KONGU ENGINEERING COLLEGE, PERUNDURAI, ERODE – 638 052
(Autonomous)
M.Sc DEGREE IN SOFTWARE SYSTEMS (5 YEARS)
CURRICULUM
(For the candidates admitted from academic year 2014 – 15 onwards)

SEMESTER-I

Course Code	Course Title	Hours/Week			Credit	Maximum Marks		
		L	T	P		CA	ESE	Total
	THEORY							
14IST11	Communicative English I	3	0	0	3	40	60	100
14IST12	Applied Mathematics	3	1	0	4	40	60	100
14ISC11	Problem Solving and Programming	3	0	3	4	40	60	100
14IST13	Digital Principles	3	1	0	4	40	60	100
14IST14	Fundamentals of Computer Science	3	0	0	3	40	60	100
14VEC11	Value Education	0	2	1	1	100	0	100
	PRACTICAL							
14ISL11	Communication Skills and Career Development Laboratory I	0	0	3	1	100	0	100
14ISL12	Digital Laboratory	0	0	3	1	100	0	100
14ISL13	Office Automation Laboratory	0	0	3	1	100	0	100
				Total	**22**			

CA – Continuous Assessment, ESE – End Semester Examination

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SEMESTER-II

Course Code	Course Title	Hours/Week			Credit	Maximum Marks		
		L	T	P		CA	ESE	Total
	THEORY							
14IST21	Communicative English II	3	0	0	3	40	60	100
14IST22	Mathematical Structures	3	1	0	4	40	60	100
14IST23	Object Oriented Programming with C++	3	0	0	3	40	60	100
14IST24	Data Structures	3	0	0	3	40	60	100
14IST25	Computer Architecture	3	1	0	4	40	60	100
	PRACTICAL							
14ISL21	Communication Skills and Career Development Laboratory II	0	0	3	1	100	0	100
14ISL22	Object Oriented Programming with C++ Laboratory	0	0	3	1	100	0	100
14ISL23	Data Structures Laboratory	0	0	3	1	100	0	100
				Total	**20**			

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SEMESTER-III

Course Code	Course Title	Hours/Week			Credit	Maximum Marks		
		L	T	P		CA	ESE	Total
	THEORY							
14IST31	Probability and Statistical Methods	4	0	0	4	40	60	100
14IST32	Java Programming	4	0	0	4	40	60	100
14IST33	Database Management Systems	4	0	0	4	40	60	100
14IST34	Software Engineering	4	0	0	4	40	60	100
14IST35	Design and Analysis of Algorithms	3	0	0	3	40	60	100
	PRACTICAL							
14ISL31	Java Programming Laboratory	0	0	4	2	100	0	100
14ISL32	RDBMS Laboratory	0	0	4	2	100	0	100
14ISL33	Software Engineering Laboratory	0	0	2	1	100	0	100
	Total				**24**			

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SEMESTER-IV

Course Code	Course Title	Hours/Week			Credit	Maximum Marks		
		L	T	P		CA	ESE	Total
	THEORY							
14IST41	Optimization Techniques	4	0	0	4	40	60	100
14IST42	Computer Networks	4	0	0	4	40	60	100
14IST43	Operating Systems	3	1	0	4	40	60	100
14IST44	Object Oriented System Design	4	0	0	4	40	60	100
14IST45	Requirements Engineering	3	0	0	3	40	60	100
	PRACTICAL							
14ISL41	Network Programming Laboratory	0	0	4	2	100	0	100
14ISL42	Operating Systems Laboratory	0	0	4	2	100	0	100
14ISL43	CASE Tools Laboratory	0	0	2	1	100	0	100
				Total	**24**			

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SEMESTER-V

Course Code	Course Title	Hours/Week			Credit	Maximum Marks		
		L	T	P		CA	ESE	Total
	THEORY							
14IST51	.Net Programming	3	1	0	4	40	60	100
14IST52	Web Technology	4	0	0	4	40	60	100
14IST53	Software Testing	4	0	0	4	40	60	100
14IST54	Mobile Communications	4	0	0	4	40	60	100
	Elective I (Professional)	3	0	0	3	40	60	100
	PRACTICAL							
14ISL51	.Net Programming Laboratory	0	0	4	2	100	0	100
14ISL52	Web Technology Laboratory	0	0	2	1	100	0	100
14ISL53	Software Testing Laboratory	0	0	4	2	100	0	100
	Total				**24**			

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SEMESTER-VI

Course Code	Course Title	Hours/Week			Credit	Maximum Marks		
		L	T	P		CA	ESE	Total
	THEORY							
14IST61	Advanced Java Programming	3	1	0	4	40	60	100
14IST62	Advanced Database Technologies	4	0	0	4	40	60	100
14IST63	Software Project Management	4	0	0	4	40	60	100
14IST64	Computer Graphics	4	0	0	4	40	60	100
	Elective II (Professional)	3	0	0	3	40	60	100
	PRACTICAL							
14ISL61	Advanced Java Programming Laboratory	0	0	4	2	100	0	100
14ISL62	Database Applications Laboratory	0	0	4	2	100	0	100
14ISL63	Computer Graphics Laboratory	0	0	2	1	100	0	100
	Total				**24**			

CA – Continuous Assessment, ESE – End Semester Examination

SEMESTER-VII

Course Code	Course Title	Hours/Week			Credit	Maximum Marks		
		L	T	P		CA	ESE	Total
14ISP71	Project Work I	0	0	24	12	100	100	200
				Total	12			

CA – Continuous Assessment, ESE – End Semester Examination

SEMESTER-VIII

Course Code	Course Title	Hours/Week			Credit	Maximum Marks		
		L	T	P		CA	ESE	Total
	THEORY							
14IST81	Data Mining and Data Warehousing	4	0	0	4	40	60	100
14IST82	Network Security	4	0	0	4	40	60	100
14IST83	Advanced Software Engineering	4	0	0	4	40	60	100
	Elective III (Professional)	3	0	0	3	40	60	100
	Elective IV (Professional)	3	0	0	3	40	60	100
	Elective V(Open)	3	0	0	3	40	60	100
	PRACTICAL							
14ISL81	Data Mining Laboratory	0	0	4	2	100	0	100
14ISL82	Communication Skills and Career Development Laboratory III	0	0	2	1	100	0	100
				Total	24			

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SEMESTER-IX

Course Code	Course Title	Hours/Week			Credit	Maximum Marks		
		L	T	P		CA	ESE	Total
	THEORY							
14IST91	Open Source Systems	4	0	0	4	40	60	100
14IST92	Distributed Computing	4	0	0	4	40	60	100
	Elective VI (Professional)	3	0	0	3	40	60	100
	Elective VII (Professional)	3	0	0	3	40	60	100
	Elective VIII (Open)	3	0	0	3	40	60	100
	Elective IX (Open)	3	0	0	3	40	60	100
	PRACTICAL							
14ISL91	Open Source Systems Laboratory	0	0	4	2	100	0	100
14ISL92	Software Application Development Laboratory	0	0	4	2	100	0	100
	Total				**24**			

CA – Continuous Assessment, ESE – End Semester Examination

SEMESTER-X

Course Code	Course Title	Hours/Week			Credit	Maximum Marks		
		L	T	P		CA	ESE	Total
14ISP01	Project Work II	0	0	24	12	100	100	200
	Total				**12**			

CA – Continuous Assessment, ESE – End Semester Examination

Total Credits: 210

Course Code	Course Title	Hours/Week			Credit
		L	T	P	
LIST OF PROFESSIONAL ELECTIVES					
SEMESTER V					
14ISE01	Network Protocols	3	0	0	3
14ISE02	Compiler Design	3	0	0	3
14ISE03	Information System Design	3	0	0	3
14ISE04	Distributed Operating Systems	3	0	0	3
SEMESTER VI					
14ISE05	Network Management	3	0	0	3
14ISE06	ASP .Net programming	3	0	0	3
14ISE07	Professional Ethics and Human Values	3	0	0	3
14ISE08	Software Metrics	3	0	0	3
SEMESTER VIII					
14ISE09	High Speed Networks	3	0	0	3
14ISE10	Software Quality Assurance	3	0	0	3
14ISE11	Principles of Management	3	0	0	3
14ISE12	Artificial Intelligence	3	0	0	3
14ISE13	Multicore Architecture	3	0	0	3
14ISE14	Soft Computing	3	0	0	3
14ISE15	XML and Web Services	3	0	0	3
14ISE16	Multimedia Systems	3	0	0	3
SEMESTER IX					
14ISE17	Cloud Computing	3	0	0	3
14ISE18	Information Security	3	0	0	3
14ISE19	Modern Information Retrieval	3	0	0	3
14ISE20	Ubiquitous Computing	3	0	0	3
14ISE21	Cyber Forensics	3	0	0	3
14ISE22	Human Resource Management	3	0	0	3
14ISE23	Big data Analytics	3	0	0	3
14ISE24	Agile Software Engineering	3	0	0	3

Course Code	Course Title	Hours/Week			Credit
		L	T	P	
LIST OF OPEN ELECTIVES					
SEMESTER VIII					
14ISO01	E-Commerce	3	0	0	3
14ISO02	User Interface Design	3	0	0	3
14ISO03	Software Reuse	3	0	0	3
SEMESTER IX					
14ISO04	Pair Programming	3	0	0	3
14ISO05	Adhoc and Sensor Networks	3	0	0	3
14ISO06	Software Maintenance	3	0	0	3
14ISO07	Service Oriented Architecture	3	0	0	3
14ISO08	Internet of Things	3	0	0	3
14ISO09	UNIX Internals	3	0	0	3

14IST11   COMMUNICATIVE ENGLISH I

3   0   0   3

UNIT – I   **9**
Grammar & Vocabulary :Affixes and roots – Prefixes (de, dis, il, im, in, ir, mis, un) and Suffixes (ment, ance, ly, less, ion, able)- Synonyms & Antonyms, Homophones, Homonyms; **Writing**: Introduction to Technical Writing- Using Abbreviations, Acronyms, and Technical terms; Comprehension passage-I (Multiple choice).
Verbal Activities (NOT FOR EXAMINATION):
Listening : Types of listening; **Reading:** Skimming; **Speaking**: Storytelling.

UNIT – II   **9**
 Grammar & Vocabulary : Word formation and Derivation – Single-word Substitute – Noun, Verb, Adjective, Adverb; **Writing**: Letter writing – Informal letter writing; Comprehension passage-II (Question and Answer).
Verbal Activities (NOT FOR EXAMINATION):
Listening – Process of listening; **Reading**: Scanning; **Speaking:** Role Play.

UNIT – III   **9**
Grammar & Vocabulary: Sentence formation – Tenses- Present –Indefinite/ Continuous / Perfect
Writing: Letter Writing – Personal letter; Comprehension passage – III (Complete the sentence).
Verbal Activities (NOT FOR EXAMINATION):
Listening: Implications of effective listening; **Reading**: Identifying main idea; **Speaking:** Making oral Presentation – Different kinds of Presentation – Planning a presentation.

