design", Fourth Edition, Reprint "Pearson Education", Delhi, 2008.

REFERENCE BOOKS

1. Floyd Thomas L., "Digital Fundamentals", 10th Edition, UBS, 2008.
2. Yarbrough, John M. "Digital Logic Applications and Design", Thomson Publications, New Delhi, 2007.
3. Givone, Donald D., "Digital Principles and Design", Tata McGraw-Hill, New Delhi, 2003.

11BC104 OFFICE AUTOMATION

(Common to Computer Technology, Information Technology and Software Engineering)

3 1 0 4

Objective:

- To learn basics of computers.
- To become familiar with the essentials for working with latest version of Microsoft Office programs.

MODULE – I **15**

Fundamentals of Computers: Understanding the computer - Input Devices – Output Devices – Computer Software: Introduction, Types of Computer Software, System Management Programs, System Development Programs, Standard Application Programs, Problem Solving – Data Communication and Networks: Introduction, Data Communication using Modem, Computer Networks, Application of Network – The Internet and World Wide Web: Introduction, History of the Internet, Internet Applications.

MODULE - II **15**

Word Processing and Spreadsheet: Viewing and Editing Text in Word- Formatting in word- Working with Special Content in Word: Inserting a Cover Page, Inserting an Equation, Creating a Table of Contents, Printing an Envelope, Printing a Mailing Label, Mail Merge - Working in Excel- Analysing and presenting data in Excel: Creating a Table, Cell References, Formulas & Functions- Calculations, Doing the Arithmetic, Summing the Data, Creating a Series of Calculations, Making Calculations with Functions, Sorting and Filtering data, The Anatomy of a chart: Charting your data, Formatting and Customizing a chart.

MODULE -III **15**

Presentation and Access: Creating a PowerPoint presentation – Presenting a PowerPoint slide show: Adding speaker notes, Running a slide show, Recording a Narration, Timing a presentation, Using Navigation Buttons, Creating pictures of your slides, Changing slide show settings - Working in Access - Exchanging Information among Office Programs: Inserting a PowerPoint slide show into a document, Worksheet or Publication, Adding Excel data to an Access database, Using Access Data in a Mail Merge, Managing and Editing your pictures, Linking to a File or to a Web Page, Managing Pictures, Videos and Sound Files.

Lecture: 45, Tutorial: 15, TOTAL: 60

TEXT BOOKS

1. Balagurusamy. E, **"**Fundamentals of Computers" **,** Tata McGraw-Hill Ltd, New Delhi, 2009 (Module –I)
2. Joyce Jerry and Moon, Marianna., "2007 Microsoft Office System Plain and Simple", PHI Learning, New Delhi, 2009 (Module –II, III).

REFERENCE BOOKS

1. Leon Alexis, and Leon Mathews, "Introduction to Information Systems" Vijay Nicole Imprints Private Limited, First Edition, 2008.
2. Rajaraman, "Fundamentals of Computers", 4th Edition, PHI Learning, 2008.
3. Peter Norton, "Introduction to Computers", 4th Edition, Tata McGraw-Hill, New Delhi, 2006.

11BC105 PROGRAMMING IN C

(Common to Computer Technology, Information Technology and Software Engineering)

3 1 0 4

Objective:

- To introduce the basic programming concepts in C.
- To explore the functionalities in C programming language.
- To inculcate the knowledge and an ability to solve the real world problems.

MODULE – I **15**

Introduction , Decision Making and Looping: Overview of 'C' language- Constants, Variables and Data types - Operators, Expressions and Assignment Statements- Managing Input and Output Operations- Formatted I/O- Decision Making and Branching- if, switch, goto Statements - Looping- while, do..while, for statements.

MODULE - II **15**

Arrays, Functions and Pointers: Arrays - One Dimensional, Two Dimensional and Multi-dimensional arrays - Character Arrays and Strings- User defined Functions – Pointers - Accessing the Address of a Variable – Declaration - Initialization – Accessing a Pointer Variable – Chain of Pointers – Pointer Expressions – Scale Factor - Pointers and Arrays - Array of Pointers.

MODULE - III **15**

Structures, Unions and File Management: Basics of Structures- Declaring a structure- Array of structures- Passing structure elements to functions- Passing entire structure to function- Structures within structures- Union- Union of structures- File management in C- I/O Operations on Files, Error Handling During I/O Operations- Random access file- Preprocessors - Macro Substitution, File Inclusion, Compiler Control Directives.

Lecture: 45, Tutorial: 15, TOTAL: 60

TEXT BOOK

1. Balaguruswamy, E. "Programming IN ANSI C", 4th Edition, Tata McGraw-Hill, New Delhi, 2007.

REFERENCE BOOKS

1. Rajaraman.V, "Computer Programming in C", Prentice Hall of India, New Delhi, 2004.
2. Venugopal K.R, Prasad S.R, "Mastering C", Tata McGraw-Hill, New Delhi, 2006.
3. Kamthane, A.N. "Programming with ANSI and Turbo C", Pearson Education, Delhi 2006.
4. Smarajit Ghosh, "Programming in C", Prentice Hall of India, New Delhi, 2009.
5. Kernighan Brain W. and Ritchie Dennis M., "The C Programming Language", (ANSI C Version), 2nd Edition, Prentice Hall of India, New Delhi, 2009.

11BC106 DIGITAL LABORATORY

(Common to Computer Technology, Information Technology and Software Engineering)

0 0 3 1

LIST OF EXPERIMENTS

1. Binary and BCD counter
2. Verification of NAND, NOR, XOR, AND, OR Gate Logic
3. Parity Generator
4. Multiplexer / Demultiplexers
5. Encoder / Decoder
6. Half Adder / Full Adder
7. Half Subtractor / Full Subtractor
8. Code Converters
9. Up / Down 4 bit Binary Counter
10. Up / Down 4 bit Decimal Counter
11. Shift Register
12. Ring counter

11BC107 OFFICE AUTOMATION LABORATORY

(Common to Computer Technology, Information Technology and Software Engineering)

0 0 3 1

LIST OF EXPERIMENTS

1. Creating Editing and Formatting a word document
2. Creating a Flowchart Using MS- Word
3. Creating a Model Newspaper
4. Creating a Mail Merge
5. Creating Editing and Formatting a Worksheet
6. Creating a chart using MS-Excel
7. Functions and Formulas using MS-Excel
8. Sorting and Filtering
9. PowerPoint Presentation
10. Create Table Using Access
11. Generate Report using Access
12. Executing Queries in Access
13. Import and Export Data

11BC108 C PROGRAMMING LABORATORY

(Common to Computer Technology, Information Technology and Software Engineering)

0 0 3 1

LIST OF EXPERIMENTS

1.Input / output function
2.Operators and Expression
3.Decision Making and Branching
4. Looping statements
5. Arrays
6. Functions
7.Recursive Functions
8.String Handling Functions
9. Pointers
10.String using Pointers (Use Linux)
11. Structures and Unions (Use Linux)
12.Files (Use Linux)

Case study:

Roots of a quadratic equation – Matrix Operations – Evaluation of trigonometric functions –calculate NCR using function– Pay roll problems. String operations like substring, concatenation, finding a string from a given paragraph, finding the number of words in a paragraph, Reverse of a string using pointers, Counting number of words, lines in a file.

11BC201 FUNCTIONAL ENGLISH

(Common to Computer Technology, Information Technology and Software Engineering)

3 0 0 3

Objective:

- To bestow the basic knowledge of the functional skills in English.
- To improve the language needed for different situations and different purposes.
- To enrich the grammar for effective use of language in both spoken and written communication.

MODULE – I **15**

Focus on Grammar: Subject-pronoun agreement – punctuation – abbreviations and technical terms – modifiers – connectives – spelling rules - degrees of comparison – sentence structure: fragments, run-on, parallelism - transformation of sentences – transitional words and phrases.

MODULE - II **15**

Listening: difference between listening and hearing – process of listening – modes of listening – advantages of listening : conversation, negotiation, group discussion and meetings – factors affecting listening: external factors and internal factors – note-taking

Reading: mechanics of reading – skimming – scanning – summarizing - paraphrasing - undesirable reading habits – improving reading skill, types of reading, reading speed and techniques for comprehension.

MODULE – III **15**

Speaking: purposes – planning and procedure - effective presentation : combating stage fright, audience awareness, choosing a topic, developing a presentation and use of visual aids – informal presentation - formal presentation – telephoning and voice mail – participating in interviews.

Writing: introduction to technical writing - memo writing – preparing and sending e-mails and brochure – document design – letter writing : letter of application, letter of inquiry and complaint letter – proposal writing – article writing.

TOTAL: 45

TEXT BOOK

1. Gerson Sharon J. and Gerson Steven M., "Technical Writing: Process and Product", Fifth Edition, Pearson Education (Singapore) Pvt. Ltd., New Delhi, 2007.

REFERENCE BOOKS

1. Sangeeta Sharma and Mishra Binod, "Communication Skills for Engineers and Scientists", PHI Learning Pvt. Ltd., New Delhi, 2009.
2. Aruna Koneru, "Professional Communication", Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
3. Leena Sen, "Communication Skills", Prentice Hall of India Pvt. Ltd., New Delhi, 2007.

11BC202 APPLIED MATHEMATICS II

(Common to Computer Technology, Information Technology and Software Engineering)

3 1 0 4

Objective:

- To grasp the basics of vector calculus comprising of gradient, divergence and curl and line, surface and volume integrals along with the classical theorems involving them.
- To have a sound knowledge of analytical functions and Laplace transforms.

MODULE – I **15**

Vector Calculus: Vector Differential calculus: Scalar and vector point functions- vector operator ∇, gradient, Directional derivative, Divergence and curl of vectors – Irrotational and solenoidal vectors – Vector identities (without proof) Vector Integral calculus: Line Integral – Surface Integrals and Volume Integrals – Verification of Gauss Divergence theorem (without proof) – cubes and rectangular parallelopiped –Verification of Green's theorem (without proof) – circle and ellipse – Verification of Stoke's theorem (without proof) -Square, rectangle – Simple problems

MODULE – II **15**

Analytic Functions and Complex Integration: Analytic functions – properties - Cauchy Riemann equations – Harmonic functions – Construction of Analytic function whose real and imaginary part is given – Cauchy's integral theorem –Cauchy's integral formula — Singularities – Calculation of residues – Cauchy's Residue theorem – simple problems

MODULE - III **15**

Laplace Transforms: Laplace Transforms – transforms of some standard functions – properties- transforms of derivative and integrals - transforms of functions of the type $t^n f(t)$, $f(t)/t$ – initial and final value theorems – inverse Laplace transform of trigonometric and logarithmic functions – problems of type partial fraction method - simple problems

Lecture: 45, Tutorial: 15, TOTAL: 60

TEXT BOOK

1. Veerarajan. T, "Engineering Mathematics- First year", Tata McGraw-Hill, New Delhi, 2008.

REFERENCE BOOKS

1. Grewal. B.S., "Engineering Mathematics", Khanna Publishers, Delhi, 2006.
2. Singaravelu. A. "Engineering Mathematics – II", Meenakshi Agency, Chennai, 2006.
3. Kandasamy P, Thilagavathy K and Gunavathy K., "Engineering Mathematics", Volume. I & II, S.Chand & Co., New Delhi, Revised edition 2005.

11BC203 OBJECT ORIENTED PROGRAMMING USING C++

(Common to Computer Technology, Information Technology and Software Engineering)

3 1 0 4

Objective:

- To impart knowledge on object oriented concepts and programming skills in C++.
- To write applications in an object-oriented language.
- To provide ways of modularizing programs in C++.

MODULE – I **15**

Introduction, Functions, Class and Objects: Object Oriented Programming paradigm – Basic Concepts – Benefits of OOP – Beginning with C++ – Structure of C++ program –Tokens, Expressions and Control Structures. Functions in C++: Main Function – Function prototyping – Call by reference – Return by reference – Inline functions – Function overloading – Classes and objects - Specifying a class – Defining Member functions -Making an outside function inline – Nesting of member functions – Private member functions – Arrays within a class – Memory allocation for objects – Static data members and member functions – Arrays of objects – Friendly functions – Pointers to members.