UNIT – IV   **9**
Grammar & Vocabulary: Sentence formation – Tenses – Past – Indefinite/ Continuous / Perfect, Future – Indefinite/ Continuous / Perfect – Definitions; **Writing**: Writing & Sending Email Messages; Comprehension passage – IV (True or False, Match the Synonyms and Antonyms).
Verbal Activities (NOT FOR EXAMINATION):
Listening: Gap filling activity while listening; **Reading:** Summarizing; **Speaking** – Making oral Presentation – Adapting a speaker's ideas to audience – planning the use of visual and other devices to involve audience.

UNIT – V   **9**
Grammar & Vocabulary: Sentence Formation – Subject-verb agreement, Jumbled words, Error correction; **Writing**: Writing Instructions; Comprehension passage-V (Reasoning or Moral Questions).
Verbal Activities (NOT FOR EXAMINATION):
Listening: Listening to a discourse & filling up gaps in a worksheet**; Reading**: paraphrasing; **Speaking**: Group Discussion.

TOTAL: 45

TEXT BOOKS:
1.   Santana Sinha Chaudhuri, "Learn English – A Fun Book of Functional Language, Grammar And Vocabulary", McGraw Hill Education [India] Pvt. Ltd, 2013.
REFERENCE BOOKS:
1.   Aruna Koneru, "Professional Communication", Tata McGraw Hill Publishing Company Ltd, New Delhi, 2009.
2.   Andrea, J. Rutherford, "Basic Communication Skills for Technology", Second Edition, Pearson Education, 2006.
Course Outcomes:
On completion of course the student will be able to
  • improve their grammar and vocabulary to use in different contexts
  • get familiarized with different methods of listening skills
  • speak effectively in English in various situations and acquire reading skills
  • gain knowledge about writing skills
  • enrich reading habit to acquire good vocabulary skill

14IST12 APPLIED MATHEMATICS

3   1   0   4

Pre-requisites: Basic concepts of Matrices, Basic Concepts of differentiation and integration

UNIT – I   9
Matrices: Characteristic Equation of a matrix – Eigen values and Eigen vectors of real matrix – Properties of Eigen values and Eigen vectors (statement and problems only) – Cayley Hamilton theorem (statement and problems only) – Similarity transformation (concept only) – Orthogonal matrices – Orthogonal transformation of symmetric matrix to diagonal form – Quadratic forms – Reduction of Quadratic form to Canonical form by Orthogonal reduction.

UNIT – II   9
Solution of Ordinary Differential Equations : Linear differential equations of second and higher order with constant coefficients when the R.H.S is e^{ax}, x^n (n>0), sin(ax), cos(ax), $e^{ax} x^n$, e^{ax} sin(bx), e^{ax} cos(bx), x^nsinax, x^ncosax – Differential equations with Variable coefficients (Euler's type only).

UNIT – III   9
Solution of algebraic and transcendental equations: Bisection method – Newton-Raphson method – Regula Falsi method. **Solution of simultaneous linear equations:** Gauss elimination method – Gauss Jordan method – Inverse of a matrix – Gauss- Jacobi and Gauss- Seidel Iterative methods.

UNIT – IV   9
Curve Fitting: Principle of least squares: Fitting a straight line- Fitting a parabola – Fitting an exponential curve – Fitting a curve of the form y= ax^b. **Numerical solution of First order Differential Equations:** Single steps methods: Taylor series method – Euler's method – Modified and Improved Euler's method – Runge-Kutta method of fourth order – Multi step method: Milne's Predictor – Corrector method

UNIT – V   9
Interpolation, Numerical Differentiation and Integration: Newton – Gregory forward interpolation formula and Newton - Gregory backward interpolation formula for equally distributed data – Newton's divided difference method for unequally distributed data – Lagrange interpolation formula –Numerical differentiation using Newton's forward and backward difference formula – Numerical Integration using Simpson's $1/3^{rd}$ rule – Simpson's $3/8^{th}$ rule –Trapezoidal rule.

Lecture:45, Tutorial:15, TOTAL: 60

TEXT BOOKS:
1.   Kandasamy, P., Thilagavathy, K. and Gunavathy, K, "Engineering Mathematics For First Year B.E/B.Tech", S.Chand and Co., New Delhi, 2014.
2.   Kandasamy, P., Thilagavathy, K and Gunavathy. K, "Numerical Methods", S.Chand and Co., New Delhi, 2014.

REFERENCE BOOKS:
1.   Grewal, B.S., "Higher Engineering Mathematics", 41st Edition, Khanna Publications, New Delhi, 2011.
2.   Balasubramanie,P., Tamilarasi, A., " Engineering Mathematics" Tata McGraw - Hill Education, New Delhi, 2011.
3.   Veerarajan, T., "Engineering Mathematics, (for first year), Tata McGraw-Hill New Delhi, 2013.
4.   Jain, M.K., Iyengar, S.R.K., and Jain, R.K., "Numerical methods for scientific and Engineering Computation", 5th Edition, New age International (P) Ltd., New Delhi, 2007.

Course Outcomes:
On completion of the course the student will be able to
- solve engineering problems which needs matrix computations
- deal with differential equations of certain types
- solve algebraic, transcendental and simultaneous equations
- fit an approximate curve to a given data
- perform numerical differentiation and integration

14ISC11 PROBLEM SOLVING AND PROGRAMMING

3   0   3   4

UNIT – I   **9**
Introduction to Computer and Problem Solving: Overview of computers – Applications of computers-Characteristics of computer - Basic computer Organization – Number System - Problem solving: Planning the computer program – Algorithms - Flowcharts – Pseudo codes – Structuring the logic - Top-Down design.

UNIT – II   **9**
Case Study on Problem Solving: Algorithm, Flowchart and Pseudo code for the problems: Exchanging the values of two variables – Finding the biggest number - Counting – Summation of numbers – Factorial computation – Generation of Fibonacci Sequence - Summation of series – Base Conversion - Reversing the digits of an Integer.

UNIT – III   **9**
Introduction to C and Control Statements: Overview of C – Basic structure of a C Program – Executing a C Program – C Character set – Tokens – Keywords and Identifiers – Constants – Variables – Data types - Storage classes - Managing Input and Output operations – Operators and Expressions - Decision making and Branching - Looping – break and continue statements.

UNIT – IV   **9**
Arrays, Strings and Functions: Arrays – One dimensional and Two dimensional arrays - Handling of character strings: Declaring and initializing string variables – String handling functions - Library functions – User defined functions: Elements of User defined Functions – nesting of functions – passing arrays to function – passing strings to functions - recursion.

UNIT – V   **9**
Structures, Unions and Pointers: Structure definition – Structure declaration – Accessing a structure member- Structure initialization – Array of Structures - Arrays within structures –Structures within Structures – Structures and Functions, Unions. Understanding pointers – Accessing address of a variable – Declaring pointer variables – Initialization of pointer variables – accessing a variable through its pointer – Pass by value vs. Pass by pointers.

Lecture: 45, Practical: 45, TOTAL: 90

REFERENCE BOOKS:
1.   R.G.Dromey, "How to Solve it by Computer", Pearson Education, 2009.
2.   E.Balagurusamy, "Fundamentals of Computing and Programming", Tata McGraw-Hill Education Pvt. Ltd, 2010.
3.   Stephen G Kochan, "Programming in C", Third Edition, Pearson Education, 2005.
4.   Yashavant P. Kanetkar, " Let Us C", BPB Publications, 2011.

Course Outcomes:
On completion of the course the students will be able to
* apply fundamental principles of problem solving techniques
* develop algorithm, flowchart and pseudo code to provide solutions to problems
* develop programs using basic programming principles of C language
* Implement modular programming concepts using functions
* design simple applications using arrays, structures and pointers

14IST13 DIGITAL PRINCIPLES

3   1   0   4

UNIT – I
9

Binary Systems and Logic Gates: Digital Systems – Binary Numbers – Number Base Conversions – Octal Numbers – Hexadecimal Numbers – Complements – Signed Binary Numbers – Binary Codes – Binary Storage and Registers – Binary Logic – Digital Logic Gates.

UNIT – II
9

Minimization and Boolean Algebra: Basic Theorems and Properties of Boolean Algebra – Boolean Functions – Canonical and Standard Forms – Minimization: POS – SOP – K-Map Method: 2-variable, 3-variable, 4-variable – Don't Care Conditions – NAND and NOR Implementation.

UNIT – III
9

Combinational Logic: Combinational circuits – Analysis Procedure – Design Procedure – Binary Adder-Subtractor – Half Adder – Full Adder – Half Subtractor – Full Subtractor – Decimal Adder – Binary Multiplier –Magnitude Comparator – Decoders – Encoders – Multiplexers.

UNIT – IV
9

Synchronous Sequential Logic: 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.

UNIT – V
9

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 BOOKS:
1. Morris Mano, M., Michael D. Ciletti, "Digital Design", Fourth edition, Pearson Education, New Delhi, 2012.

REFERENCE BOOKS:
1. Floyd Thomas, L., "Digital Fundamentals", Eleventh Edition, Prentice Hall, New Delhi, 2014.
2. Yarbrough, John M., "Digital Logic: Applications and Design", First Edition, Cengage Learning, India Pvt. Ltd., New Delhi, 2006.
3. Givone, Donald D., "Digital Principles and Design", First Edition, Tata McGraw-Hill Education Pvt. Ltd., New Delhi, 2012.

Course Outcomes:

On completion of the course, the student will be able to
*   apply the principles of logic gates.
*   use boolean algebra and K-maps to manipulate and minimize logic expressions and functions
*   design the sequential circuits using flip flops
*   analyze the operation of circuits built with various flip-flops
*   perform the operation of latches, flip-flops, registers and counters

14IST14 FUNDAMENTALS OF COMPUTER SCIENCE

3   0   0   3

UNIT – I   9
Basics of Computer: Introduction to Computer: Introduction – Digital and Analog Computers – Characteristics – History – Generations – Classification – Computer System – Applications – The Computer System Hardware: Introduction – Central Processing Unit – Memory – Instruction – Microprocessor – Interconnection – Performance – Inside a Computer Cabinet.

UNIT – II   9
Fundamentals of Memory and IO Devices: Computer Memory: Introduction – Representation – Hierarchy – CPU Registers – Cache Memory – Primary and Secondary Memory – Access types – Magnetic storage – Optical storage – Using memory – Input and Output Devices: Introduction – I/O Unit – Data Entry Devices – Output Devices – I/O Port – Working of I/O system.

UNIT– III   9
Basics of Software: Interaction of User and Computer: Introduction – Types of Software – System and Application Software – Software Acquisition – Operating System: Introduction – Objectives – Types and Functions of OS – Process Management – Memory Management – File Management – Device Management – Protection and Security – User Interface – Examples of OS.

UNIT – IV   9
Network and Internet Fundamentals: Data Communication and Computer Network: Introduction – Importance – Transmission Media – Data Transmission and Data Networking – Computer Network – Wireless Networking – Internet and Internet Services: Introduction – History – Protocol – Architecture – Managing and Connecting to the Internet – Connections – Internet Address – Internet Services – Uses of Internet.

UNIT – V   9
Fundamentals of Database and Security: Introduction – Database – Database System – Database Management System – Database System Architectures – Database Applications – Computer Security: Introduction – Security Threat and Attack – Malicious Software – Hacking – Security Services – Mechanisms – Cryptography – Digital Signature – Firewall – Authentication – Security Measures – Awareness – Policy.

TOTAL: 45

TEXT BOOKS:
1.   Anita Goel, "Computer Fundamentals", Pearson Education India, 2013.
REFERENCE BOOKS:
1.   Sinha, K.Pradeep, Sinha Priti, "Computer Fundamentals", Third Edition, BPB Publications, New Delhi, 2004.
2.   Balagurusamy, E., **"**Fundamentals of Computers"**,** Tata McGraw-Hill Ltd, New Delhi, 2009.
3.   Rajaraman,V., "Fundamentals of Computers", Fifth Edition, PHI Learning Pvt. Ltd., 2010.
Course Outcomes:
On completion of the course the student will be able to
*   demonstrate the functions of computer components
*   describe the functions of system and application software
*   develop skills on computer networks and its connections
*   exhibit the basic understanding of how to use the Internet for communication, education, research, and business
*   develop confidence with database management system and computer security

14VEC11 VALUE EDUCATION

                                                               0   2   1   1

UNIT – I   **6**
Philosophy of Life Science: Life – Purpose of life (four stages of life) – Philosophy of life (who am 'I') – Law of nature (cause of the life and body) – Content of the Life (five sheaths) – Goal of life. Five duties in life.
Methodology: Life and messages of spiritual and national leaders– The forgotten hero, etc.
Project report: Complementing with happiness - Every soul is potentially divine

UNIT – II   **6**
Human Values-Moral foundation: Truth, forgiveness, compassion, endurance, humility, non violence, moderate diet, non stealing, self purification, self discipline, self study, content, cleanliness, honesty, and totality in faith– Good habits – Attitude forming for Individual peace.
Practical Methods: Personal experience with above characters, Puranic Stories - Self resolve diary maintenance

UNIT – III   **6**
Social Values: Family – Family System - Greatness of women – World brotherhood (vasudeiva kudumbagam) – Glorious Bharath - Bharathian systems - Past –Present – Future - Team spirit - Goal setting – Economics – Education – Politics – Responsibilities of people – Preserving natural resources.
Methodology: Preparing an album on glorious Bharath Past, Present and Future Plans. Goal setting - Management Games. Team Spirit - Yogic Games.

UNIT – IV   **6**
Development of Mental Prosperity: Prosperity of mind – Functions of mind - Obstacles of mind - Practical method to perfect mind is yoga – Types – Uses – Precaution – Contradiction – Kriyas - Asanas – Pranayamas – Meditative techniques.
Methodology: Asana - Pranayama – Cyclic meditation – Nada anu sandhana – Meditation – Yogic games for memory. Album on asanas , pranayama and mantra.

UNIT – V   **6**
Maintenance of Physical Health: Human body – Structure - Ten Systems of the body as per modern science. Five elements - Harmonious relationship – Life force – Conserving vitality & health through natural life – Pranic food and its importance – Uses of herbs - Right way of cooking to preserve nutrients - Cause of the disease – Acute and chronic - Disease - Life and death.
Methodology: Natural food making, traditional millet dishes. Asanas, pranayamas, cleansing procedures. Quiz on healthy living, Uses of herbs or kitchen garden.

                                                                   TOTAL : 30
TEXT BOOK:
1.   "Value Education", compiled by Vethathiri Maharishi Institute for Spiritual and Intuitional Education, Aliyar, Pollachi, for Kongu Engineering College
Course Outcomes:
On completion of the course the students will be able to
 * understand the purpose and value of life
 * exhibit positive human values
 * understand social values
 * take steps to develop mental and physical health

14ISL11 COMMUNICATION SKILLS AND CAREER DEVELOPMENT LABORATORY - I

0	0	3	1

LIST OF EXPERIMENTS:

1. Listening:
   - Listening to grammar exercises
   - Listening to famous speeches
2. Speaking:
   - Introduction on speech mechanism
   - Speaking on general topics
   - Presenting an abstract
3. Reading:
   - Vocabulary drilling
   - Reading newspaper
4. Writing:
   - Dialogue writing
   - Letter writing
   - Circular writing
   - Paragraph writing

TOTAL: 45

REFERENCES / MANUALS / SOFTWARE:

- Globarena

Course Outcomes:

On completion of the course the students will be able to

- enhance students communication skill
- enrich their vocabulary
- develop creative writing skills
- Helps to overcome their inferiority in communication

14ISL12 DIGITAL LABORATORY

<div align="right">0   0   3   1</div>

LIST OF EXPERIMENTS:
1. Verification of AND, OR, NOT, NAND, NOR, XOR Logic Gates
2. Code Converters
3. Parity Generator
4. Half Adder / Full Adder
5. Half Subtractor / Full Subtractor
6. Encoder / Decoder
7. Multiplexer / Demultiplexers
8. Binary and BCD counter
9. Up / Down 4 bit Binary Counter
10. Shift Register
11. Ring counter

<div align="right">TOTAL: 45</div>

REFERENCES / MANUALS / SOFTWARE:
- Digital Trainer Kit
- Integrated Circuits

Course Outcomes:
On completion of the course the student will be able to
- apply the principles of Boolean algebra to manipulate and minimize logical expressions
- analyze the operation of sequential circuits built with various flip-flops
- use registers and counters in required applications

14ISL13 OFFICE AUTOMATION LABORATORY

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LIST OF EXPERIMENTS:

MS-WORD

1. Create a Word document by Formatting the Margin, Page Size, Orientation, Indent and Change the Font Size, Type, Style, Color and Effects of the contents in the document.
2. Design an advertisement for a news paper by inserting pictures, water mark, borders and charts.
3. Insert a table to the document and apply table properties (Insert a Row and Column, Delete Row and Column, Format height and Width) and add hyperlink.
4. Type a Letter in word document and send it to various recipients using Mail Merge.

MS-EXCEL

1. Using spread sheet, create and format the contents using mathematical functions.
2. Analyse the marks of the students in a class using appropriate charts with excel.
3. Apply Sorting and Filtering options for the contents of the spread sheet.

MS-POWER POINT

1. Create a presentation with different layouts and designs.

MS-ACCESS

1. Design a database in Microsoft Access to store the details of employees.
2. Import the above created table in Excel through External Data Sources.

<div align="right">**TOTAL: 45**</div>

REFERENCES / MANUALS / SOFTWARE:

- Office Suite

Course Outcomes:

On completion of the course the student will be able to

- prepare, format and align documents
- create charts and perform mathematical functions in excel
- build power point slides for any presentation
- create and manipulate tables in a database

14IST21 COMMUNICATIVE ENGLISH – II

3   0   0   3

UNIT – I   **9**
Grammar & Vocabulary: Use of Pronouns/ Prepositions/ Conjunctions- Infinitives and Gerunds. Writing: Writing descriptions: places, people, buildings, events; Comprehension passage-I (Question and Answer & Multiple choice). **Verbal Activities** (NOT FOR EXAMINATION):
Listening : Listening to Conversations; Speed Reading: Reading short stories; Speaking: Informal presentation.

UNIT – II   **9**
Grammar & Vocabulary: Voice- Active/ Passive / Impersonal Passive; Writing: Report writing, Note making. **Verbal Activities** (NOT FOR EXAMINATION):
Listening : Listening to Presentations; Speed Reading: Reading Passages (general); Speaking: Formal presentation.

UNIT – III   **9**
 Grammar & Vocabulary: Four Types of Sentences- Declarative- Interrogative- Imperative- Exclamatory; Writing: Essay writing; Comprehension passage-III (Complete the sentence).
Verbal Activities (NOT FOR EXAMINATION):
Listening : Listening to Announcements; Speed Reading: Reading News clips; Speaking: Participating in Interviews.

UNIT – IV   **9**
Grammar & Vocabulary: Simple Sentences- Complex Sentences- Compound Sentences   [If clause]; Writing: Transcoding: Transferring information from passages to charts and tables – converting information from charts and tables to passages; Comprehension passage-IV (True or False, Match the Synonyms and Antonyms). **Verbal Activities** (NOT FOR EXAMINATION):
Listening : Listening to Instructions; Speed Reading: Reading technical passages; Speaking: Oral Presentation – General/Technical.

UNIT – V   **9**
Grammar & Vocabulary: 1.Punctuation 2. Spotting errors; Writing: Formal letter writing – Job application letter; Comprehension passage-V (Reasoning or Moral Questions).
Verbal Activities (NOT FOR EXAMINATION):
Listening : Listening to TV News; Speed Reading: Reading Tongue twisters; Speaking: Group Discussion.

TOTAL: 45

TEXT BOOKS:
1.   Santana Sinha Chaudhuri, "Learn English – A Fun Book of Functional Language, Grammar And Vocabulary", McGraw Hill Education [India] Pvt. Ltd, 2013.
REFERENCE BOOKS:
1.   Sangeeta Sharma and Mishra Binod, " Communication Skills for Engineers and Scientists", PHI Learning Pvt. Ltd., New Delhi. 2011.
2.   Leena Sen, "Communication Skills", Prentice Hall of India Pvt. Ltd., 2009.
Course Outcomes:
On completion of the course the student will be able to
- improve their grammar and vocabulary for use in different contexts
- get familiarized with different methods of listening skills
- get familiarized with different methods of reading
- speak effectively in English in various situations
- acquire knowledge about various academic and technical writing skills

14IST22 MATHEMATICAL STRUCTURES

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UNIT – I   9
Propositional Calculus: Propositions – Truth table – Logical operators – Tautologies and contradictions – Logical Equivalences and implications – Laws of logic – Principal disjunctive normal form and Principal conjunctive normal form – Proofs in propositional calculus : Direct proof– Conditional conclusion – Indirect proof– Inconsistent set of Premises.

UNIT – II   9
Predicate calculus: Predicates – Statement function – Variables and quantifiers – Predicate formulae – Free and Bound variables – The Universe of discourse – Logical implications and equivalence for Quantified statements – Theory of inference of predicate calculus.

UNIT – III   9
Relations and Functions: Basic operations on sets – Relations – Properties of relations – Equivalence relation – Equivalence classes – Partition – Partial ordering relations – Composition of relations – Closure operations on relations – Warshall's algorithm for transitive closure – Functions – Injective, Surjective and Bijective functions – Composition of functions – Inverse functions.

UNIT – IV   9
Counting Techniques and Recurrence Relations: Mathematical induction – Pigeon hole principle – Principle of inclusion and exclusion – Permutations and Combinations – Permutations with repetition – Circular permutation – Principle of inclusion and exclusions- Recurrence relations – Solution of linear recurrence relations- Generating functions. (Simple Problems only)

UNIT – V   9
Graph Theory: Basic definitions – Degree of a vertex – Some special simple graphs – Matrix representation of graphs – Paths, cycles and connectivity – Eulerian and Hamiltonian graphs – Connectedness in directed graphs – Trees – Spanning trees – Kruskal's algorithm – Prim's algorithm. (Simple Problems only)

Lecture:45, Tutorial:15, TOTAL: 60

TEXT BOOKS:
1. Kenneth, H., Rosen, "Discrete Mathematics and its Applications", Seventh Edition, Tata McGraw - Hill Pub. Co. Ltd., New Delhi, 2012.
2. Natarajan, A.M., Tamilarasi, A., and Balasubramanie, P., "Mathematical Foundations of Computer Science", Scitech Publishers(India) Pvt. Ltd., 2008.