MODULE – II **15**

Constructors, Operator Overloading, Conversion and Inheritance: Constructors and destructors : Constructors – parameterized constructors – Multiple constructors – Copy constructor – Dynamic constructors – Destructors – Operator overloading and type conversions : Overloading unary operators – Overloading binary operators – Overloading binary operators using friends – Manipulation of strings using operators – Rules for overloading operators – Type conversions- Inheritance : Single inheritance – Making a private member inheritable – Multilevel inheritance – Multiple inheritance – Hierarchical inheritance – Hybrid inheritance.

MODULE - III **15**

Polymorphism and Files: Virtual base classes – Abstract classes – Constructors in derived class – Pointers- Pointers to objects – this pointer – Pointers to derived classes – Virtual functions – Pure virtual functions- Managing console I/O operations - Working with files: Classes for file stream operations – Opening and closing a file – Detecting end-of-file –File modes – File pointers and their manipulations – Sequential input and output operations – Error handling during file operations – Command line arguments-Templates: Class templates–Class templates with multiple parameters function templates-function templates with multiple parameters- overloading of template functions – member function templates-exception handling.

Lecture : 45, Tutorial : 15, TOTAL : 60

TEXT BOOK

1. Balagurusamy, E., “Object Oriented Programming with C++”, Fourth Edition, Tata McGraw Hill Pub. Co., New Delhi, 2008.

REFERENCE BOOKS

1. Lafore, Robert., “Object Oriented Programming in Microsoft C++”, Galgotia Publications, New Delhi, 1999.
2. Kamthane., “Object Oriented Programming with ANSI and Turbo C++”, Pearson Education, Delhi, 2003.
3. Deitel and Deitel, “C++ How to Program”, Sixth Edition, PHI Press, 2009.

11BS201 INTRODUCTION TO SOFTWARE ENGINEERING

3 1 0 4

Objective:

- To enhance the knowledge in the fundamental process of software development activities.
- To understand the concepts of design and testing processes.

MODULE – I **15**

Introduction and Software Requirements: Introduction: The Problem Domain – Software Engineering Challenges - Software Engineering Approach - Software processes: Desired characteristics of software process –Software process models – Other Software Processes - Software Requirements Analysis and Specification: Software Requirements – Problem Analysis - Requirement Specification – Validation.

MODULE – II **15**

Design Fundamentals and Coding: Function Oriented Design : Design Principles- Module level concepts- Design notation and specification- Structured Design Methodology – Verification - Object Oriented Design: Design Concepts – Coupling and Cohesion - Unified Modeling Language - Cyclomatic complexity - Coding: Programming principles and guidelines- Code Verification.

MODULE - III **15**

Testing and Project Management: Testing: Testing fundamentals- Black box testing - White box testing - Testing process – Defect Analysis and Prevention - Planning a Software Project: Process Planning - Effort estimation – Project Scheduling and Staffing – Software Configuration Management Plan – Risk Management.

Lecture : 45, Tutorial : 15, TOTAL : 60

TEXT BOOK

1. Jalote Pankaj, "An Integrated Approach to Software Engineering", Third Edition, Narosa Publishing House, New Delhi, 2008.

REFERENCE BOOKS

1. Pressman, Roger S., "Software Engineering: A Practitioner's Approach", Sixth Edition, McGraw-Hill, New York, 2005.
2. Rajib Mall., "Fundamental of Software Engineering", Second Edition, Prentice Hall of India, New Delhi, 2005.
3. Ghezzi, Et al, "Fundamental of Software Engineering", Second Edition, Prentice Hall of India, New Delhi, 2009.

11BC205 DATA STRUCTURES

(Common to Computer Technology, Information Technology and Software Engineering)

3 1 0 4

Objective:

- To provide insight on the properties and applications of various data structures.
- To compare different implementations of data structures and to recognize the advantages and disadvantages of the different implementations.
- To impart knowledge on various sorting algorithms and compare its efficiency.

MODULE – I **15**

Arrays, Sorting and Searching: Linear Data Structures and their sequential storage representation: concepts and terminology – Storage structure for arrays – Structures and arrays of structures - Sorting and Searching – Sorting – Notation & Concepts – Selection Sort – Bubble Sort – Quick Sort – Heap Sort – Radix Sort – Searching Techniques: Sequential Search and Binary Search.

MODULE - II **15**

Stacks, Queues and Linked Lists: Stacks – Application: Recursion, Conversion of Infix to Postfix - Queues – Operations – Circular Queue – Priority Queue –Application : Simulation - Pointers and Linked Allocation – Linked Linear Lists : Operations , Doubly Linked Lists – Application: Addition of Polynomial.

MODULE – III **15**

Trees and Graphs: Definition and Concept – Binary tree Traversals - Storage Representation of Binary tree: Linked Storage – Threaded Storage - Application of Binary Tree: Manipulation of Arithmetic Expression - Graphs and their representation – Matrix representation of graph – Graph Traversal Techniques: Breadth first search – Depth first search – Spanning trees – Application: Program Evaluation and Review Technique (PERT).

Lecture : 45, Tutorial : 15, TOTAL : 60

TEXT BOOK

1. Tremblay, J.P. and Soresen, P.G., "An Introduction to Data Structures with Applications", Second Edition, Tata McGraw Hill, New Delhi, Reprint 2008.

REFERENCE BOOKS

1. Lipschutz Seymour and Vijayalakshmi Pai G.A., "Data Structures", Tata McGraw-Hill, New Delhi, 2007.
2. ISRD Group, "Data Structures Using C", Tata McGraw Hill, New Delhi, 2007.
3. Balagurusamy, E., "C and Data Structures", Tata McGraw-Hill, New Delhi, 2002.

11BS202 SOFTWARE ENGINEERING LABORATORY

0 0 3 1

LIST OF EXPERIMENTS

Software Engineering Methodologies:

1. Requirement Analysis – DFD, CFD.
2. Design – Cyclomatic Complexity or Function Point Analysis.
3. Implementation – using C.

List of Applications on which the above should be implemented (Any five):

1. Library Management System.
2. Bank Management System.
3. Inventory System.
4. Software for a Game.
5. Text Editor.
6. Natural Language Based Grammar Checker.
7. Airline Reservation system.
8. Online Survey.
9. Financial Accounting System.
10. Graphics Tool Kit.

11BC206 OBJECT ORIENTED PROGRAMMING LABORATORY

(Common to Computer Technology, Information Technology and Software Engineering**)**

0 0 3 1

LIST OF EXPERIMENTS

1. Simple Programs in C++
2. Implementation of Call by Value, Call by Address and Call by Reference
3. Create a Complex Number Class with all possible Operators
4. Implementation of Classes and Objects
5. Constructors and destructors
6. Operator Overloading and Function Overloading
7. Implementation of Inheritance
8. Implementation of Virtual Base Class
9. Implementation of Polymorphism
10. File Handling
11. Function Template

Case study:

Biggest Number, Factorial, Fibonacci, Swapping, Complex Number, Electricity Bill, Adding two numbers, Concatenating two strings, Mark sheet Preparation, Displaying different data types, Area of different shapes, Handling sequential file for I/O operations , Minimum value in an array.

11BC208 DATA STRUCTURES LABORATORY

(Common to Computer Technology, Information Technology and Software Engineering)

0 0 3 1

LIST OF EXPERIMENTS

1. Array Operations
2. Selection sort
3. Quick sort
4. Heap sort
5. Sequential search.
6. Binary search
7. Stack Operations using Arrays
8. Applications of Stack – Infix to postfix
9. Queue Operations using Arrays
10. Circular Queue using Arrays
11. Singly linked list Operations
12. Doubly linked list Operations
13. Circular Linked List Operations
14. Operation on binary trees.

11BC301 NUMERICAL METHODS

(Common to Computer Technology, Information Technology and Software Engineering)

3 1 0 4

Objective: To provide the wide range of numerical methods for solving varies kind of problems which give an opportunity to develop skills in soft computing.

MODULE – I **15**

Numerical Solutions of Nonlinear and Linear Equations: Numerical Solution of Algebraic and Transcendental Equations: Method of Bisection-Method of False Position – Fixed point iterative Method-Newton Raphson Method.

Simultaneous Linear Non Homogeneous Algebraic Equations: Gauss Elimination Method-Gauss Jordan Method- Gauss Jacobi Method-Gauss Seidel Method.

MODULE - II **15**

Interpolation, Numerical Differentiation and Integration: Interpolation with equal intervals: Gregory- Newton Forward Interpolation formula-Gregory- Newton Backward Interpolation formula-Stirling's Formula-Interpolation with unequal Intervals: Lagrange's Interpolation Formula- Newton's Divided Difference Formula.

Numerical Differentiation and Integration: Newton's Forward Difference formula- Newton's Backward Difference formula - Trapezoidal Rule- Simpson's 1/3 Rule -Simpson's 3/8 Rule.

MODULE – III **15**

Numerical Solution of Ordinary and Partial Differential Equations: Taylors Series of first order differential equation- Modified Euler's Method –Fourth Order Runge Kutta Method for First order Differential equations- Classification of partial differential equations of the second order –Solution of Laplace equation- Solution of Heat equation: Schmidt Method -Crank-Nicolson Method.

Lecture : 45, Tutorial : 15, TOTAL : 60

TEXT BOOK

1. Thangaraj. P., "Computer-Oriented Numerical Methods", Prentice Hall of India Private Ltd., New Delhi, 2008.

REFERENCE BOOKS

1. Sastry, S.S., "Introductory Methods of Numerical Analysis", Third Edition, Prentice Hall of India Private Ltd., New Delhi, 1999.
2. Kandasamy, P., Thilagavathy. K and Gunavathy, K., "Numerical Methods", S.Chand and Company, New Delhi, 2003.
3. Balagurusamy, E., "Numerical Methods", Tata McGraw Hill Publications Company, New Delhi, 1999.

11BC302 JAVA PROGRAMMING

(Common to Computer Technology, Information Technology and Software Engineering)

3 1 0 4

Objective:

- To impart knowledge and develop skills required to solve real world problems using Java Language constructs.
- To introduce the fundamentals of the Java language, object oriented features and the structure of Java applets and applications.

MODULE – I **15**

Introduction to Java, Classes, Arrays and Strings: Java Features – comparison of Java with C and C++ - Java and Internet – Java Environment – Java Program structure – Java Tokens – Implementing a Java Program – Java Virtual Machine – Constants – Variables – Data Types – Scope of Variables – Type casting – Operators and expressions – Decision Making and Branching - Decision Making and Looping-Defining a class – Constructors – Method overloading – static Members – Nesting of Methods – Overriding methods – Final Classes – Abstract Class – Visibility control – Arrays- Strings – String Arrays – String Methods – String Buffer Class – Vectors – Wrapper Classes.

MODULE - II **15**

Inheritance, Interfaces, Packages and Multithreading,: Defining a subclass – Subclass constructor – Multilevel inheritance – Hierarchical Inheritance – Defining Interfaces – Extending Interfaces – Implementing Interfaces – Java API Packages – creating a package – Accessing and Using a package – Adding a class to a package – Hiding Classes - Creating the Threads-Extending the Thread class – Thread Life cycle – Thread Exception – Thread priority – Synchronization – Runnable Interface.

MODULE – III **15**

Exception Handling, Files, Applet Programming and Collections:– Exceptions – Throwing own Exceptions – Concepts of streams – stream classes – Byte Stream Classes – Character stream Classes - Difference between Application and Applets – Applet Life cycle – creating an Executable Applet – Designing a Web Page – Adding Applet to HTML File – Passing Parameters to Applets, The Collection Interface : Queue Interface, Dequeue Interface, Generic Collections : The Enumeration, vector, stack, Dictionary, Hash table.