REFERENCE BOOKS:
1. Tremblay, J.P. and Manohar, R., "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw- Hill, New Delhi, 2010.
2. Veerarajan, T., "Discrete Mathematics with Graph Theory and Combinatorics", Eighteenth Reprint, Tata McGraw- hill, New Delhi, 2013.

Course Outcomes:
On completion of the course the student will be able to
- deal with propositions, predicates and their inferences
- analyze the sets, relations, functions
- work with counting techniques
- solve recurrence relations
- have a clear idea about connectedness of a graph and find the minimal spanning tree

14IST23 OBJECT ORIENTED PROGRAMMING WITH C++

3 0 0 3

Pre-Requisites: Basics of C Programming

UNIT – I   **9**
Introduction : Object-Oriented Programming Paradigm – Basic Concepts – Benefits of OOP – Beginning with C++ – Structure of C++ Program – Tokens, Expressions and Control Structures - Functions in C++: The Main Function – Function Prototyping – Call by Reference – Return by Reference – Inline Functions – Function Overloading.

UNIT – II   **9**
Classes and Objects, Constructors and Destructors : 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 – Constructors and Destructors: Constructors – Parameterized Constructors – Multiple Constructors – Copy Constructor – Dynamic Constructors – Destructors.

UNIT – III   **9**
Operator Overloading and Inheritance : 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 - Virtual Base Classes – Abstract Classes – Constructors in Derived Class.

UNIT – IV   **9**
Pointers, Polymorphism and Streams : Pointers - Pointers to Objects – This Pointer – Pointers to Derived Classes – Virtual Functions – Pure Virtual Functions - Managing Console I/O Operations: C++ Streams – C++ Stream Classes – Unformatted I/O Operations – Formatted Console I/O Operations – Managing Output with Manipulators.

UNIT - V   **9**
Files and Exception Handling : 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 – Updating a File: Random Access - Error Handling During File Operations – Command Line Arguments - Exception Handling.

TOTAL: 45

TEXT BOOKS:
1. Balagurusamy, E., "Object Oriented Programming with C++", Fifth Edition, Tata McGraw-Hill, New Delhi, 2013.

REFERENCE BOOKS:
1. Venugopal K.R, Rajkumar Buyya, "Mastering C++", Second Edition, Tata McGraw Hill, New Delhi, 2013.
2. Trivedi, B., "Programming with ANSI C++", Oxford University Press, Oxford, 2010.
3. Herbert Schildt, "C++ The Complete Reference", Fifth Edition, Mc-Graw Hill Education, United States of America, 2012.

Course Outcomes:
On completion of the course the student will be able to
- demonstrate the differences between traditional imperative design and object-oriented design
- elucidate class structure as fundamental, modular building blocks
- pertain the concepts of constructors and destructors
- understand and apply various object oriented features like inheritance, data abstraction,
- encapsulation and polymorphism to solve various computing problems using C++ language
- exercise exception handling and data manipulation through file in C++

14IST24 DATA STRUCTURES

3   0   0   3

UNIT - I   **9**

Arrays and Stacks: Linear Data Structures and their Sequential Storage Representation - Concepts and Terminology for Nonprimitive Data Structures - Storage Structures for Arrays – Structures and Array of Structures - Stacks – Operations on Stacks – Application: Recursion – Conversion of Infix Expressions to Polish Notation.

UNIT – II   **9**

Queues and Linked List: Queues – Operations – Circular Queue - Priority Queue – Application: Simulation - Linear Data Structures and their Linked Storage Representation - Pointers and Linked Allocation – Linked Linear Lists – Operations – Circularly Linked Linear Lists – Doubly Linked Linear Lists – Applications: Polynomial Manipulation.

UNIT – III   **9**

Trees : Nonlinear Data Structures – Definitions and Concepts - Operations on Binary Trees – Storage Representation and Manipulation of Binary Trees – Linked Storage Representation – Threaded Storage Representation - Application: The Manipulation of Arithmetic Expressions.

UNIT - IV   **9**

Graphs : Graphs and their Representations - Matrix Representation of Graphs – List Structures – Other Representation of Graphs - Breadth First Search – Depth First Search – Spanning Trees – Application: PERT.

UNIT - V   **9**

Sorting and Searching : Sorting - Notation and Concepts – Selection Sort – Bubble Sort – Merge Sort – Heap Sort – Quick Sort - Radix Sort – Searching Techniques: Linear Search and Binary Search.

TOTAL: 45

TEXT BOOKS:
1. Tremblay, J.P. and Sorensen, P.G., - "An Introduction to Data Structures with Applications", Second Edition, Tata McGraw Hill, New Delhi, Reprint 2013.

REFERENCE BOOKS:
1. Ellis Horowitz & Sartaj Sahni "Fundamentals of Data Structures", Galgotia Publications.
2. Balagurusamy, E., "Computer Programming and Data Structures", Third Edition, Tata McGraw-Hill, New Delhi, 2012.
3. M. Tenenbaum and Augestien, "Data Structures using C", Third Edition, Pearson Education 2009.

Course Outcomes:
On completion of the course the student will be able to
- perceive the concepts of data type, data structure and array structures
- understand and apply various data structures such as stack, queue, tree and graph in real world scenarios
- implement linked list data structure to solve various problems
- comprehend the working principle of various searching and sorting techniques
- effectively choose the data structure that efficiently model the information in a problem

14IST25 COMPUTER ARCHITECTURE

3   1   0   4

Pre-requisites: Digital Principles

UNIT – I   **9**
Basic Structure and Machine Instructions: Introduction – Functional Units – Basic Operational Concepts – Bus Structures – Performance – Multiprocessors and Multicomputers – Machine Instructions: Numbers, Arithmetic Operations and Characters – Memory Locations and Addresses – Memory Operations – Instructions and Instruction Sequencing – Addressing Modes.

UNIT – II   **9**
Arithmetic Operations: Addition and Subtraction of Signed Numbers – Design of Fast Adders – Multiplication of Positive Numbers – Signed Operand and Fast Multiplication – Integer Division – Floating Point Numbers and Operations.

UNIT – III   **9**
Basic Processing Unit and Pipelining: Fundamental Concepts –Execution of a Complete Instruction – Multiple Bus Organization – Hardwired and Microprogrammed Control – Pipelining: Basic Concepts –Data and Instruction Hazards.

UNIT – IV   **9**
Memory Systems: Basic Concepts – Semiconductor RAM – ROM – Speed Size and Cost – Cache Memories – Performance considerations – Virtual Memories – Memory Management Requirements – Secondary Storage – Associative Memories.

UNIT – V   **9**
Input/Output Organization: Introduction – Accessing I/O Devices – Interrupts – Direct Memory Access – Buses – Case Study of one RISC and one CISC Processor.

Lecture:45, Tutorial:15, TOTAL: 60

TEXT BOOKS:
1.   Hamacher Carl, Vranesic Zvonko, and Zaky Safwat, "Computer Organization", Sixth Edition, McGraw Hill, New York, 2013.

REFERENCE BOOKS:
1.   Patterson David, A. and Hennessy, John L., "Computer Organization and Design: The Hardware / Software Interface", Second Edition, Harcourt Asia, Morgan Kaufmann, Singapore, 2009.
2.   Hayes, John P., "Computer Architecture and Organization", Third Edition, Tata McGraw-Hill, New Delhi, 2008.
3.   Stallings William, "Computer Organization and Architecture: Designing for Performance", Sixth Edition, Pearson Education, New Delhi, 2003.

Course Outcomes:
On completion of the course the student will be able to
- become familiar with fundamental knowledge on computer architecture
- analyze the operations of functional units, memory and addressing modes
- understand Secondary Storage Organization and Problem Solving
- work with ALU functions, Input and Output processing
- familiar with pipelined and RISC/CISC architectures

14ISL21 COMMUNICATION SKILLS AND CAREER DEVELOPMENT LABORATORY-II

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LIST OF EXPERIMENTS:

I. LISTENING TO SOFTWARE PACKAGES:
    i.   Cloze exercises
    ii.   Choose the best option-Vocabulary
    iii.   Choose the best option-Discourse

II. SPEAKING:
    i.   Introducing oneself and answering FAQ's
    ii.   Making a presentation
    iii.   Participating in Group Discussion
    iv.   Introduction on Soft Skills

III. READING:
    i.   Reading a text – Vocalization
    ii.   Practicing Stress & Intonation
    iii.   Reading News clips

IV. WRITING:
    i.   Writing a Job application letter with Resume
    ii.   Preparing a draft and writing a summary on the presentation topic

TOTAL: 45

REFERENCES / MANUALS / SOFTWARE:

1. Young India Software:
- Tense Buster Intermediate
- Tense Buster Advanced
- Issues in English

2. Video Files:
- Videos for Speaking

Course Outcomes:

On completion of the course the student will be able to
- make students familiar with the pronunciation styles of the native speakers of English
- participate in communicative activities in formal contexts effectively
- write effective reports and improve accuracy in the use of language
- to involve themselves in all the verbal activities
- reproduce the content effectively in English language

14ISL22 OBJECT ORIENTED PROGRAMMING WITH C++ LABORATORY

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LIST OF EXPERIMENTS:

1. Simple programs in C++
2. Command Line Arguments
3. Inline functions and default function arguments
4. Function Overloading
5. Constructors, Destructors, Instantiation of Objects and Dynamic Object
6. Friend functions and Friend class
7. Operator Overloading
8. Inheritance
9. Virtual Functions
10. Streams
11. Files
12. Exception Handling

TOTAL: 45

REFERENCES / MANUALS / SOFTWARE:

- Borland C++

Course Outcomes:
On completion of the course the student will be able to
- write procedural C++ programs to solve various problems
- understand the implementation issues related to object-oriented techniques
- gain some practical experience of C++
- build good quality software using object-oriented techniques

14ISL23 DATA STRUCTURES LABORATORY

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LIST OF EXPERIMENTS:

1. Array Operations
2. Stack and its Operations
3. Applications of Stack
4. Queue and its Operations
5. Linear Linked List Operations
6. Binary tree traversals
7. Breadth First Search
8. Depth First Search
9. Selection Sort
10. Quick Sort
11. Heap Sort
12. Linear and Binary Search

<div align="right">TOTAL: 45</div>

REFERENCES / MANUALS / SOFTWARE:

- Borland C

Course Outcomes:

On completion of course the student will be able to

- identify the appropriate data structure for a given problem
- gain practical knowledge on the application of data structures
- handle operations like searching, sorting, insertion, deletion, traversing mechanisms on various data structure

14IST31 PROBABILITY AND STATISTICAL METHODS

4   0   0   4

Pre–requisites: Mathematics

UNIT – I   **12**

Probability: Basic Terminologies– Mathematical Probability– Axiomatic Approach to Probability– Some Theorems on Probability– Addition Theorem on Probability– Conditional Probability– Multiplication Theorem on Probability– Independence of Events– Total Probability– Baye's Theorem–Definition of Random variable.

UNIT – II   **12**

Correlation and Regression: Definition and Meaning of Correlation– Scatter Diagram– Karl Pearson's Coefficient of Correlation – Probable Error for Correlation Coefficient– Rank Correlation– Spearman's Rank Correlation Coefficient– Repeated Ranks– Regression Line of Y on X– Regression Line of X on Y.

UNIT – III   **12**

Test of Significance for Small Samples: Student's t Test– Test of Significance Between the Sample Mean and the Population Mean– Test for Difference Between Two Means– F–test for Difference Between Two Population Variances– Chi–square Test for Goodness of Fit– Chi–square Test For Independence of Attributes.

UNIT – IV   **12**

Analysis of Variance: Basic Definitions – Assumptions in Analysis of Variance– One Way Classification– Two way Classification– Randomized Block Design– Completely Randomized Block Design– Latin Square Design.

UNIT – V   **12**

Statistical Quality Control: Control Charts– Types of Control Charts– Mean Chart– R– Chart, σ– Chart, C–Chart(Number of Defectives)– P–Chart(Fraction Defective)– Advantages and Limitations of Statistical Quality Control

TOTAL: 60

TEXT BOOK:

1.   Gupta S.P, " Statistical Methods", 35th Revised Edition, Sultan Chand & Sons, New Delhi, 2007.

REFERENCE BOOKS:

1.   Gupta S.C and Kapoor V.K, "Fundamentals of Mathematical Statistics", 11th Revised Edition, Sultan Chand & Sons, New Delhi, Reprint 2007.
2.   Veerarajan T, " Probability, Statistics and Random processes", 3rd Edition, Tata McGraw Hill Publishing Company, New Delhi, 2008.

Course Outcomes:

On completion of the course the students will be able to

* deal with probability and the related areas
* analyze statistical measures such as correlation and regression
* perform test of significance for small samples
* apply analysis of variance and randomized block design
* use control charts for monitoring quality

14IST32 JAVA PROGRAMMING

4 0 0 4

Pre–requisites: Object Oriented Programming

UNIT – I   12
Introduction: Java Features – How Java Differs from C and C++ – Java and Internet – Java Environment – Overview of Java Language: Simple Java Program – More of Java – An Application with Two Classes – Java Program Structure – Java Tokens – Implementing a Java Program – Java Virtual Machine – Command Line Arguments – Constants, Variables and Data Types: Constants – Variables – Data Types – Declaration of Variables – Giving Values to Variables – Scope of Variables – Type Casting – Operators and Expressions.

UNIT – II   12
Classes and Inheritance: Decision Making and Branching – Decision Making and Looping – Classes, Objects and Methods: Defining a Class – Fields Declaration – Methods Declaration – Creating Objects – Accessing Class Members – Constructors – Method Overloading – Static Members – Nesting of Methods – Inheritance: Extending a Class – Overriding Methods – Final Variables and Methods – Final Classes – Abstract Methods and Classes – Visibility Control.

UNIT – III   12
Arrays, Interfaces and Packages: Arrays – One–dimensional Array – Creating an Array – Two–Dimensional Arrays – Strings – Vectors – Wrapper Classes – Enumerated Types – Interfaces: Defining Interfaces – Extending Interfaces – Implementing Interfaces – Accessing Interface Variables – Packages: Java API Packages – Using System Packages – Naming Conventions – Creating a Package – Accessing a Package – Using a Package – Adding a Class to a Package – Hiding Classes.

UNIT – IV   12
Multithreading and Exception Handling: Creating Threads – Extending the Thread Class – Stopping and Blocking a Thread – Life Cycle of a Thread – Using Thread Methods – Thread Exceptions – Thread Priority – Synchronization – Implementing the Runnable Interface – Managing Errors and Exceptions: Types of Errors – Exceptions – Syntax of Exception Handling Code – Multiple Catch Statements – Using Finally Statement – Throwing Our Own Exceptions.

UNIT – V   12
Applet Programming and Streams: How Applets Differ from Applications – Preparing to Write Applet – Building Applet Code – Applet Life Cycle – Creating an Executable Applet – Designing a Web Page – Applet Tag – Adding Applet to HTML File – Running the Applet – More About Applet Tag – Passing Parameters to Applets – Concepts of Streams – Stream Classes – Byte Stream Classes – Character Stream Classes – Using Streams – Using the File Class – Creation of Files – Reading and Writing of Characters – Reading and Writing of Bytes – Random Access Files.

TOTAL: 60

TEXT BOOK:

1. Balagurusamy, E., "Programming with Java – A Primer", 5th Edition, Tata McGraw Hill Publishing Company, New Delhi, 2014.

REFERENCE BOOKS:

1. Dietel and Dietel., "Java How to Program", 10th Edition, Prentice Hall of India, New Delhi, 2014.
2. Schildt Herbert., "Java – The Complete Reference", 9th Edition, Tata McGraw Hill Publishing Company, New Delhi, 2014.

Course Outcomes:
On completion of the course the students will be able to
- gain knowledge on object oriented programming with java
- create multithreaded programs in java
- develop the user defined packages
- design GUI applications using applet
- implement the concept of streams and files

14IST33 DATABASE MANAGEMENT SYSTEMS

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UNIT – I 12

Introduction: Database System Applications- Purpose - View of Data - Data Models- Transaction Management - Database Architecture- Data Mining and Information Retrieval – Specialty Databases – Users and Administrators – History of Database Systems - Relational Model: Structure of Relational Databases- Database Schema – Keys – Schema Diagrams.

UNIT – II 12

Introduction to SQL : Relational Query Languages - Relational Algebra Operations- SQL – Data Definition – Basic Structure –Basic Operations – Set Operations – Null Values and Aggregate Functions– Nested Sub Queries- Modification of Databases

UNIT – III 12

SQL and ER modeling : Join Expressions – Views – Transactions – Integrity Constraints – Triggers – SQL - Data Types and Schemas - Authorization - Database Design and ER Model – ER Diagrams – Extended ER Features

UNIT – IV 12

Relational Database Design: Features of Good Relational Designs - 1NF-Functional Dependencies-Decomposition Using Functional Dependencies - 2NF- Boyce Codd Normal Form - 3NF - 4NF - More Normal Forms- Database Design Process

UNIT – V 12

Data Storage: Storage and File Structures – Overview- RAID – Tertiary Storage- File Organization-Data Dictionary - Indexing and Hashing – Basics – Ordered Indices – B+ Tree Index Files -Static and Dynamic Hashing.

TOTAL: 60

TEXT BOOK:

1. Abraham Silberschatz, Henry F Korth and Sudarshan S, "Database System Concepts", 6th Edition, Mc Graw Hill, 2011.

REFERENCE BOOKS:

1. Ramez Elmasri and Shamkanth B. Navathe, "Fundamentals of Database Systems", 5th Edition, Pearson Education, 2013.
2. Date C.J., Kannan A and Swamynathan S., "An Introduction to Database Systems", Pearson Education, 2012.

Course Outcomes:

On completion of the course the students will be able to
- implement various data models.
- write queries for data manipulation
- design relational databases
- normalize databases
- apply various types of indices

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14IST34 SOFTWARE ENGINEERING

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UNIT – I   **12**

Process Models: The Nature of Software – Software Engineering – The Software process – Software Engineering Practice – Software Myths. Process Models : A Generic Process Model – Process Assessment and Improvement – Prescriptive Process Models – Specialized Process Models– The Unified Process – Personal and Team Process Models – Process Technology – Product and Process.

UNIT – II   **12**

Requirements Engineering and Modeling: Requirements Engineering – Establishing the Ground Work – Eliciting Requirements – Developing Use Cases – Building the Requirement Model – Negotiating Requirements – Validating Requirements. Requirement Modeling: Requirement Analysis – Scenario–Based Modeling – UML Models – Data Modelling Concepts – Class – Based Modeling.

UNIT – III   **12**

Design Concepts and Architectural Design: Design within the context of Software Engineering – The Design process – Design concepts – The Design model. Architectural Design: Software Architecture – Architectural Genres – Architectural Styles – Architectural Design – Assessing Alternative Architectural Designs – Architectural Mapping Using Data Flow.

UNIT – IV   **12**

Software Quality: Quality Concepts: Software Quality – Software Quality Dilemma – Achieving software Quality. Review Techniques: Cost Impact of Defects – Defect Amplification and Removal – Review Metrics and their use – Reviews – Informal Reviews – Formal Technical Reviews. Software Quality Assurance: Issues – Elements – SQA Tasks – Goals and Metrics – Formal Approaches to SQA – Statistical SQA – Software Reliability – ISO 9000 Quality Standards – SQA Plan.

UNIT – V   **12**

Software Testing Strategies: A strategic approach to software testing – Strategic Issues – Test Strategies for Conventional software – Test Strategies for Object oriented software – Validation testing – System testing – The Art of Debugging. Testing Conventional Applications: Software Testing Fundamentals – Internal and External Views of Testing – White Box Testing – Basis Path Testing – Control Structure Testing – Black Box Testing.

TOTAL: 60

TEXT BOOK:

1. Roger S. Pressman, "Software Engineering – A Practitioners Approach", 7th Edition, Tata McGraw Hill Publishing Company, New Delhi, 2014.

REFERENCE BOOKS:

1. Sommerville Ian, "Software Engineering", 8th Edition, Pearson Education Asia, Singapore, 2009.
2. Ghezzi, "Fundamentals of Software Engineering", 2nd Edition, Prentice Hall of India, New Delhi, 2013.

Course Outcomes:

On completion of the course the students will be able to

- understand process models
- translate requirements specification into an implementable design
- learn about architectural design
- acquire knowledge in software quality assurance
- gain knowledge in testing strategies

14IST35 DESIGN AND ANALYSIS OF ALGORITHMS

3   0   0   3

Pre–requisites: Data Structures

UNIT – I   **9**

Introduction, Divide and Conquer: Introduction: Algorithm Specification – Performance Analysis – Divide and Conquer: General Method – Binary Search – Finding the Maximum and Minimum – Merge Sort – Quick Sort.

UNIT – II   **9**

Greedy Method and Dynamic Programming: The Greedy Method**:** The General Method – Knapsack Problem – Tree Vertex Splitting – Minimum–Cost Spanning Trees – Prim's Algorithm – Kruskal's Algorithm – An Optimal Randomized Algorithm – Dynamic Programming: The General Method – Multistage Graphs – All–Pairs Shortest Paths – Single–Source Shortest Paths – Optimal Binary Search Trees – The Travelling Salesperson Problem.

UNIT – III   **9**

Basic Traversal and Search Techniques: Techniques for Binary Trees – Techniques for Graphs – Breadth First Search and Traversal – Depth First Search and Traversal – Connected Components and Spanning Trees – Biconnected Components and DFS.

UNIT – IV   **9**

Backtracking: The General Method – The 8–Queens Problem – Sum of Subsets – Graph Coloring – Hamiltonian Cycles – Knapsack Problem.

UNIT – V   **9**

Branch–and–Bound, NP–Hard and NP–Complete Problems: Branch and Bound: The Method – Least Cost (LC) Search – The 15–puzzle – Control Abstractions – Bounding – FIFO Branch–and–Bound – LC Branch–and–Bound – 0/1 Knapsack Problem – Travelling Salesperson Problem – NP–Hard and NP–Complete Problems: Basic Concepts.