Lecture : 45, Tutorial : 15, TOTAL : 60

TEXT BOOK

1. Balagurusamy. E., “Programming with Java – A Primer”, Third Edition, Tata McGraw Hill, New Delhi, 2008.

REFERENCE BOOKS

1. Schildt, Herbert, “Java:The Complete Reference”, Seventh Edition, Tata McGraw Hill, New Delhi, 2006
2. Dietel and Dietel., “Java How to Program”, Prentice Hall, New Jersey, 1999.
3. Arnold, Ken., Gosling James and Holmes, David., “The Java Programming Language”, Fourth Edition, Pearson Education, New Delhi, 2005.

11BC303 COMPUTER ARCHITECTURE

(Common to Computer Technology, Information Technology and Software Engineering)

3 1 0 4

Objective: To illustrate the principles of computer organization and also hone the problem solving skills.

MODULE – I **15**

Basic Structure and Machine Instructions: Introduction-Functional units-Basic operational concepts-Bus Structures-Performance-Multiprocessors and Multicomputer - Machine Instructions: Numbers, Arithmetic Operations and Characters-Memory Locations and Addresses-Memory Operations-Instructions and Instruction Sequencing-Addressing Modes-Encoding of Machine Instructions.

MODULE - II **15**

Arithmetic Operations, Processing Unit and Pipelining: Addition and Subtraction of Signed Numbers-Design of Fast Adders-Multiplication-Division-Floating Point Numbers and Operations - Fundamental Concepts-Execution of a Complete Instruction-Multiple Bus Organization-Hardwired and Micro programmed Control-Pipelining: Concepts-Data and Instruction Hazards.

MODULE - III **15**

Memory Systems and Input/Output Organization: Basic Concepts-RAM and ROM - Memory Hierarchies - Cache Memories-Performance Considerations-Virtual Memories-Memory Management Requirements-Secondary Storage-Associative Memories - Introduction-Accessing I/O Devices-Interrupts-DMA-Buses- Case Study of one RISC and one CISC Processor.

Lecture: 45, Tutorial: 15, TOTAL: 60

TEXT BOOK

1. Hamacher Carl, Vranesic Zvonko, and Zaky Safwat., “Computer Organization”, Fifth Edition, McGraw Hill, New York, 2002.

REFERENCE BOOKS

1. Stallings, William, “Computer Organization and Architecture: Designing for Performance”, Sixth Edition, Pearson Education, New Delhi, 2003.
2. Patterson, David A and Hennessy, John L., “Computer Organization and Design: The Hardware / Software Interface”, Second Edition, Harcourt Asia, Morgan Kaufmann, Singapore, 2000.
3. Hayes, John P, “Computer Architecture and Organization”, Third Edition, Tata McGraw-Hill, New Delhi, 2008.

11BC304 DATABASE MANAGEMENT SYSTEMS

(Common to Computer Technology, Information Technology and Software Engineering)

3 1 0 4

Objective: To develop background knowledge as well as core expertise in Database Management Systems.

MODULE – I **15**

Introduction: Introduction – Database VS File System – DBMS Architecture - View of Data – Data Models: E-R model– Basic Concepts – Constraints – Keys – Design Issues – ER Diagram – Weak Entity Sets – Extended ER-Database System Architecture- Relational Algebra: Fundamental Operations–Select-Project-Cartesian Product-Rename-Relational Calculus: Domain Relational Calculus-Tuple Relational Calculus.

MODULE - II **15**

Relational Databases and Relational Design: SQL: Data Definition-Basic Structure-Set operations-Aggregate Functions-Null values-Nested Sub queries-Complex Queries - Views-Modification of the Database - Joined Relations -Triggers-Assertions -MYSQL: Working with Data: Inserting, Updating, and Deleting Records-Retrieving Records-Copying, Importing, and Exporting Records-Relational Database Design: Functional dependency- Normal Forms: First Normal form-Second Normal Form-Third Normal Form-Boyce Codd Normal Form-Fourth Normal Form-Fifth Normal Form.

MODULE – III **15**

Transaction Management: Storage and File Structure: RAID-Transactions: Transaction Concept-Transaction State-Implementation of Atomicity and Durability-Concurrent Executions-Serializability-Recoverability-Testing for Serializability – Concurrency Control – Lock Based Protocols – Timestamp Based Protocols – Validation Based Protocols – Recovery system – Log Based Recovery.

Lecture : 45, Tutorial : 15, TOTAL : 60

TEXT BOOKS

1. Silberschatz, Abraham, Korth, Henry F. and Sundarshan, S., "Database System Concepts", Sixth Edition, McGraw Hill, New York, 2011. (Module I, II & III)
2. Vikram Vaswani," My SQL: The complete Reference", Ninth reprint, Tata McGraw-Hill Edition, New Delhi, 2008. (Module II)

REFERENCE BOOKS

1. Date, C.J., "An Introduction to Database Systems", Seventh Edition, Pearson Education, New Delhi, 2002.
2. Elmasri, Remez, and Navathe, Shamkant B., "Fundamentals of Database Systems", Fourth Edition, Pearson Education, New Delhi, 2004.
3. Raghu Ramakrishnan, and Johhannes Gehrke, "Database Management Systems", Third Edition, Tata McGraw Hill, New Delhi, 2008.

11BC305 OBJECT ORIENTED ANALYSIS AND DESIGN

(Common to Computer Technology, Information Technology and Software Engineering)

3 0 0 3

Objective: T**o** provide concept about object orientation and describe the development stages of object-oriented programming to manage the relationships and hierarchies between objects.

MODULE – I **15**

Object Basics and Object Modeling Technique: Introduction – An Object-Oriented Philosophy – Objects – Attributes – Object Behavior and Methods – Objects Respond to Messages – Encapsulation and Information Hiding – Class Hierarchy – Polymorphism – Object Relationships and Associations – Aggregations and Object Containment – Meta Classes – Object-Oriented System Development Life Cycle.- Rumbaugh Object Modeling Technique – The Booch Methodology – The Jacobson Methodologies

MODULE - II **15**

Object-Oriented Methodologies and Analysis: Patterns – Frameworks- The Unified Approach- Business Object Analysis – Use-Case Driven Object-Oriented Analysis – Business Process Modeling – Use-Case Model – Object Analysis – Noun Phrase Approach – Common Class Pattern Approach – Use-Case Driven Approach – Classes, Responsibilities and Collaborators.

MODULE - III **15**

Object Oriented Design and UML: Object-oriented Design Process – Object-Oriented Design Axioms – Corollaries – Design Patterns - Designing classes – Case study - Introduction – Static and Dynamic Models – Introduction to the Unified Modeling Language – UML Diagrams – UML Class Diagram – Use Case Diagram – UML Dynamic Modeling – Case study to inventory, sales and banking.

TOTAL : 45

TEXT BOOK

1. Bahrami, Ali, "Object Oriented Systems Development", Tata McGraw Hill, New Delhi, 2008.

REFERENCE BOOKS

1. Booch, Gredy, "Object Oriented Analysis and Design with Applications", Second Edition, Addision Wesley, New York, 1994.
2. Fowler, Martin, "UML Distilled", Second Edition, PHI/Pearson Education, New York, 2002.
3. Rumbaugh, James, Jacobson, Ivar, and Booch, Grady, "The Unified Modeling Language Reference Manual", Addision Wesley, New York, 1999.

11BC306 JAVA PROGRAMMING LABORATORY

(Common to Computer Technology, Information Technology and Software Engineering)

0 0 3 1

LIST OF EXPERIMENTS

Java Programming

1. Classes and Objects
2. Command Line Arguments
3. Constructors
4. Method Overloading
5. Method Overriding
6. Abstract and Static Methods
7. Inheritance
8. Interfaces and Packages
9. Multithreading
10. Exception Handling
11. Applets

Case Study: Determination of odd and even numbers – Sorting and Searching - Complex number manipulation – Area calculation for Geometrical Shapes – Payroll preparation – Mark list preparation – Producer consumer problem – Voters eligibility – Banner Creation - Simple calculator.

11BC307 DATABASE MANAGEMENT SYSTEMS LABORATORY

(Common to Computer Technology, Information Technology and Software Engineering)

0 0 3 1

LIST OF EXPERIMENTS

1. Simple DDL and DML
2. Constraints and Views
3. Sequences
4. Nested Queries
5. Group by Functions / HAVING Clause
6. PL/SQL Functions
7. PL/SQL Procedures
8. Triggers
9. Cursors
10. PL/SQL Packages / Constants
11. Forms and Menus
12. Reports

Case Study: Banking System, Inventory System, Student Information System, Library Management System.

11BC308 COMMUNICATION SKILLS AND CAREER DEVELOPMENT LABORATORY

(Common to Computer Technology, Information Technology and Software Engineering)

0 0 3 1

LIST OF EXPERIMENTS

1. Listening skills**:**

   Listening to instructional software packages in the communication laboratory, using them, understanding the mechanics of language like grammar, listening to native speakers' presentation, developing oral communication by imitating the model dialogues, taking notes on key aspects like pronunciation accent and meaning in context, developing sentence skills - listening for specific information – listening to improve pronunciation and imitating the native speakers.
2. Reading comprehension and vocabulary**:**

   Reading for getting information and understanding: scanning, skimming and identifying topic sentences – reading for gaining knowledge, looking for transitions, understanding the attitude of the writer, learning to identify chunks of relevant information, arguing for points of view, improving spelling, recognizing new words in context and guessing their meanings etc.,
3. Speaking**:**

   Group discussion(General and Technical Topics): verbal and non-verbal communication; speaking on situational topics – maintaining eye contact, speaking audibly, clearly and with confidence and talking to the point and answering trouble shooting questions.
4. Writing skills:

   Writing job applications**:** resume, applications for jobs, making complaint letters-

   Projects: report writing-editing and proof reading-research paper, and translating numerical data from charts and diagrams into verbal communication.
5. Presentation Skills

   Oral Presentation on a topic for five minutes
6. Interview Skills

Communication Software Package:

1. Young India Software
   a. Tense Buster Intermediate
   b. Tense Buster Advanced
   c. Issues in English
2. Globarena Software
   a. Media for Group Discussion
   b. Media for Speaking

11BC401 OPERATIONS RESEARCH

(Common to Computer Technology, Information Technology and Software Engineering)

3 1 0 4

Objective:

- To enhance the knowledge of queuing theory, inventory and shortest route problems.
- To develop a complete procedure for solving different kinds of programming problems.

MODULE – I **15**

Linear Programming: Mathematical formulation of Linear programming problem – Graphical solution – Simplex method – Artificial variable technique – Big M method – Two phase method - Simple problems.

MODULE - II **15**

Application of Linear Programming and Network Models: Transportation Model – Initial Basic Feasible solution – North west Coher Rule – Least cost method – Vogel's approximation method: Balanced and Unbalanced problems – Assignment model: Balanced problems – Unbalanced problems. Shortest Route Problem using Floyds algorithm - Critical path computation- PERT (without Crashing).

MODULE – III **15**

Inventory Models and Game Theory: Deterministic Inventory Model – Static and Dynamic EOQ Models – with or without shortage – Probabilistic Inventory model – Discrete and continuous type - Simple problems. - Two person zero-Sum Games-Maxmin- Minmax Principle-Saddle Point and Value of the Game-Games without Saddle points, Mixed Strategies-Matrix oddment method for n x n games-Dominance Property-Graphical method for 2 x n or m x 2 games.

Lecture: 45, Tutorial: 15, TOTAL: 60

TEXT BOOK

1. Sundaresan, V., Ganapathy Subramanian, K.S. and Ganesan, K., "Resource Management Techniques", A. R. Publications, Arpakkam, 2007.

REFERENCE BOOKS

1. Sharma, J.K., "Operations Research: Theory and Application", Macmillan, London, 2003.
2. Kantiswarup, Gupta P. K., and Man Mohan., "Operations Research", Sultan Chand & Sons, New Delhi,1999.
3. Taha, H.A., "Operations Research: an Introduction", Prentice Hall of India, New Delhi, 2002.