TOTAL: 45

TEXT BOOK:

1. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, "Fundamentals of Computer Algorithms", 2nd Edition, Galgotia Publications, New Delhi, 2008.

REFERENCE BOOKS:

1. Anany Levitin, "Introduction to the Design and Analysis of Algorithms", 3rd Edition, Pearson Education, New Delhi, 2015.
2. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", 3rd Edition, Prentice Hall of India, New Delhi, 2009.

Course Outcomes:

On completion of the course the students will be able to

- learn good principles of algorithm design
- analyse algorithms and estimate their worst-case and average-case behaviour
- compare the efficiency of algorithms using asymptotic complexity
- master different algorithm design techniques like divide and conquer, greedy, dynamic programming, branch and bound etc
- categorize the classes of problems P, NP, NP-hard and NP-complete

14ISL31 JAVA PROGRAMMING LABORATORY

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LIST OF EXPERIMENTS / EXERCISES:

1. Simple java programs
2. Programs using branching and iterative statements
3. Programs using class
4. Constructors
5. Method overloading
6. Inheritance
7. Interfaces
8. Packages
9. Multithreading
10. Exception Handling
11. Applets

TOTAL : 60

REFERENCES / MANUALS / SOFTWARE:

1. Windows–Operating System
2. JDK1.5 or higher version

Course Outcomes:

On completion of the course the students will be able to

- design a basic java program
- implement the solution for the problem using package and inheritances
- handle exceptions and design applets

14ISL32 RDBMS LABORATORY

0	0	4	2

LIST OF EXPERIMENTS / EXERCISES:

1. Implementation of data definition statements and keys

2. Data manipulation and queries

3. Data control statements

4. Join operations

5. Complex and nested sub queries

6. Creating views and index

7. Transaction control statements

8. Implementation of triggers in PL/SQL

9. Implementation of cursors in PL/SQL

10. Exception handling

TOTAL : 60

REFERENCES / MANUALS / SOFTWARE:

1. Oracle SQL 10g, MS Access

Course Outcomes:
On completion of the course the students will be able to
- create tables with key constraints
- write queries for data manipulation
- implement triggers and cursors

14ISL33 SOFTWARE ENGINEERING LABORATORY

0	0	2	1

LIST OF EXPERIMENTS / EXERCISES:

To prepare SRS, Data flow modeling and compute Cyclomatic Complexity for the following exercises

1. Student mark sheet preparation

2. Order processing in a hotel

3. Payroll system

4. Library management system

5. Bank management system

6. Inventory system

7. Railway reservation system

8. College admission system

9. Online shopping

10. Hospital information maintenance system

TOTAL : 30

REFERENCES / MANUALS / SOFTWARE:

1. Microsoft Visio

Course Outcomes:
On completion of the course the students will be able to
- develop SRS before developing the project
- draw the dataflow diagram for the given specification
- demonstrate the principle of software development

14IST41 OPTIMIZATION TECHNIQUES

4   0   0   4

Pre–requisites: Mathematics

UNIT – I   **12**
Linear Programming : Graphical Method – Some Exceptional Cases– Slack Variables, Surplus Variables– Simplex Method– Artificial Variable Techniques– Big M Method– Two Phase Simplex Method– Limitations of Linear Programming.

UNIT – II   **12**
Transportation and Assignment Models: Transportation Problem – Initial Basic Feasible Solution – North West Corner Rule– Least Cost Method– Vogel's Approximation Method– Optimum Basic Feasible Solution by MODI Method– Degenaracy–Assignment Problem– Solution by Using Hungarian Method.

UNIT – III   **12**
Network Models: Phases of Project Management – Network Construction–Rules of Network Construction– Critical Path Method(CPM)– Forward Pass Computation– Backward Pass Computation– Computation of Total, Free and Independent Floats– Critical Path– Project Evaluation and Review Technique(PERT).

UNIT – IV   **12**
Decision Theory: Introduction to Decision Analysis– Steps in Decision Theory Approach– Decision Making Environments– Decision Under Uncertainty– Criterion of Pessimism– Criterion of Optimism– Laplace Criterion– Criterion of Realism– Criterion of Regret– Decision under Certainty– Decision Making Under Risk– Expected Monetary Value (EMV) Criterion – Expected Opportunity Loss (EOL) Criterion –Expected Value of Perfect Information (EPPI).

UNIT – V   **12**
Game Theory: Introduction to Games– Basic Terminologies– Two Person Zero Sum Game– Games Without Saddle Points: Mixed Strategies– Dominance Property– Matrix Method–Algebraic Method for 2 ×2 Games– Graphical Method for 2 ×n and n × 2 Games.

TOTAL: 60

TEXT BOOK:
1. Natarajan A.M, Balasubramanie P and Tamilarasi A, "Operations Research", 2nd Edition, Pearson Education, 2014.

REFERENCE BOOKS:

1. Kanti Swarup, Gupta P.K and Man Mohan, "Operations Research" , 17th Edition, S. Chand & Co., New Delhi, 2014.
2. Hamdy A.Taha, Natarajan A.M, Balasubramanie P, and Tamilarasi A, "Operations Research – An Introduction", 8th Edition, Pearson Education, New Delhi, 2008.

Course Outcomes:
On completion of the course the students will be able to
- formulate and solve the linear programming models
- deal with transportation and assignment models
- perform network computations using PERT and CPM
- analyze various decision making environments
- discuss some game theory techniques

14IST42 COMPUTER NETWORKS

4   0   0   4

UNIT – I   12
Data Communication and Media: Data Communications– Components – Data representation and Data flow –Networks – Criteria–Physical Structures – Network types – Internet History–Standards and Administration – Protocol Layering – OSI model –TCP/IP protocol suite. Transmission Media – Guided Media – Unguided Media.

UNIT – II   12
Data Link Layer: Introduction – Link Layer Addressing–Error Detection and Correction – Introduction – Types of Errors – Redundancy – Detection Vs Correction – Coding. DLC services – Framing – Flow Control and Error control – Connectionless and Connection Oriented– Data Link Layer Protocols – Simple – Stop and Wait – Piggybacking – Wired LANs– Ethernet.

UNIT – III   12
Network Layer: Network Layer Services – Packet Switching – Network Layer Performance– Internet Protocol (IP) – Datagram Format – Fragmentation – Options – Security of IPv4 Datagrams– Unicast Routing : Introduction – Routing Algorithms.

UNIT – IV   12
Transport Layer: Introduction to Transport Layer– Transport Layer Services – Connectionless and Connection Oriented Protocols– User Datagram Protocol – Transmission Control Protocol.

UNIT – V   12
Application Layer: World Wide Web and HTTP – EMAIL – FTP – TELNET–Secure shell–Domain Name System.

TOTAL: 60

TEXT BOOK:
1. Behrouz A. Forouzan, "Data Communication and Networking", 5th Edition, Tata McGraw Hill, 2013.

REFERENCE BOOKS:

1. Larry L. Peterson and Peter S. Davie, "Computer Networks", 5th Edition, Elsevier, 2012.
2. Andrew S. Tanenbaum and David J. Wetherall, "Computer Networks", 5th Edition, Pearson Education, 2011.

Course Outcomes:
On completion of the course the students will be able to
- recognize the different internetworking devices and their functions
- explain the role of protocols in networking
- analyze the services and features of the various layers of data networks
- apply the functions of OSI layers in communication
- analyze the features and operations of various application layer protocols such as HTTP, DNS, and SMTP

14IST43 OPERATING SYSTEMS

3   1   0   4

UNIT – I   9
Overview and Process: Introduction: Roles of Operating System – Operating System Structure – Operations – Distributed Systems – Special Purpose Systems – System Structures: Operating System Services – System Calls – Types of System Calls – Process Concept: Concept – Process Scheduling – Operations on Processes – Interprocess Communication.

UNIT – II   9
Threads, Scheduling and Synchronization: Multithreaded Programming: Overview – Multithreading Models –Threading Issues – Process Scheduling: Basic Concepts – Scheduling Criteria – Scheduling Algorithms – Synchronization: Background – The Critical–Section Problem – Synchronization Hardware – Semaphores – Classic Problems of Synchronization.

UNIT – III   9
Deadlock and Memory Management: Deadlocks: System Model – Deadlock Characterization – Methods for Handling Deadlocks – Deadlock Prevention – Deadlock Avoidance – Deadlock Detection – Recovery from Deadlock – Memory–Management Strategies: Background –Swapping – Contiguous Memory Allocation – Paging – Segmentation.

UNIT – IV   9
Virtual Memory and File System: Virtual–Memory Management: Background – Demand Paging – Page Replacement – Thrashing – File System: File Concept – Access Methods – Directory and Disk Structure.

UNIT – V   9
File System Implementation and Disk Scheduling: Implementing File System: File–System Structure – File–System Implementation – Directory Implementation – Allocation Methods – Free Space Management – Secondary–Storage Structure: Overview – Disk Structure – Disk Scheduling.

Lecture:45, Tutorial:15, TOTAL: 60

TEXT BOOK:
1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts", 8th Edition, John Wiley & Sons, 2011.

REFERENCE BOOKS:

1. Andrew S. Tanenbaum and Albert S. Woodhull, "Operating Systems Design and Implementation", 3rd Edition, Pearson Education, 2009.
2. Harvey M. Deitel, Paul Deitel and David R. Choffnes, "Operating Systems", 3rd Edition, Pearson Education, 2009.
3. William Stallings, "Operating Systems: Internals and Design Principles", 8th Edition, Pearson Education, 2014.

Course Outcomes:
On completion of the course the students will be able to
- possess knowledge of the role of Operating Systems and their types
- apply the concept of a process, thread and scheduling algorithms
- apply the concepts of process synchronization and how it is achieved
- realize the concept of deadlock and different ways to handle it
- realize various memory management techniques and File System

14IST44 OBJECT ORIENTED SYSTEM DESIGN

4	0	0	4

Pre–requisites: Software Engineering

UNIT – I   **12**

Object Basics: 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.

UNIT – II   **12**

Object–Oriented Methodologies: Rumbaugh Object Modeling Technique – The Booch Methodology – The Jacobson Methodologies – Patterns – Frameworks – The Unified Approach.

UNIT – III   **12**

Unified Modeling Language: 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

UNIT – IV   **12**

Object Oriented Analysis: 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.

UNIT – V   **12**

Object Oriented Design: Object Oriented Design Process – Object Oriented Design Axioms Corollaries – Design Patterns – Designing Classes – Case Study.

        TOTAL: 60

TEXT BOOK:

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

REFERENCE BOOKS:

1. Michael Blaha and James Rumbaugh, "Object Oriented Modeling and Design with UML", Prentice Hall of India, 2012.
2. Mike O'Docherty, "Object Oriented Analysis and Design", Wiley, 2005.
3. Grady Booch, , "Object Oriented Analysis and Design", Pearson Education, 2009.