11BC402 MICROPROCESSORS AND INTERFACING

(Common to Computer Technology and Software Engineering)

3 1 0 4

Objective:

- To introduce microprocessor and its applications.
- To promote knowledge about assembly language programming.
- To give awareness on microcontrollers and higher level processor.

MODULE – I **15**

Architecture and Instruction Set: Introduction – Comparison of Micro Computers, Mini Computers and Large Computers – The 8085 microprocessor – Architecture -Memory Interfacing - The 8085 Programming Model – Instruction Classification – Formats – Instruction Set – Assembly Language Programming.

MODULE - II **15**

Interrupts and DMA: Interfacing Input / Output Devices - Peripheral mapped I/O – Memory Mapped I/O - Interrupts - Hardware Vs Software Interrupts – Interrupt Controller – DMA Transfer – DMA Controller.

MODULE – III **15**

Interfacing Devices and its Applications: Programmable Interface Devices – 8255 DPI, 8279 Keyboard / Display Controller – Serial Input / Output and Data Communication – 8251 USART – 8253 Timer - Applications: ADC/DAC Interface – Traffic Light Controller – Bidirectional Transfer between two microcomputers.

Lecture: 45, Tutorial: 15, TOTAL: 60

TEXT BOOK

1. Gaonkar, Ramesh S., “Microprocessor Architecture, Programming and Applications with the 8085”, Fifth Edition, Penram International Publishing (India) Pvt. Ltd., Mumbai, 2007.

REFERENCE BOOKS

1. Hall, Douglas V., “Microprocessors and Interfacing”, Tata McGraw-Hill, New Delhi, 2005.
2. Mathur Adithya P, “Introduction to Microprocessor”, Third Edition, Tata McGraw Hill, New Delhi, 2004.
3. Gilmore, “Microprocessor: Principles and Applications”, Second Edition, Tata McGraw-Hill, New Delhi, 1997.

11BC403 COMPUTER NETWORKS

(Common to Computer Technology, Information Technology and Software Engineering)

3 1 0 4

Objective:

- To impart the knowledge on various concepts of computer networks.
- To provide insight on the various layers and their functionality of network models

MODULE - I **15**

Introduction to Data Communication and Switching: Components-Data Flow- Networks-type of connection-Topology – Categories of networks-Internet-Protocol and Standards-Network models: Layered Tasks-OSI model-Layers in the OSI Model-TCP/IP Protocol Suite-Addressing-Transmission media: Guided Media - Unguided Media. Switching: Circuit Switched Networks –Datagram Networks – Virtual Circuit Networks – Structure of switch-Space of circuit switch-Crossbar switch – Multistage switch.

MODULE - II **15**

Direct Link Networks and Internetworking: Ethernet (802.3) –Physical properties-Access Protocol –Experience - Token Ring (802.5)-Token ring Media Access Control-Maintenance- FDDI – Wireless LAN: WiMax - Cellular Technologies - Internetworking – Simple Internetworking (IP) –Service model-Global addresses-ARP-ICMP-Virtual Networks and Tunnels-Routing-Distance Vector(RIP)-Link State (OSPF).

MODULE - III **15**

Global Internet and Application Layer: Subnetting-Classless Routing (CIDR) – Inter-domain Routing (BGP) - IPV6– Multicast: Multicast addresses-Multicast routing-DVMRP- Domain Name System: Namespace-Domain Name Space-Distribution of Name Space- DNS in the Internet-Resolution-Remote Logging-TELNET- Electronic Mail-Architecture-User Agent – Message Transfer agent- Message Access Agent – Web based Mail.

` Lecture: 45, Tutorial: 15, TOTAL: 60

TEXT BOOKS

1. Forouzan, Behrouz A., "Data communication and Networking", Fourth Edition, Tata McGraw-Hill, New Delhi, 2008.(Module-I and III)
2. Davie, Bruce S. and Peterson, Larry L., "Computer Networks", Fourth Edition, Harcourt Asia, Morgan Kaufmann, Singapore, 2003. (Module –II and III)

REFERENCE BOOKS

1. Tanenbaum, Andrew S, "Computer Networks", Fourth Edition, Prentice Hall of India, New Delhi, 2002.
2. Kurose, James F. and Ross, Keith W., "Computer Networking: A Top-Down Approach Featuring the Internet", Pearson Education, New Delhi, 2003.
3. Stallings, William, "Data and Computer Communication", Eighth Edition, Pearson Education, New Delhi, 2007.

11BC404 OPERATING SYSTEMS

(Common to Computer Technology, Information Technology and Software Engineering)

3 1 0 4

Objective :

To demystify the internals of the operating system by using the step by step approach of going from the very basics to much advanced concepts.

MODULE – I **15**

Overview of Operating System and Process Management: Main frame Systems - Desktop Systems – Multiprocessor Systems – Distributed Systems – Clustered Systems – Real Time systems – Hand held Systems, Operating Systems Structures: System Components – Operating System Services - System calls – Proces Concepts –Process Sheduling – operation on process – co-operating process – Inter process communication – Threads: Multithreading models.

MODULE - II **15**

CPU Scheduling, Process Synchronization and Deadlock: CPU scheduling: Basic Concepts – Scheduling algorithms - Process synchronization: The Critical Section Problem – Synchronization Hardware - Semaphores – Classical problem of Synchronization–Deadlock: Deadlock Characterization - Methods for handling Deadlocks - Deadlock Prevention – Deadlock Avoidance - Deadlock Detection – Recovery from Deadlock.

MODULE - III **15**

Memory Management and File Systems: Background – Swapping - Contiguous Memory Allocation - Paging - Segmentation – Segmentation with paging - Virtual Memory: Demand paging - Page Replacement – Thrashing - File Concepts - Access methods - Directory Structure - File Protection - File System Implementation: File System Structure and Implementation – Directory Implementation – Allocation methods - Free Space Management – Mass-Storage Structure: Disk Structure – Disk Scheduling.

Lecture: 45, Tutorial: 15, TOTAL: 60

TEXT BOOK

1. Silberschatz, Abraham., Galvin, Peter Baer and Gagne, Greg, "Operating System Concepts", Sixth Edition, John Wiley & Sons, Singapore, 2007.

REFERENCE BOOKS

1. Tanenbaum, A S and Woodhull, A S., "Operating Systems, Design and Implementation", Second Edition, Pearson Education, New Delhi, 2002.
2. Deitel, H.M., "Operating Systems", Second Edition, Pearson Education, New Delhi, 2002.
3. Stallings, William, "Operating Systems: Internals and Design Principles", Sixth Edition, Prentice Hall of India, 2008.

11BC405 MICROPROCESSORS AND INTERFACING LABORATORY

(Common to Computer Technology and Software Engineering)

0 0 3 1

LIST OF EXPERIMENTS

8085 MPU :

1. Addition and Subtraction
    a. 8 bit addition.
    b. 16 bit addition.
    c. 8 bit subtraction.
    d. BCD subtraction.
2. Multiplication and Division
    a. 8 bit multiplication.
    b. 8 bit division.
3. Sorting and Searching
    a. Searching for an element in a array.
    b. Sorting in ascending order.
    c. Finding largest and smallest elements from an array.
    d. Reversing array elements.
    e. Block move.
    f. Sorting in descending order.
4. Code Conversion
    a. Binary to ASCII and ASCII to binary.
5. Applications
    a. Square of a single byte hex number.
    b. Traffic signal controller.

Interfacing Experiments (Any Three)

1. Write a C program to read a SMS stored in the inbox and delete it.
2. Write a C program to answer an incoming call and disconnect the call.
3. Write a C program to display the IMEI number of the GSM modem.
4. Write a C program to find a number stored in phone book.
5. Write a C program to find the model, manufacturer and serial number of the GSM modem.
6. Write a C program to change the message storage memory and save the settings.
7. Write a C program to show the signal quality of the network used in GSM modem.
8. Write a C program to read and display the mobile operator name.
9. Write a C program to dial a voice call to a particular number.
10. Write a C program to find the service centre address.

11BS401 CASE TOOLS AND UML LABORATORY

0 0 3 1

Prepare the following for ANY THREE of the experiments listed below

1. Familiarization of features of any one of the standard UML case tool.
2. Capturing key functional requirements for Use cases and class diagram.
3. Use work products-Interaction diagrams, state chart diagrams, Component diagrams, and deployment diagrams.
4. Implementations using any one of object oriented languages.
5. Testing- Unit test case, integration test case.

LIST OF EXPERIMENTS

1. Student Information System
2. Railway Reservation System
3. Banking System
4. Sales and Marketing system
5. Inventory System

11BC407 OPERATING SYSTEMS LABORATORY

(Common to Computer Technology, Information Technology and Software Engineering)

0 0 3 1

LIST OF EXPERIMENTS

1. Basic UNIX Commands.
2. Shell programming :
   Command Syntax, Writing Simple Functions, Basic Tests, Loops, Patterns, Expansions, Substitutions
3. Write programs using the following system calls of UNIX operating system: fork, exec, getpid, exit, wait, close, stat, opendir, readdir
4. Write programs using the I/O system calls of UNIX operating system (open, read, write, etc)
5. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for FCFS. Compute and print the average waiting time and average turnaround time.
6. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for SJF. Compute and print the average waiting time and average turnaround time.
7. Implement the page Replacement Algorithms using FIFO
8. Implement the page Replacement Algorithms using LRU
9. Implement Interprocess Communication using Semaphores
10. Implement Interprocess Communication using Pipes and Message Queues
11. File systems
12. Implement producer-consumer problem.

11BS501 SOFTWARE TESTING

3 1 0 4

Objective:

- To provide a solid foundation in testing techniques and easy debugging.
- To develop the software as design testable software.

MODULE - 1 **15**

Software Development Life Cycle Models: Phases of Software project – Quality, Quality Assurance, Quality control – Testing, Verification and Validation – Process Model to represent Different Phases – Life Cycle models – White-Box Testing: Static Testing – Structural Testing – Challenges in White-Box Testing – Black Box testing : What is Black-Box Testing – Why Black-Box Testing – When to do Black-Box Testing – How to do Black-Box Testing.

MODULE - II **15**

Testing Process: Integration Testing: Integration Testing as Type of Testing – Integration Testing as a Phase of Testing – Scenario Testing – Defect Bash - System Testing Overview – Why System testing is done – Functional versus Non- functional Testing – Functional system testing – Non-functional Testing – Acceptance Testing – Summary of Testing Phases – Factors governing Performance Testing – Methodology of Performance Testing – Tools for Performance Testing – Process for Performance Testing – Challenges.

MODULE - III **15**

Management, Execution and Reporting: Regression Testing: What is Regression Testing – Types of Regression Testing – When to do Regression Testing – How to do Regression Testing – Best Practices in Regression Testing – Test Planning – Test Management – Test Process – Test Reporting – Best Practices – Test Metrics and Measurements**:** Project Metrics – Progress Metrics – Productivity Metrics – Release Metrics.

Lecture : 45, Tutorial : 15, TOTAL : 60

TEXT BOOK

1. Srinivasan Desikan and Gopalswamy, Ramesh., "Software Testing: Principles and Practices", Pearson Education, 2008.

REFERENCE BOOKS

1. Renu Rajani and Pradeep Oak, "Software Testing Effective Methods, Tools and Techniques", Tata McGraw Hill, 2006.
2. Perry, William E., "Effective Methods of Software Testing", Third Edition, Wiley India, New Delhi, 2005.
3. Pressman, Roger S., "Software Engineering: A Practitioner's Approach", Seventh Edition McGraw- Hill, New York, 2010.

11BS502 SOFTWARE ARCHITECTURE

3 0 0 3

Objective :

- To understand and evaluate designs of existing software systems from an architectural perspective.
- To provide the intellectual building blocks for designing new systems in principled ways, using well – understood architectural paradigms.

MODULE - I **15**

Introduction and Architectural Styles: Introduction – Software Architecture – Engineering Discipline for Software – Status of Software Architecture – Architectural Styles – Case Studies: Instrumentation Software – Mobile Robotics – Shared Information Systems – Database Integration – Integration in Software Development Environments – Integration in the Design of Buildings – Architectural Structures for Shared Information Systems.

MODULE - II **15**

Architectural Design Guidance: Guidance for User-Interface Architectures : Design spaces and rules – Design space for User Interface Architecture – Design rules for User Interface Architecture – Applying the design space – Validation – Preparation – The Quantified Design Phase: Overview – Background – QDP – Formal Models and Specifications: The Value of Architectural Formalism – Formalizing the Architecture of a Specific System – Formalizing an Architectural Style – Formalizing and Architectural Design Space.

MODULE - III **15**

Linguistic Issues and Tools for Architectural Design: Linguistic Issues: Requirement for Architecture – Description Languages – First Class Connectors – Adding Implicit Invocation to Traditional Programming Languages – Tools For Architectural Design: UniCon: Universal Connector Language – Exploiting Style in Architectural Design Environments: Architectural style – Automated support for Architectural design – Beyond Definition / Use Architectural Interconnection : Implementations Vs Interaction – Examples – Wright model of Architectural Descriptions.

TOTAL : 45

TEXT BOOK

1. Mary Shaw and David Garlan, “Software Architectural Perspectives on an Emerging Discipline", Prentice Hall, 2007.

REFERENCE BOOKS

1. Eric Braude, “Software Design: From Programming to Architecture”, Addison Wesley, 2004.
2. Len Bass, Paul Clements and Rick Kazman, “Software Architecture in Practice”, Second Edition, Addison Wesley, 2003.
3. Albin, Stephen T., “The Art of Software Architecture: Design Methods and Techniques”, John Wiley & Sons, New York, 2003.

11BC501 WEB TECHNOLOGY

(Common to Computer Technology, Information Technology and Software Engineering)

3 1 0 4

Objective :

- To include knowledge about web technological concepts and functioning Internet.
- To explore the programming in web using HTML, XML and Java Script.
- To introduce the server side programming technologies such as CGI,Servlets and ASP.NET.

MODULE – I **15**

WWW, HTTP, TELNET, **JAVASCRIPT:** Introduction-Brief History of WWW - The Basics of WWW and Browsing – HTML - Formatting tags - Creating links – Frames – Tables – Lists – Forms – Images – Style sheets - Web Browser Architecture - Common Gateway Interface - Remote Login - Javascript.

MODULE - II **15**

ASP.NET &JAVA WEB TECHNOLOGIES: Introduction - Popular web Technologies - What is ASP.NET - An overview of the .NET Framework - ASP.NET Details - Server controls and Web Controls - Validation Controls - Java Servlets - Java Server Pages - Apache struts - Java Server Faces - Enterprise Java Beans - Java applets - Life cycle of Java applets.

MODULE - III **15**

XML, WEBSERVICES AND MIDDLEWARE: XML - XML versus HTML - Electronic Data Exchange - XML Terminology - Introduction to DTD - Document Type Declaration - Element Type Declaration - Attribute Declaration - Limitations of DTDs - Introduction to schema - Extensible Stylesheet Language Transformation - Middleware concepts – CORBA - Java RMI - Microsoft Distributed Component Object Model - Web Services.

Lecture: 45, Tutorial: 15, TOTAL: 60

TEXT BOOK

1. Achyut S Godbole and Atul Kahate, "Web Technologies: TCP/IP, Architecture, And Java Programming", Second Edition, Tata McGraw-Hill, New Delhi, 2008.

REFERENCE BOOKS

1. Xavier C., "World Wide Web Design with HTML", Tata McGraw-Hill, New Delhi, 2008.
2. Powers. Shelly, et al., "Dynamic Web Publishing", Second Edition, TechMedia, New Delhi, 2006.
3. Deitel P.J. and Deitel H.M., "Internet and World Wide Web: How to Program", Fourth Edition, Prentice Hall of India, New Delhi, 2008.

11BC502 VISUAL PROGRAMMING

(Common to Computer Technology, Information Technology and Software Engineering)

3 1 0 4

Objective:

- To introduce the basic programming concepts in VB.NET.
- To explore the functionalities in Microsoft.Net windows application.
- To inculcate the knowledge and an ability to develop different applications with database connectivity.

MODULE – I **15**

Visual Basic .Net Programming: .Net Framework Architecture- Welcome to IDE: What is IDE - Selecting a form and the controls-Setting the properties of form and controls-Solution Explorer-Writing an Event Procedure-Hungarian notation- Standard toolbar-Setting Properties using the properties windows –Setting properties using Event Procedures -Visual basic .Net Programming Language: Variables and data types- Arithmetic Operators, Logical Operators, Conditional Operators - Programming Statements: If.. Then and If…Then… End If- Iteration Statements- Do-While Loop, Do Loop While, Do Until loop, Do Loop Until, For Next statement - Select Case – Arrays.

MODULE - II **15**

Functions and Object Oriented Programming: Visual basic .Net Programming Language : Import Statement- Functions-MsgBox function- InputBox() function - Structured Programming: What is Structured Programming- Event, Subroutines and function- Using Built-in functions: String Functions, Time and Date functions, Mathematical functions- Object Oriented Programming: What is Object Oriented Programming - Implementing OOP- Inheritance Overriding-Early Binding and Late Binding- Collections.

MODULE – III **15**

Files and Database: Working with files: Files - Classification of files – Handling Files and Folders using functions and classes- File Processing using Functions and Streams– Menus and Dialog Boxes - Advanced Techniques in Visual Basic .NET: Debugging a Program-Structured Exception Handling – Database connectivity: ADO .NET Architecture- Connection, Command, Dataset, Data Adapter.

Lecture: 45, Tutorial: 15, TOTAL: 60

TEXT BOOK

1. Chavan, Shirish., "Visual Basic .NET", Pearson Education, Third Reprint, New Delhi, 2009.

REFERENCE BOOKS

1. Holzner, Steven., Howell, Bob and Howell, Robert, "Ado.net Programming In Visual Basic .net" Second Edition, Prentice Hall, New Jersey, 2003.
2. Schnedier, David I., " An Introduction to Programming using Visual Basic .NET", Fifth edition , PHI learning , 2005
3. Willis, Thearon and Newsome, Bryan., "Beginning Visual Basic 2005**",** Wiley India Private Limited, New Delhi, 2006.

11BS503 SOFTWARE TESTING LABORATORY

0 0 3 1

LIST OF EXPERIMENTS

1. Perform Functional Testing to test user interface.
2. Perform Integration Testing in which modules are combined and tested as a group.
3. Perform Performance Testing to understand your application or WWW site's scalability.
4. Perform User Acceptance testing on any application system.
5. Perform Stress testing to evaluate limits of the components and its specified requirements to determine the load under which it fails and how.
6. Perform validation of the function by applying Manual Script testing.
7. Perform Structural Testing to analysis of internal workings and structure of a piece of software. Includes techniques such as Branch Testing and Path Testing
8. Perform System Testing on a complete, integrated system to evaluate the system's compliance with its specified requirements.
9. Perform Accessibility Testing to test database management.
10. Perform Usability Testing on any application system.
11. Perform Regression Testing to ensure reported product defects have been corrected and that no new quality problems were introduced during the correction process
12. Perform Unit Testing for the behavior of components of a product to ensure their Correct behavior prior to system integration

11BC505 WEB PROGRAMMING LABORATORY

(Common to Computer Technology, Information Technology and Software Engineering)

0 0 3 1

LIST OF EXPERIMENTS

1. Develop a HTML document which displays your name as ***<h1>*** heading and displays any four of your friends. Each of your friend's names must appear as hot text. When you click your friend's name, it must open another HTML document, which tells about your friend.
2. Write names of several countries in a paragraph and store it as an HTML document, world. HTML. Each country name must be a hot text. When you click India Image (for example), it must open the file and it should provide a brief introduction about India.
3. Design a HTML document describing you. Assign a suitable background design and background color and a text color.
4. Write a HTML document using ordered and unordered list.
5. Write a HTML document to print your class Time Table
6. Develop a Complete Web Page using Frames and Framesets which gives the Information about a Hospital using HTML.
7. Develop a web page using image mapping and roll over effects.
8. Write a program using style sheet to create borders and to modify the font and text appearance.
9. Write a script to count the number of characters entered by user in a textbox and limit it to a particular number.
10. Create a form and validate it using java script.
11. Create a Dynamic Webpage using LAMP tool.
12. Write a servlet that calculates the factorial of a given number that has been submitted through a form.
13. Write a Cookie Program using ASP that counts the number of access to a web page.
14. Create a XML document for displaying the book details.
15. Create a XML document for displaying the bank details.

11BC506 VISUAL PROGRAMMING LABORATORY

(Common to Computer Technology and Software Engineering)

0 0 3 1

LIST OF EXPERIMENTS

1. Working with controls such as label, text box, combo box. etc
2. Electricity Bill Preparation using Constructor and Destructor
3. Fibonacci, Factorial, Prime number Calculation - Branching & Looping
4. String Functions
5. Area Calculation using Polymorphism
6. Student Mark sheet Preparation using Inheritance
7. Payroll Processing using Interfaces
8. Voters List using Exception handling
9. Stack, Queue and List operation using System Collections
10. Finding file path, file extension using Dialog boxes and Menus
11. File processing using Functions
12. Bank Management System using ADO .Net

11BS601 SOFTWARE PROJECT MANAGEMENT

(Common to Computer Technology, Information Technology and Software Engineering)

3 0 0 3

Objective:

- To construct the knowledge and skills in project managerial aspects.
- To create awareness on issues and problems in software development.
- To describe the basic steps that need to be carried out by a project management
- To focus on project monitoring and control issues

MODULE – I **15**

Introduction and Project Evaluation: Introduction to Software Project Management – Project Evaluation and Programme Management - An Overview of Project Planning – Selection of an Appropriate Project Approach.

MODULE – II **15**

Planning and Scheduling: Activity planning: Objectives of Activity planning – Project Schedules - Projects and Activities – Sequencing and Scheduling Activities - Network Planning Models – Formulating a Network Model – Time Dimensions – Forward and Backward pass – Identifying Critical Path – Activity Float - Identifying Critical Activities – Activity on Arrow Network - Risk Management: Introduction – Risk and Categories of Risk – A Framework for Dealing with Risk - Risk identification, Assessment, Planning and Management – Evaluating Risks – PERT Technique – Resource allocation.

MODULE – III **15**

Monitoring and Managing: Monitoring and Control – Managing Contracts – Managing People in Software Environments – Working in Teams- Introduction – Becoming a Team - Decision Making – Organization and Team Structures - Coordination Dependencies – Dispersed and Virtual Teams – Communication Genres – Communication Plans – Leadership

TOTAL: 45

TEXT BOOK

1. Hughes Bob., Cotterell Mike. and Mall Rajib., "Software Project Management", Fifth Edition, Tata McGraw- Hill, New Delhi, 2011.

REFERENCE BOOKS

1. Pressman, Roger S., "Software Engineering- A practitioner's Approach", Seventh Edition, McGraw-Hill, New York, 2010.
2. Gray Clifford F. and Larson Erik W., "Project Management, the Managerial Process", Third Edition, McGraw- Hill, New Delhi, 2008.
3. Jalote, Pankaj, "Software Project Management in Practice", Pearson Education, New Delhi, 2005

11BS602 SOFTWARE QUALITY ASSURANCE

3 1 0 4

Objective:

To provide knowledge and skills in underlying quality assurance concepts, types of quality audits and assessments to produce true customer satisfaction products.

MODULE – I **15**

Introduction: Meaning – Quality challenge – Quality control Vs Quality Assurance – QA at each phase of SDLC – QA in software support projects – SQA functions – Managing Software quality in an organization : Quality management system in an organization – Various expectations – Need for the SQA – Software Quality Assurance Plans – Organization level initiatives – Quality Planning: Some interested dilemmas and Observations – Product quality and Process quality – Software systems evolution – Product quality – Models for Software Product Quality – Process quality.