Course Outcomes:

On completion of the course the students will be able to

- understand object orientation and describe the development stages of object-oriented programming
- manage the relationships and hierarchies between objects
- understand various object oriented analysis techniques
- learn object oriented design axioms and patterns
- design application oriented UML diagrams

14IST45 REQUIREMENTS ENGINEERING

3   0   0   3

Pre–requisites: Software Engineering

UNIT – I   **9**
Introduction: Importance of Requirements Engineering – Challenges – Success Factors – Definition – Characteristics - Requirements Engineering and Artifact Modeling – RE Taxonomy- Artifact Model – Tips for Requirements Engineering

UNIT – II   **9**
Eliciting Requirements: Introduction – Issues and Problems in Requirements Elicitation – Requirements Elicitation Methods – Customer Specific Business Rules - Requirements and Cost Estimation – Tips for Gathering Requirements.

UNIT – III   **9**
Requirements Modeling: Model Driven Requirements Engineering (MDRE) – Advantages – Prerequisites – MDRE Processes – Heuristics – Determining Model Completeness – Transitioning – Design Model Structure

UNIT – IV   **9**
Quality attribute requirements: An Integrated Model - Quality Attribute Requirements – Selecting Stakeholders – Methods for Architectural Requirements Engineering - Requirements Engineering Platforms – Challenges – Experience – Tips for RE Platforms

UNIT – V   **9**
Requirements Managements: Background – Change Management – Traceability – Scalability – Organizational Issues – Requirements Driven System Testing - Requirements Engineering Inputs for Testing – Test Performance and Scalability – Rules of Thumb

TOTAL: 45

TEXT BOOK:
1. Brian Berenbach, Daniel Paulish, Juergen Kazmeier and Arnold Rudorfer, "Software and Systems Requirements Engineering: in Practice", Tata McGraw Hill Publishing Company, New Delhi, 2009.

REFERENCE BOOKS:
1. Sommerville Ian and Sawyer Peter, "Requirement Engineering: A Good Practice Guide", Wiley India, 2009.
2. Axel van Lamsweerde, "Requirement Engineering: From System Goals to UML Models to Software Specifications", Wiley India, 2009.
3. Elizabeth Hull, Ken Jackson and Jeremy Dick, "Requirements Engineering", Springer Publication, 2013.

Course Outcomes:
On completion of the course the students will be able to
- analyze the requirements in the problem
- solve the issues in requirements engineering process
- elicit and validate the requirements
- perform data flow and object oriented modeling
- test the requirements

14ISL41 NETWORK PROGRAMMING LABORATORY

0	**0**	**4**	**2**

LIST OF EXPERIMENTS / EXERCISES:

1. Implementation of URL

2. Implementation of echo

3. Design remote command execution

4. Design TCP/IP client sockets

5. Develop an application for transferring files over the port

6. Develop a client – server application for chat

7. Implementation of ARP

8. Implementation of RARP

9. Implementation of Dijkstra's algorithm

10. Implementation of ping command to check the connectivity

TOTAL : 60

REFERENCES / MANUALS / SOFTWARE:

1.   JDK1.4

Course Outcomes:
On completion of the course the students will be able to
- design and implement TCP/IP communication
- apply appropriate method for transferring files
- implement ARP and RARP protocols

14ISL42 OPERATING SYSTEMS LABORATORY

0	0	4	2

LIST OF EXPERIMENTS / EXERCISES:

1. Basic UNIX commands

2. Shell Programs

3. Write a program using the system calls of UNIX operating system Process management: fork, exec, getpid, exit, wait, close, stat, opendir, readdir

4. Write a program using the I/O system calls of UNIX operating system (open, read, write, etc)

5. Implement interprocess communication using pipes and message queues

6. Given the list of processes, their CPU burst times and arrival times, compute and print the average waiting time and average turnaround time using FCFS scheduling

7. Given the list of processes, their CPU burst times and arrival times, compute and print the average waiting time and average turnaround time using SJF Scheduling

8. Write a program using file system related system calls to create, open, read, write, seek into, close files and open, read, write, search, close directories

9. Implement the page replacement algorithm using FIFO

10. Implement the page replacement algorithm using LRU

TOTAL : 60

REFERENCES / MANUALS / SOFTWARE:
1. Unix Operating System
2. Borland C

Course Outcomes:

On completion of the course the students will be able to

*   work with basic commands in UNIX
*   use the UNIX file system and file access control
*   implement process scheduling and memory management algorithms

14ISL43 CASE TOOLS LABORATORY

0	0	2	1

LIST OF EXPERIMENTS / EXERCISES:

1. Determining the scope of the given problem

2. Analyze the Requirements for the given problem

3. Generating use case model
   a. Identifying actors
   b. Identifying use cases
   c. Writing use case description (detailed use case)

4. Design and create class model
   a. Finding methods
   b. Refining attributes and associations

5. Perform class diagram with generalization/specialization

6. Generating behavioral model by creating activity diagram

7. Generating sequence diagrams

8. Generating collaboration diagrams

9. Generating state diagrams

10. Generating C++ and Java code to implement the above model

TOTAL : 30

REFERENCES / MANUALS / SOFTWARE:
1. Rationale Rose Lab manual
2. Ali Bahrami, "Object Oriented Systems Development", Tata McGraw Hill Publishing Company, New Delhi, 2008.

Course Outcomes:
On completion of the course the students will be able to
- generate requirements specification
- model the use case diagram, class diagram, sequence diagram and activity diagram
- generate skeleton codes in Visual Basic, C++ and Java

14IST51 .NET PROGRAMMING

3   1   0   4

Pre– requisites: Basic knowledge in Object oriented programming

UNIT – I   **9**
Introduction: Understanding .Net: The C# Environment – Overview of C# – Literals, Variables and Data Types – Operators and Expressions – Decision Making and Branching – Decision Making and Looping.

UNIT – II   **9**
Methods, Arrays, Strings, Structures, Enumerations and Classes: Methods in C# – Arrays – Manipulating Strings – Structures and Enumerations – Classes and Objects.

UNIT – III   **9**
Inheritance, Interface, Delegates, Errors and Exception: Inheritance and Polymorphism – Interfaces: Multiple Inheritance – Operator Overloading – Delegates and Events – Errors and Exceptions.

UNIT – IV   **9**
Building a better Window: Overview of the Windows forms Namespace – Interacting with the Windows forms types – control events – Building menus with windows forms – Understanding Status bars – Building a Tool Bar – A minimal and complete windows forms application – Interacting with the system registry and event – programming with windows form controls.

UNIT – V   **9**
C# and ADO .Net: The need for ADO .NET – Data Providers – Understanding Names – Types of System.Data – Data Relation type – Understanding Data View type – Role of the DataSet –Data Relation type – Reading and writing XML – Based DataSet – Building a simple test database – Selecting a data provider – working with connected layer of ADO.net and OleDbDataReader – Working with the SQL Data Provider – Auto– Generating SQL commands using CommandBuilder Types – A Complete ADO.Net Windows forms Example – Working with DataSets at design time.

Lecture: 45,Tutorial: 15,TOTAL: 60

TEXT BOOKS:
1. Balagurusamy E., "Programming in C#: A Primer", 3rd Edition, Tata McGraw Hill, New Delhi, 2010.
2. Troelsen Andrew, "C# and the .NET Platform", 2nd Edition, DreamTech Press, New Delhi, 2008.

REFERENCE BOOKS:
1. Herbert Schildt, "C# 4.0: Complete Reference", Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2013.

Course Outcomes:
On completion of the course the students will be able to
*   demonstrate the architecture of .Net Framework
*   design C# programs using Console and Windows application
*   implement the inheritance and polymorphism features in the program
*   handle the errors and exceptions in the application
*   create the application that integrates back end databases

14IST52 WEB TECHNOLOGY

4   0   0   4

Pre-requisites: Basic knowledge in Networking and Java

UNIT – I   **12**
Introduction to Internet and HTML: Introduction to Computers and Internet: History of the Internet– History of the world wide web– JavaScript: object– based scripting for web– Browser portability– Internet and world wide web how to program– Dynamic HTML– Introduction to HTML4 – Intermediate HTML4.

UNIT – II   **12**
Javascript: JavaScript /Jscript– Introduction to Scripting – Control Structures I : control structures– the if selection structure– the if/else selection structure – The while repetition structure. Control Structures II: The for repetition structure– The switch Multiple selection structure –The do/while repetition structure –break and continue statement –logical operators. JavaScript Functions.

UNIT – III   **12**
Javascript Arrays, Objects and CSS: JavaScript Arrays – JavaScript Objects – Cascading Style Sheets– Inline styles –Creating style sheets– Conflicting style sheets– Linking External style sheets– positioning Elements– Background Dimensions– Text Flow and the Box model– User Style Sheets.

UNIT – IV   **12**
DHTML Event Handling and Object Mode: DHTML Event Handling and Data Binding : Dynamic HTML Event Model– Onclick– Onload– Onerror– Onmousemove– Onmouseout– Onfocus and Onblur– Onsubmit and Onreset– Event Bubbling– DHTML Object model and collections

UNIT – V   **12**
Data Binding with Tabular Data and XML : Data Binding with Tabular Data Control XML : XML– Structuring Data– Document Type Definitions– Customized Markup Languages– XML Parsers– Using XML with HTML– XSL– Schema– XHTML.

TOTAL : 60

TEXT BOOKS:
1. H.M Dietel, P.J Dietel, Nieto T.R., " Internet and World Wide Web How to Program", Pearson Education ,2012.

REFERENCE BOOKS:
1. Xavier C., "World Wide Web Design with HTML", Tata McGraw Hill, New* Delhi, 2008.
2. Paul Deitel, Harvey Deitel, Abbey Deitel, "Internet and World Wide Web– How To Program", 5th Edition, Prentice Hall, 2012.
3. Brain A. Croft, Rick Darnell and Shelly Powersl, "Dynamic Web Publishing" 2nd Edition, TechMedia, New Delhi, 2006.

Course Outcomes:
On completion of the course the students will be able to
- explore about web technology concepts and functioning of Internet
- apply the features of markup languages in creating web pages
- use scripting to validate the web pages
- perform event handling actions using scripts
- explore the basic concepts of Extensible Markup Language

14IST53 SOFTWARE TESTING

4	0	0	4

Pre– requisites: Software Engineering

UNIT – I   **12**

White Box and Black Box Testing: White Box Testing: Introduction – Static Testing – Structural Testing – Challenges in White– Box Testing – Black Box testing: What is Black Box Testing – Why, When and How to do Black Box Testing.

UNIT – II   **12**

Integration, System and Acceptance Testing: Integration Testing: Introduction – Integration Testing as a Type and a Phase of Testing – Scenario Testing – Defect Bash. System and Acceptance Testing: Overview – Why System Testing–Functional System Testing – Non– Functional Testing – Acceptance Testing – Summary of Testing Phases.

UNIT – III   **12**

Performance and Regression Testing: Introduction – Factors Governing Performance Testing – Methodology – Tools and Process for Performance Testing – Challenges. Regression Testing: What is Regression Testing – Types – When and How to do Regression Testing – Best Practices

UNIT – IV   **12**

Ad Hoc, Usability and Accessibility Testing: Ad hoc Testing : Overview – Buddy and Pair Testing – Exploratory and Iterative Testing – Agile and Extreme Testing – Defect Seeding – Usability and Accessibility Testing: Usability Testing – Approach – When and How – Quality Factors – Aesthetics Testing – Accessibility Testing – Tools – Lab Setup – Test Roles.