MODULE – II **15**

Software Measurement and Metrics: Introduction – Measurement during Software life cycle context – Defect metrics – Metrics for Software maintenance – Classification – Requirements – Measurements Principles – Identifying measures and metrics – Implementation – Benefits – Earned value analysis – Planning – Issues – Object oriented Metrics: an overview – Walkthrough and Inspection – Introduction – Structured walkthroughs – Inspections – Various roles and responsibilities – Some psychological aspects of Reviews – Making reviews and Inspective effective – Comparison of review techniques.

MODULE – III **15**

Software Configuration Management and ISO: Software configuration management – Why and what – SCM Activities – Standards for configuration audit functions – Personnel in SCM activities – ISO 9001– Overview – Origins of ISO 9000 – Standards Development process – ISO 9000 family – ISO 9001:2000 – ISO certification – Assessment / Audit preparation – Assessment process – ISO consulting services and Consultants – Software CMM : Overview – Capability Maturity model for software – CMM and ISO – Types of CMM – CMM Integrated Model – Other models – People CMM.

Lecture:45, Tutorial:15, TOTAL: 60

TEXT BOOK

1. Godbole, Nina S, "Software Quality Assurance: Principles and Practice", Narosa Publishing House, New Delhi, 2007.

REFERENCE BOOKS

1. Ince, Darrel., "ISO 9001 and Software Quality Assurance", Second Edition, Tata McGraw Hill, New Delhi, 2003,
2. Pressman, Roger S., "Software Engineering: A Practitioner's Approach", Seventh Edition McGraw- Hill, New York, 2010.
3. Kishore, Naik., "ISO 9001:2000 for Software Organizations", Tata McGraw Hill, New Delhi, 2003

11BC601 DATA WAREHOUSING AND DATA MINING

(Common to Computer Technology, Information Technology and Software Engineering)

3 0 0 3

Objective:

- To introduce the basic concepts and techniques of Data Mining.
- To gain experience of doing independent study and research.
- To build the skills on data warehousing with planning, designing and testing techniques.

MODULE – I **15**

Introduction to Data Mining and Data Preprocessing: Introduction: Data Mining Definition - Kind of Data-Data Mining Functionalities-Patterns-Classification of Data Mining Systems- Data Mining Task Primitives-Integration of a Data Mining System –Major Issues in Data Mining- Data Preprocessing : Data Cleaning- Data Integration and Transformation- Data Reduction.

MODULE - II **18**

Association, Classification and Clustering: Basic Concepts and a Road Map- Efficient and Scalable Frequent Itemset Mining Methods- Classification and Prediction: Issues Regarding Classification and Prediction-Classification by Decision Tree Induction - Decision Tree Induction – Attribute Selection Measure – Tree Pruning - Bayesian Classification-Baye's Theorem –Naive Bayesian Classification - Clusters Analysis: Types of Data in Cluster Analysis- Categorization of Major Clustering Methods: Partitioning Methods – K-Means - Hierarchical Methods-ROCK

MODULE - III **12**

Data Warehousing: Data Warehouse and OLAP Technology - Data Warehouse Definition - A Multidimensional Data Model- Data Warehouse Architecture-Steps for the Design and Construction of Data Warehouses – A Three-Tire Data Warehouse Architecture - Data Warehouse Back-End Tools and Utilities – Metadata Repository – Types of OLAP Servers - Data Warehouse Implementation – From Data Warehousing to Data Mining.

TOTAL : 45

TEXT BOOK

1. Han, Jiawei and Kamber, Micheline., "Data Mining: Concepts and Techniques", Second Edition Morgan Kaufmann Publishers, 2009.

REFERENCE BOOKS

1. Ian H. Witten and Eibe Frank, "Data Mining Practical Machine Learning Tools and Techniques", Elsevier Inc., 2005.
2. Rajeev Parida, "Principles and Implementation of Data warehousing", Firewall Media, 2006.
3. Berson, Alex and Smith, Stephen J., "Data Warehousing, Data Mining & OLAP", Tata McGraw- Hill, 2008.

11BC012 CLOUD COMPUTING

(Common to Computer Technology and Information Technology)

3 0 0 3

Objective :

- To understand how cloud computing works and examine which type of users can benefit
- To examine the practical benefits of cloud computing in different scenarios
- To learn about various web-based applications

MODULE – I **15**

Understanding Cloud Computing : Introduction – Cloud Computing - Collaboration to the cloud – Network is the Computer – Cloud Computing Today - Pros and Cons of Cloud Computing – Benefits – Developing Cloud Services – Pros and Cons of Cloud Service Development – Types of Cloud Service Development – Cloud Computing for Everyone - Cloud Computing for the Family - Cloud Computing for the Community - Cloud Computing for the Corporation.

MODULE – II **15**

Using Cloud Services: Collaborating on Calendars, Schedules and Task Management – Exploring online Calendar Applications – Exploring Online Scheduling Applications – Exploring Online Planning and Task Management - Collaborating on Event Management – Understanding Event Management Applications – Exploring Event Management Applications - Collaborating on Contact Management – Understanding Contact Management and CRM – Exploring Contact Management and CRM Applications - Collaborating on Project Management – Understanding Project Management.

MODULE– III **15**

Web Based Processing and Storage : Collaborating on Word Processing – Working with Web-Based Word processing – Exploring Web-Based Word Processors - Collaborating on Spreadsheets – Working with Web-Based Spreadsheet – Exploring Web-Based Spreadsheets - Collaborating on Databases - Understanding Database Management – Exploring Web-Based Databases - Collaborating on Presentation – Preparing Presentation Online – Evaluating Web-Based Presentation Applications – Storing and Sharing Files and other Online Content – Understanding Cloud Storage – Evaluating Online File Storage and Sharing Services – Exploring Online Bookmarking Services.

TOTAL : 45

TEXT BOOK

1. Michael Miller., "Cloud Computing Web-Based Applications That Change the Way You Work and Collaborate Online ", First Edition, Pearson Education, 2009.

REFERENCE BOOKS

1. John Rhoton , " Cloud Computing Explained ", Second Edition, Recursive Press, 2010
2. Toby Velte, Anthony Velte, Robert Elsenpeter., "Cloud Computing, A Practical Approach", McGraw- Hill, 2010.
3. Barrie Sosinsky., "Cloud Computing Bible" , Wiley Publishing, 2011.

11BC013 ENTERPRISE RESOURCE PLANNING

(Common to Computer Technology, Information Technology and Software Engineering)

3 0 0 3

Objective

- To understand the basics and key implementation issues of ERP
- To know the business modules of ERP
- To be aware of some popular products in the area of ERP

MODULE – I **15**

Introduction: ERP: An Overview- Enterprise : An Overview- Benefits of ERP- ERP and Related Technologies- Business Process Reengineering (BPR)- Data Warehousing-Data Mining- Online Analytical Processing(OLAP)-Supply Chain Management(SCM).

MODULE- II **15**

ERP Implementation and the Business Modules: ERP Implementation Life cycle- Implementation Methodology-Hidden Costs-Organizing the Implementation- Vendors-Consultants and Users-Contracts with Vendors- Consultants and Employees- Project Management and Monitoring- Business modules in an ERP Package- Finance-Manufacturing-Human Resources- Plant Maintenance-Materials Management- Quality Management- Sales and Distribution.

MODULE- III **15**

The ERP Market and Future: ERP Market Place- SAP AG- People soft-Baan Company- JD Edwards World Solutions Company- Oracle Corporation- QAD- System Software Associates(SSA)-Turbo Charge the ERP System- Enterprise Integration Applications(EIA)- ERP and E-Commerce-ERP and Internet- Future Directions in ERP.

TOTAL :45

TEXT BOOK

1. Alexis Leon, “ERP Demystified”, Second Edition, Tata McGraw Hill, New Delhi, 2008.

REFERENCE BOOKS

1. Brady Joseph A, Monk Ellen F, and Wagner Bret, “Concepts in Enterprise Resource Planning”, Thompson Course Technology, USA, 2001.
2. Vinod Garg Kumar and Venkitakrishnan N K, “Enterprise Resource Planning: Concepts and Practice”, Prentice Hall of India, New Delhi, 2003.
3. Fernandz Jose Antonio, “The SAP R /3 Hand book”, Tata McGraw Hill, New Delhi, 1998.

11BC014 PROFESSIONAL ETHICS AND HUMAN VALUES

(Common to Computer Technology, Information Technology and Software Engineering)

3 0 0 3

Objective:

- To enable the students to identify ethical and moral issues
- To provide a frame work for resolving ethical problems
- To educate the students regarding ethical issues relating to environment and globalization.

MODULE – I **15**

Introduction and Solving Moral Problems: Role Morality – What is a Profession – Professional ethics – Engineering Ethics as Preventive Ethics – Framing the Problem – Common Morality – Moral Justification – Analyzing a case – Factual Issues – Conceptual Issues - General and Specific Moral Problems-Introduction - Conflicting Values – Standpoints of the Judge and the Agent – Utilitarian Thinking – Three Utilitarian Approaches – the Ethics of Respect for Persons – Three Respect for Person Approaches – Convergence, Divergence and Creative Middle Ways.

MODULE- II **15**

Fundamental Issues: Generic Concerns: Responsible engineers- Honesty, Integrity and Reliability – Ways of Misusing the Truth – Why is Dishonesty Wrong? – Honesty on Campus – Integrity in Engineering Research and Testing – Integrity in the Use of Intellectual Property – Integrity and Client-Professional Confidentiality – Integrity and Expert Testimony – Integrity and Failure to Inform the Public – Conflicts of Interest – Risk, Safety, and Liability in Engineering: The Codes and Engineering Practice – Difficulties in Estimating Risk – Normalizing Deviance – The Expert's Approach to Acceptable Risk – Identifying and defining acceptable risk - The Layperson's Approach to Acceptable Risk – The government Regulator's Approach to Risk – The Engineer's Liability for Risk – Becoming a Responsible Engineer Regarding Risk.

MODULE- III **15**

Engineers Diverse Roles and Engineering Professionalism: Engineers as Employees: The codes and Employer – Employee Relationships – The Changing Legal Status of Employee Rights – The Manager-Engineer Relationship – Paradigmatic Engineering and Management Decisions – The Challenger Case – Loyalty: Uncritical and Critical – Responsible Organizational Disobedience – Implementing Professional Employee Rights – Engineers and the Environment - International Engineering Professionalism – Engineering professionalism and ethics: Issues Old and New .

TOTAL :45

TEXT BOOK

1. Harris, Charles E., Pritchard, Michael S. and Rabins, Michael J., "Engineering Ethics", Second Edition, Wadsworth Thomson Learning, Canada Latest Indian Edition,2000.

REFERENCE BOOKS

1. Fleddermann, Charles B., "Engineering Ethics", Second Edition, Pearson Education, New Delhi, 2004.
2. Martin, Mike W. and Schinzinger, Roland, "Ethics In Engineering", Third Edition, Tata McGrew-Hill Publishing, New Delhi, 2003.
3. Krishnaswamy, K., Thangaraj, K. and Karmegam, G., "Professional Ethics and Human Values", First Edition, R.K. Publishers, Coimbatore, 2005.

11BC015 ENVIRONMENTAL SCIENCE AND ENGINEERING

(Common to Computer Technology, Information Technology and Software Engineering)

3 0 0 3

Objective:

The student should be conversant with

- Precious Natural resources in the environment and conservation
- Ecosystem and bio-diversity
- Pollution and Wastewater treatment methods
- Role of a human being in maintaining a clean environment for the future generations
- Population explosion and Social Issues

MODULE – I **15**

Introduction to Environmental Studies and Natural Resources: Introduction to Environmental Science – Forest resources: Use and over-exploitation, deforestation, case studies. Water resources: Use and over-utilization of surface and ground water, Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems – effects of modern agriculture, case studies – Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources, case studies – Role of an individual in conservation of natural resources.

Ecosystems and Biodiversity: Concept of an ecosystem – Structural features – Functional attributes (Food chain and Food web only). Introduction to Biodiversity – Values of biodiversity – Hot-spots of biodiversity – Endangered and endemic species of India – In-situ and Ex-situ conservation of biodiversity.

MODULE – II **15**

Pollution: Definition – Causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Radioactive Pollution – role of an individual in prevention of pollution – Case studies.

Water Treatment methods: Treatment of Water for Domestic Supply (Screening, Aeration, Sedimentation with Coagulation, Filtration and Disinfection methods) – Break point chlorination – Sewage treatment (Primary, Secondary & Tertiary methods) – Methods of Sewage treatment by activated sludge process – Membrane Technology for wastewater treatment – Activated carbon in pollution abatement of wastewater.

MODULE- II **15**

Social Issues and the Environment: From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people – Case studies – Environmental ethics - Issues and possible solutions – Environment Production Act – Air (Prevention and control of pollution) Act – Water (Prevention and control of pollution) Act – Wildlife protection Act – Forest conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.

Human Population and the Environment: Introduction – Population growth – Variation of population based on age structure – Variation among nations – Population explosion – Family welfare programme – Environment and human health – Human Rights – Value Education – HIV / AIDS – Women and Child welfare – Role of Information Technology in Environment and human health – Case studies.

TOTAL : 45

TEXT BOOK

1 P.N.Palanisamy et al, “Environmental Science”, First Edition: 2012, Pearson Education, New Delhi – 110 017.

REFERENCE BOOKS

1 Anubha Kaushik and Kaushik C P, “Environmental Science and Engineering”, Third Edition: 2008 (Reprint 2010), New Age International (P) Ltd, New Delhi.

2 B Uppal M M revised by S C Bhatia, “Environmental Chemistry”, Sixth Edition Khanna Publishers, New Delhi, 2002.

3 Masters. Gilbert M, “Introduction to Environmental Engineering and Science”, Second Edition, Pearson Education, New Delhi, 2004.

11BC016 COMPONENT BASED TECHNOLOGY

(Common to Computer Technology, Information Technology and Software Engineering)

3 0 0 3

Objective:

- To deal with fundamental properties of components, technology, architecture and middleware.
- To introduce in depth JAVA, CORBA and .Net Components.

MODULE – I **15**

Foundation: Terms and Concepts: Components - Objects – Modules – Interfaces - Components and interfaces: Callbacks and contracts - Examples of callbacks and contracts– Component architecture – Java, java beans , EJB and Java2: Overview and history of java component technologies - Java, the language –JavaBeans - Basic java services - Component variety - Advanced java services-JXTA and JINI.

MODULE - II **15**

CORBA and DCOM Technology: At the heart - The object request broker - Common object service specifications -CORBA component model - CORBA compliant implementations - CORBA facilities - Application objects - CORBA, UML, XML, and MDA – COM,OLE/ActiveX,Com+ and .NET CLR: The first fundamental wiring model – COM - COM object reuse - Interfaces and polymorphism - COM object creation and the COM library - Initializing objects, persistence, structured storage, monitors - From COM to distributed COM-Meta information and automation-other COM services - Compound documents and OLE - Contextual composition and services.

MODULE -III **15**

Component Frameworks and .Net Frameworks: Contributions of contextual component frameworks - Framework for contextual composition - Black box component framework - Black box and OLE – Portos –A hard real time component framework and its IDE - The .NET Framework – Assemblies – The .NET components - Common language frameworks.

TOTAL : 45

TEXT BOOK

1. Szyperski Clemens, Dominik Gruntz, Stephan Murer, "Component Software Beyond Object-Oriented Programming", Second Edition,Pearson Education, New Delhi, 2008.

REFERENCE BOOKS

1. Roman Ed, "Mastering Enterprise Java Beans", John Wiley & Sons Inc., New York, 1999.
2. Mowbray Thomas J and Ruh William A., "Inside CORBA", Pearson Education, New Delhi, 2003.
3. Freeze, Wayne S "Visual Basic Development Guide for COM & COM+", BPB Publication, New Delhi, 2001.

11BC017 E-COMMERCE

(Common to Computer Technology, Information Technology and Software Engineering)

3 0 0 3

Objective: To impart knowledge about the usage of Information Technology for business environment.

MODULE- I **15**

Ecommerce and Trade Cycle: Introduction – Electronic Commerce – Scope – Definition – Trade Cycle – Electronic Markets – Electronic Data Interchange – Internet Commerce – Business Strategy – Value Chain – Supply Chain – Inter Organizational Value Chains – Competitive Advantage – Competitive Strategy – Business Strategy – Existing Business Strategy – Strategy Formulation and Implementation Planning – E-commerce implementation – Evaluation-Case Study: Airline Reservation System.

MODULE - II **15**

B2B and B2C Electronic Commerce: Business to Business Electronic Commerce – Inter Organizational Transactions – Credit Transaction Trade Cycle – Variety of Transactions – Electronic Markets – Usage – Advantage and Disadvantages of Electronic Markets – Electronic Data Interchange – Definition – Benefits – EDI Security – EDI Maturity –Business to Consumer Electronic Commerce –Internet Components – Uses of the Internets – Elements of E-commerce – E-Visibility – E-Shop – Online Payments – A Web Site Evaluation Model.

MODULE - III **15**

E-Security, Legal and Ethical Issues: E-Security – Security in Cyberspace – Designing for Security – Kinds of Threats or Crimes – Virus – Security Protection and Recovery – Encryption – Internet Security Protocols and Standards –Legal and Ethical Issues – Major Threats to Ethics – Improving the Ethical Climate – Tort Law on the Internet – Taxation Issues – Legal Disputes on the Internet – Case Study: Internet Book Shop – Electronic Newspaper.

TOTAL : 45

TEXT BOOKS

1. Whitely, David., "E-Commerce, Strategy, Technologies and Applications", McGraw-Hill, Singapore, 2008.(Module I and II)
2. Awad, Elias M., "Electronic Commerce From Vision to Fulfillment", Third Edition, Prentice – Hall of India, Delhi, 2007.(Module III)

REFERENCE BOOKS

1. Kamesh K.Bajaj and Debjani Nag, "E-Commerce, The Cutting Edge of Business", Tata McGraw Hill Pub. Co., Delhi, 2000.
2. Kalakota, Ravi and Whinston, Andrew B., **"**Frontiers of Electronic Commerce", Pearson Education,2004
3. Laudon, Kenneth C and Traver, Carol G., "E-commerce: Business, Technology, Society", Pearson Education, 2005.

11BC018 NETWORK SECURITY

(Common to Computer Technology and Software Engineering)

3 0 0 3

Objective:

- To introduce the principles of network security
- To impart a working knowledge of network security, authentication and web security issues in order to build secure systems.

MODULE – I **15**

Introduction and Cryptography: Security Trends- The OSI security Architecture –Services, Mechanisms and Attacks — A model for network security – Classical Encryption Techniques – Block ciphers and data encryption standard: simplified DES – Block cipher principles – The data encryption standard- The strength of DES - Introduction to Number theory – Public key cryptography and RSA: Principles of public-key cryptosystems – The RSA algorithm

MODULE – II **15**

Message Authentication: Key management – Diffie-Hellman key exchange –Authentication Requirements – Authentication functions – Message Authentication codes – Hash functions- Hash Algorithms : MD5 message digest algorithm – Secure Hash Algorithm – Digital signatures – Authentication protocols: Digital Signature Standard - Authentication Applications: Kerberos.

MODULE – III **15**

Network Security Applications: Electronic Mail Security: Pretty Good Privacy – S/MIME - IP Security – Web Security: Web Security Considerations – secure sockets layer and transport layer security – Secure Electronic transaction - Intruders: Intrusion detection – Password management – Malicious software: Viruses and related threats – Virus countermeasures – Firewalls: Design principles – Trusted systems.

TOTAL : 45

TEXT BOOK

1. Stallings William., "Cryptography and Network Security: Principles and Practice", Fourth Edition, Prentice Hall of India, New Delhi, 2010.

REFERENCE BOOKS

1. Kahate Atul, "Cryptography and Network Security", Tata McGraw Hill, New Delhi,2003
2. Forouzan, Behrouz A., "Introduction to Cryptography and Network Security", First Edition, McGraw-Hill Higher Education,2008
3. Pfleeger. Charles P and Pfleeger. Shari Lawrence., "Security in Computing", Third Edition, Pearson Education, New Delhi, 2006

11BI501 MOBILE COMPUTING

(Common to Computer Technology, Information Technology and Software Engineering)

3 0 0 3

Objective:

- To learn the basics of Wireless Communication Technologies.
- To study the working principles of Wireless LAN and its standards.
- To build working skills in Wireless Application Protocols and Applications.

MODULE - I **15**

Introduction: Applications – Simplified Reference Model – Wireless Transmissions: Frequencies for radio transmission – Signals – Antennas - Signal Propagation – Multiplexing – Spread Spectrum – Medium Access Control: Motivation for a specialized MAC-SDMA-FDMA-TDMA-CDMA– Comparison.

MODULE - II **15**

Telecommunication Systems: GSM – Mobile services-System Architecture – Radio interface Protocols – Handover –Localization and calling- Handover- Security – New data services- Satellite Systems: Applications-Basics-Routing-Localization-Handover-Wireless LAN: Infrared vs Radio transmission – Infrastructure and ad-hoc network - IEEE 802.11-System architecture-Protocol architecture-Physical layer-Medium access control layer-MAC management – 802.11b-802.11a – Bluetooth .

MODULE - III **15**

Mobile IP and Wireless Application Protocol: Mobile Network layer: Mobile IP-Goals – Assumptions and requirements- Entities and terminology- IP Packet Delivery – Agent discovery – Registration – Tunneling and Encapsulation – Optimization - Reverse Tunneling –Mobile Adhoc Networks: Routing Strategies - Wireless Application Protocol (WAP): Architecture – Wireless datagram protocol- Wireless transport layer security – Wireless transaction protocol – Wireless session protocol – Wireless application environment – WML Script – Wireless telephony application.

TOTAL : 45

TEXT BOOK

1. Schiller, Jochen., “Mobile Communications”, Pearson Education, Delhi, 2009.

REFERENCE BOOKS

1. Lee, William C.Y., “Mobile Cellular Telecommunications”, Second Edition, McGraw-Hill, New York, 2006.
2. Pahlavan, Kaveh and Krishnamoorthy, Prasanth., “Principles of Wireless Networks”, PHI / Pearson Education, New Delhi, 2003.
3. Stallings, William., “Wireless Communications and Networks”, PHI/Pearson Education, 2002.

11BI602 XML AND WEB SERVICES

(Common to Computer Technology, Information Technology and Software Engineering)

3 0 0 3

Objective:

- To understand various basic concepts of XML
- To understand the XML technology and its applications in the web world
- To learn how to build web services

MODULE – I **15**

XML Technology: Role of XML – XML and Web – XML Basics – SOAP – Web Services – Revolutions of XML- Advantages of XML over HTML, EDI, Databases – XML technology family – Structuring and Schemas – DTD – XML Schema – XML processing – DOM – SAX – presentation technologies –CSS- XSL – XFORMS – XHTML – VoiceXML – Transformation – XSLT – XLINK – XPATH – XQuery.

MODULE - II **15**

XML and SOAP: XML in practice-Vertical industry data descriptions-Configuration and Action-SOAP- Overview of SOAP – HTTP – XML-RPC-SOAP-Protocol – Message Structure – Intermediaries – Actors – Design Patterns and Faults – SOAP with Attachments.

MODULE – III **15**

Web service and XML security: Web service-Overview – Architecture – Key Technologies - UDDI – WSDL – ebXML – SOAP, Web Services and E-Commerce – Overview of .NET And J2EE. XML security-Security overview – Canonicalization – XML Security Framework – XML Encryption – XML Digital Signature – XKMS Structure – Guidelines for Signing XML Documents.

TOTAL: 45

TEXT BOOK

1. Frank. P. Coyle, “XML, Web Services and the Data Revolution”, Pearson Education, New Delhi, 2007.

REFERENCE BOOKS

1. Schmelzer, vandersypen, Bloomberg, et al, “XML and Web Services: unleashed”, pearson Education, New Delhi, 2008.
2. Nagappan, Ramesh, Skoczylas, Robert and Sriganesh, Patel, “Developing Java Web Services”, Wiley Publishing Inc, New York, 2004.
3. McGovern, etal, “Java Web Services Architecture”, Morgan Kaufmann Publishers, 2005.

11BI011 SERVICE ORIENTED ARCHITECTURE

(Common to Information Technology and Software Engineering)

3 0 0 3

Objective:

- To introduce the necessity of SOA
- To study the different technologies like WSDL, SOAP used in Web Services
- To impart knowledge on various case studies.

MODULE – I **15**

Introduction: Fundamental Service Oriented Architecture (SOA) – Common characteristics – Common misperceptions –Benefits of SOA – Pitfalls – Evolution of SOA – SOA timeline – Continuing evolution – roots of SOA- Activity Management And Composition**:** Web Services and Primitive SOA – Web Services framework – Services.

MODULE - II **15**

Web Services and Contemporary SOA: Web services and contemporary SOA (Part II): Addressing – reliable messaging - Correlation – policies - Principles Of Service Orientation: Service orientation and enterprise – Anatomy of SOA – Common principles – inter-relation between principles – Service layers – Service layer abstraction – Application service.

MODULE - III **15**

SOA Planning, Analysis and Design: Business service – Orchestration service – Agnostic service – Service layer configuration scenarios - SOA Design And Platforms: SOA delivery life cycle phases-introduction to SOA - Benefits of business centric SOA - Introduction to service oriented design – SOA support in J2EE – SOA support in .NET – Integration considerations – Case studies: RailCo Ltd., Transit Line Systems Inc. and the Oasis Car Wash.

TOTAL : 45

TEXT BOOK

1. Erl, Thomas, "Service Oriented Architecture (SOA): Concepts, Technology and Design", Pearson Education, New Delhi, 2005.

REFERENCE BOOKS

1. Erl Thomas, "SOA: Principles of Service Design", Pearson Education, New Delhi, 2008.
2. Lawla James P.K. and Barber H. Howell "Service Oriented Architecture: SOA strategy, Methodology and Technology", Auerbach Publications, 2008.
3. Micheal Rosen, Borris Lublinsky, Kavin T.Smith Marc. J.Balcer, "Applied SOA: Service Oriented Architecture and Design Strategies", Wiley Publications, 2008.

11BS011 SOFTWARE ESTIMATION

3 0 0 3

Objective:

- To explore on various estimation models
- To provide insight on working tools on estimation

MODULE – I **15**

Introduction: The software crisis – Software and software engineering - Life cycle - Software projects – Management activities in a software project – Organization's process orientation – Requirements engineering – Software estimation - Requirements Engineering: What is Requirements Engineering - Requirements elicitation - Requirements elicitation techniques – Requirements analysis – Models – Requirements documentation – Requirements review – Requirements management.

MODULE - II **15**

Size Estimation: Two Views of sizing – Function point analysis – Mark II FPA - Full function point analysis - Other functions point extensions – Function point computations – Directions in functional size measurements – LOC estimation – Conversion between size measures – Maintenance - Effort, Schedule and cost estimation: – Productivity – Estimation factors - Behavior of software projects - Approaches – Mark II FP estimation - COCOMO II – Other models - COCOMO 81 – Putnam estimation model.

MODULE - III **15**

Working Tools: Process maturity - Maturity of requirements , estimation - Database for requirements -Database for estimation - Model calibration – Important players - Commandments for requirements - Commandments for estimating – Tools: desirable features of requirements management tools – Requirement management tools available - Software estimation tools – Software estimation tools available.

TOTAL : 45

TEXT BOOK

1. Kishore Swapna and Naik Rajesh, "Software Requirements and Estimation", Tata McGraw-Hill, New Delhi, 2008.

REFERENCE BOOKS

1. McConnell Steve, "Software Estimation - Demystifying the black art", Microsoft Press, 2006
2. Laird. Linda M., and brennan. M.Carol., "Software Measurement and Estimation", a practical approach, John Wiley & Sons, New York, 2006.
3. Parthasarathy. M.A., "Practical Software Estimation", Pearson Education, New Delhi, 2007.

11BS012 SOFTWARE RELIABILITY

3 0 0 3

Objective:

- To provide the fundamental knowledge in software reliability.
- To identify the failures, faults, errors and monitoring the system.
- To prepare the test cases, execute and guide the testing process.

MODULE – I **15**

Introduction: Problem, Process and Product: Core Material: Problem and solution - software reliability engineering process - defining the product – Special Situations: Testing acquired software – Background: Learning reliability – software and hardware reliability - Implementing operational profiles**:** Core Material: Developing and applying operational profiles – Special Situations: Using graphical representation of the operational profile – Evolution of Operation – Applying the module usage table - Background: Learning operations and run concepts.

MODULE - II **15**

Reliability Engineering: Core Material: Failure for the product – Choosing a common measure – Setting system failure – Determining developed software failure – Engineering software reliability strategies – Special Situations: Failure severity classes – Other failure groupings – Allocating the system failure – Software safety – Dealing – Background – Failures, Faults and errors – Availability – System and component reliabilities – Predicting basic failure.

MODULE - III **15**

Testing: Preparing for Test: Core material: Preparing test cases – Preparing test procedures - Special situations: Using the graphical representation – Background : Testing efficiently – Increasing test efficiency - Executing Test: Core material: Planning and allocating test time – Invoking test - Identifying failures – Special situations – Testing multiple configurations – Handling uncertainties – Working with multiple releases – Background – Invoking test – Counting failures - Guiding Test: Core material: Tracking reliability growth – Certifying reliability – Special situations: Estimating failure intensity – Handling unreported failures – Certifying with different risk levels – Operational profile variation –Background: Understanding software reliability.

TOTAL : 45

TEXT BOOK

1. Musa John D.**, "**Software Reliability Engineering**"**, Second Edition, Tata McGraw-Hill, New Delhi, 2005.

REFERENCE BOOKS

1. Naikan V.N.A., "Reliability Engineering and Life Testing", Prentice Hall of India, New Delhi, 2009.
2. Musa, J.D., Iannino, A. and Okumoto, K., "Software Reliability, Measurement, Prediction, Application", McGraw-Hill, New York, 1990.
3. Patrick D.T, O'Connor, "Practical Reliability Engineering", Fourth Edition, John Wiley & Sons, 2003.

11BS013 REQUIREMENT ENGINEERING

3 0 0 3

Objective:

To acquire the knowledge about the basic concepts of software requirements, requirement management and various requirement engineering methods and techniques.

MODULE – I **15**

Requirement Engineering Process: Introduction: System Engineering- Requirement document - Requirement Engineering Process: Process models – Actors in requirement Engineering processes - Process support - Process improvement – Requirement Elicitation and Analysis: Elicitation and analysis process - Elicitation techniques – Prototyping - Requirement analysis and negotiation - Requirement validation: Reviews – prototyping - model validation - requirement testing.

MODULE – II **15**

Requirement Management and Methods for Requirement Engineering: Requirement management: Stable and volatile Requirements - Requirements Identification and storage – change management – Traceability - Methods for Requirement Engineering : Data flow modeling – Semantic data models – Object-oriented approaches – Formal methods - View point oriented Requirement Methods: Structured Analysis and Design Techniques(SADT) – Controlled Requirement Expressions (CORE) - View point-Oriented System Engineering (VOSE) - View point –Oriented Requirement Definition (VORD) - View point – Oriented Requirement Validation.

MODULE – III **15**

Non-functional Requirements: Classification of non-functional requirements – Deriving non-functional requirements – Requirements for critical system – Requirement engineering for safety - Related systems - Interactive system specifications: VORD – Requirement Definition – transition to object-oriented design - Case Study: EDDIS Requirements – Identifying EDDIS view point – Analysis and evolution of EDDIS requirements - Specifying EDDIS requirements.

TOTAL : 45

TEXT BOOK

1. Kotonya Gerald, and Sommerville Ian, “Requirement Engineering Processes and Techniques”, John Wiley & Sons Inc., New York, 2001.

REFERENCE BOOKS

1. Sommerville Ian and Sawyer Peter, “Requirement Engineering: A Good Practice Guide”, John Wiley & Sons Inc.,New York, 2000.
2. Axel van Lamsweerde, “Requirement Engineering: From system goals to UML models to software specifications”, John Wiley & Sons, New York, 2009.
3. Elizabeth Hull, Ken Jackson, and Jeremy Dick, “Requirement Engineering”, Second Edition, Springer, 2005.

11BS014 PERSONAL SOFTWARE PROCESS AND TEAM SOFTWARE PROCESS

3 0 0 3

Objective

- To understand the software process and identify the risk involved in software process.
- To realize the responsibility of each role in software development team

MODULE - I **15**

Introduction and Managing Your Time: Software Engineering – Time Management – Tracking Time – Period & Product Planning – Product Size – Managing Your Time – Managing Commitments – Managing Schedules - Project Plan.

MODULE - II **15**

Software Development Process: Defects - Finding Defects - Code Review Checklist - Projecting Defects – Design Defects – Product and Process Quality.

MODULE - III **15**

Product Implementation and Team Software Process: Designing with Teams – Product Implementation – Integration and System Testing – The Postmortem - The Team Leader Role – Development Manager Role – The Planning Manger Role – The Quality – Process Manager Role – The Support Manager Role - Case Study.

TOTAL : 45

TEXT BOOKS

1. Humphery, Watt S, “Introduction to Personal Software Process", First Edition, Addison Wesley, New Delhi, 2000.
2. Humphery, Watt S, “Introduction to Team Software Process", First Edition, Addison Wesley, New Delhi, 2000.

REFERENCE BOOKS

1. Jalote, Pankaj., “CMM in Practice”, First Edition, Pearson Education, New Delhi, 2002.
2. Ince Darrel, "ISO 9001 and S/W Quality Assurance", First Edition, Tata McGraw-Hill, New Delhi, 1994.
3. Pressman Roger S.., “Software Engineering: A Practitioners Approach”, Seventh Edition, Tata McGraw Hill, New Delhi, 2009.

11BS015 SOFTWARE REUSE

3 0 0 3

Objective:

- To explore the fundamental concept of reuse and reengineering process
- To provide insight on architectural and common reuse process
- To understand the importance of maintaining, testing the software and system.

MODULE – I **15**

Introduction to Software Reuse: Introducing software reuse - Definition and basic essentials- Further Introductory essential-Systematic re-use - Reusable software assets: what is a software asset - What are the characteristics of reusable assets - Managing software asset - Assets vs Objects.

MODULE - II **15**

Reuse Repository: Who needs a repository - Requirements for reuse repository - Repositories on the internet - Tool categories on the market.

Reuse process: what process do we need -Starting a corporate Reuse Programme - Practicing reuse – Asset Production and Application Production Processes - The management issues - To Reuse or not to Reuse - Reuse for all and all for Reuse-Adapting the work structure.

MODULE – III **15**

Reuse Metrics: General Aspects of a Metrics programme - A typical Reuse Metrics Programme - Reuse techniques and technologies: Rationale-Reuse enabling Architecture-Object-oriented Techniques-Design Patterns-Object-Oriented frameworks-component based development-Agent based system.

TOTAL : 45

TEXT BOOK

1. Michel Ezran, Maurizio Morisio and Colin Tully, “Practical Software Reuse”, Springer Press, London, 2002.

REFERENCE BOOKS

1. Ivar Jacobson, Martin Griss and Patrick Johnson, “Software Reuse: Architecture, Process and Organization for business success”, Addison Wesley, New York, 1997.
2. Stephen H. Kan “Metrics and models in Software Quality Engineering”, Second Edition, Addison Wesley, New York, 2003
3. Hafedh Mili, Ali Mili, Sherif Yacoub, and Edward Addy, “Reuse Based Software Engineering “, John Wiley & Sons Ltd, New York, 2002.