UNIT – V   **12**

Test Planning, Management, Execution and Reporting: Introduction – Test Planning – Test Management – Test Process – Test Reporting – Best Practices –Process – People – Technology.

TOTAL: 60

TEXT BOOKS:
1. Srinivasan Desikan and Gopalaswamy Ramesh, "Software Testing: Principles and Practices", Pearson Education, 2013.

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", 3rd Edition, Wiley India, New Delhi, 2005.
3. Pressman Roger S., "Software Engineering: A Practitioners Approach", 7th Edition, McGraw-Hill, New York, 2010.

Course Outcomes:

On completion of the course the students will be able to
- verify and validate the software developed
- apply various testing techniques during software development
- design and automate high quality tests during unit and integration testing
- build a suite of tests that covers every feature in an application
- develop confidence with development of testable software

14IST54 MOBILE COMMUNICATIONS

<div align="right">4   0   0   4</div>

Pre– requisite : Computer Networks

UNIT – I   **12**

Introduction: Wireless Transmission: Frequencies for Radio Transmission– Signals– Antennas– Signal Propagation– Multiplexing– Modulation – Spread Spectrum– Cellular Systems– Medium Access Control: Motivation for a Specialized MAC– SDMA– FDMA– TDMA– CDMA– Comparison of S/T/F/CDMA.

UNIT – II   **12**

Telecommunications Systems: GSM– Mobile Services– System Architecture– Radio Interface– Protocols– Localization And Calling– Handover– Security– New Data Services – Satellite Systems: History– Applications– Basics– Routing– Localization– Handover.

UNIT – III   **12**

Wireless LAN: Infra Red Vs Radio Transmission– Infrastructure And Ad– Hoc Network– IEEE 802.11– System Architecture– Protocol Architecture– Physical Layer– Medium Access Control Layer– MAC Management– Bluetooth: User Scenarios– Architecture– Radio Layer– Baseband Layer– Link Manager Protocol.

UNIT – IV   **12**

Mobile Network Layer: Mobile IP: Goals, Assumptions And Requirements– Entities And Terminology– IP Packet Delivery– Agent Discovery– Registration – Tunneling And Encapsulation – Optimizations– Reverse Tunneling– IPv6 – IP Micro Mobility Support. Dynamic Host Configuration Protocol. Mobile ad– hoc networks: Routing – Destination Sequence Distance Vector– Dynamic Source Routing– Alternative Metrics– Overview ad– hoc Routing Protocols.

UNIT – V   **12**

Mobile Transport Layer: Traditional TCP : Congestion Control – Slow Start – Fast retransmit/fast recovery – Implications of mobility – Classical TCP improvements : Indirect TCP – Snooping TCP – Mobile TCP – Fast retransmit/fast recovery – Transmission/Time– out Freezing – Selective retransmission – Transaction Oriented TCP – TCP over 2.5/3G Wireless Networks – Performance Enhancing Proxies.

<div align="right">**TOTAL : 60**</div>

TEXT BOOKS:
1. Jochen Schiller, "Mobile Communiations", 2nd Edition, Pearson Education, Delhi, 2012.

REFERENCE BOOKS:
1. Lee, William C.Y., "Mobile Cellular Telecommunications", 2nd Edition, McGraw-Hill, New York, 2006.
2. Pahlavan, Kaveh and Krishnamoorthy, Prasanth, "Principles of Wireless Networks", PHI, New Delhi, 2006.

Course Outcomes:

On completion of the course the students will be able to
- understand the mechanisms that are used to control the medium access
- gain knowledge on mobile telecommunication systems
- present the wireless local area network technologies
- analyze mobile network layer
- understand the protocols and mechanisms developed for the network layer to support mobility

14ISL51 .NET PROGRAMMING LABORATORY

| | | 0 | 0 | 4 | 2 |

LIST OF EXPERIMENTS /EXERCISES:

1. Simple program with branching and looping statements
2. Program with class
3. Programs on method overloading
4. Implement constructor to initialize the data members in a class
5. String Functions and Regular Expressions
6. Inheritance and sub class constructor
7. Errors and Exception
8. Delegates and Multicast delegates
9. Design a windows application form in C#
10. Connect the C# windows application to the database using Data Controls

TOTAL: 60

REFERENCES / MANUALS / SOFTWARE:

1. Microsoft Visual Studio 2008, SQL Server/MS– Access/Oracle, MSDN Collection

Course Outcomes:

On completion of the course the students will be able to

- develop a console application with basic concepts
- design a desktop application using controls
- integrate back end database and application

14ISL52   WEB TECHNOLOGY LABORATORY

0	0	2	1

LIST OF EXPERIMENTS /EXERCISES:

1. Create a HTML web page using Headers ,Image, Links

2. Create a HTML web page using Lists

3. Create a web page using Table elements

4. Write a Program using Frame element

5. Design a web form using HTML controls.

6. Design a web page using Cascading style sheet.

7. Apply image effects for a HTML web page.

8. Change the color, font size, font face at runtime using DHTML.

9. Write a program for client side image map.

10. Write a validation code for Registration form using Java Script.

11. Program for mouse events using javascript

12. Create a DTD for XML style sheet.

TOTAL : 30

REFERENCES / MANUALS / SOFTWARE:
1. Godbole, Achyut and Kahate, Atul., "Web Technologies: TCP/IP, Web/Java Programming and Cloud Computing", 3rd Edition, Tata McGraw-Hill, New Delhi, Second Reprint 2014.
2. www.w3school.com
3. Xavier C., "World Wide Web Design with HTML", Tata McGraw-Hill, New Delhi, 2008.
4. Deitel P.J. and Deitel H.M., "Internet and World Wide Web: How to Program", 4th Edition, Prentice Hall of India, New Delhi, 2008.

Course Outcomes:
On completion of the course the students will be able to
- design a Static Web Page using simple HTML tags
- design a form using form elements in HTML
- validate a web page using client side scripting
- use style sheets to design a web page
- create a server side page

14ISL53 SOFTWARE TESTING LABORATORY

0   0   4   2

LIST OF EXPERIMENTS /EXERCISES:

1. Recording test in analog and context sensitive mode.

2. Checking GUI objects.

3. Checking tables.

4. Checking bitmap objects.

5. Creating data driven test.

6. Perform verification and validation testing for a web form.

7. Write a test suite containing minimum 4 test cases.

8. Running and analyzing a test with regular expressions.

9. Maintaining test script.

10. User defined functions.

TOTAL : 60

REFERENCES / MANUALS / SOFTWARE:
1. Windows– Operating System
2. Win Runner, Load Runner, Selenium, Test Director, Junit

Course Outcomes:

On completion of the course the students will be able to
- implement the testing methodologies using different test tools
- generate test cases for various applications
- check various objects and maintain the test script

14IST61 ADVANCED JAVA PROGRAMMING

3   1   0   4

Pre-requisites: Basic knowledge in java programming

UNIT – I   **9**
Java Network Programming: Looking up Internet Addressing – Retrieving data with URL's – Sockets for Clients – Sockets for Servers – UDP datagrams and Sockets – Multicast Sockets – The URL Connection class.

UNIT – II   **9**
Servlet Programming: Introduction – Web Applications, Support for Servlets, Power of Servlets – HTTP Servlet Basics – Application Programming Interface (API) , Page Generation – The Servlet life cycle – Retrieving information – Sending HTML information

UNIT – III   **9**
Security And Database Connectivity: Session tracking – User Authentication – Hidden Form Fields – URL Rewriting – Cookies, API – Security – Authentication – Digital Certificates, SSL – Database Connectivity – Rational Databases – API, Transaction, JDBC Techniques – Applet Servlet Communication – Communication Options, Daytime Server, Chat Server

UNIT – IV   **9**
Java Server Pages: JSP Overview – JSP Syntax and Semantics – JSP Development Model – Components of a JSP Page – Expressions and Scriptlets.

UNIT – V   **9**
JSP Standard Template Library: Request Dispatching – The Page Directive – JSP Extensions – Developing Your First Custom Tags – Tag Libraries – Database Connections

Lecture:45, Tutorial:15, TOTAL: 60

TEXT BOOKS:
1. Harold, Elliotte Rusty, "Java Network Programming", 2nd Edition, Shroff Publishers and Distributors, New Delhi, 2004.
2. Hunter Jason and Crawford William, "Java Servlet Programming", 2nd Edition, Shroff Publishers and Distributors, New Delhi, 2004.
3. Hanna, Phil, "JSP2.0: Complete Reference", 2nd Edition, Tata McGraw-Hill, New Delhi, 2005.

REFERENCE BOOKS:
1. Budi Kurniawan, "Java for the Web with Servlets, JSP, and EJB: A Developer's Guide to J2EE Solutions: A Developer's Guide to Scalable Solutions", 1st Edition, New Riders, 2002.
2. Naughton Patrick and Schildt Herbert "Java 2: The Complete Reference", 3rd Edition, Tata McGraw-Hill, 2007.

Course Outcomes:
On completion of the course the students will be able to
- develop a network oriented application using java
- demonstrate the concepts of servlets
- design a web page using JSP
- develop application with validation, cookies and sessions
- connect the back end databases with the application

14IST62 ADVANCED DATABASE TECHNOLOGIES

       4   0   0   4

Pre– Requisites: Database Management Systems

UNIT – I   **12**
Query Processing and Optimization: Query processing: Overview – Measures – Selection operation – Sorting – Join operations – Query Optimization: Transformation of relational expressions – Estimating statistics of expression results – Choice of evaluation plans

UNIT – II   **12**
Transaction and Concurrency Control: Transaction management: Transaction concept, A simple model Transaction atomicity and durability – Isolation – Serializability – Isolation levels implementation – Transactions as SQL statements– Testing for serializability – Concurrency control: Lock based protocols – Timestamp based protocols – Validation based protocols – Deadlock handling .

UNIT – III   **12**
Recovery System and DBMS Architecture: Recovery system: Log based recovery – Recovery with concurrent transactions – Buffer management – Database system architecture: Centralized and client–server architectures – Server system architectures – Parallel systems – Distributed systems –Network types

UNIT – IV   **12**
Parallel Databases: Parallel databases – Introduction – I/O Parallelism – Interquery parallelism – Intraquery parallelism – Intraoperation parallelism– Interoperation parallelism.

UNIT – V   **12**
Distributed Databases: Distributed databases – Data storage – Distributed transactions– Commit protocols – Concurrency control in distributed databases – Availability – Distributed query processing – Cloud databases

                                                         TOTAL: 60

TEXT BOOKS:
1. Silberschatz, Abraham, Korth, Henry F., S.Sudarshan, "Database System Concepts", 6th Edition, Mc Graw-Hill, 2011.

REFERENCE BOOKS:
1. Ramez Elmasri, Shamkanth B. Navathe, "Fundamentals of Database Systems", 5th Edition, Pearson Education, 2013.
2. Raghu Ramakrishnan, Johannes Gehrke, "Database Management Systems", 3rd Edition, McGraw-Hill Education, 2003.

Course Outcomes:

On completion of the course the students will be able to

*   optimize the queries
*   understand transaction concepts in databases
*   handle concurrent transactions
*   recover the databases
*   manage distributed and parallel databases

14IST63   SOFTWARE PROJECT MANAGEMENT

                    4   0   0   4

Prerequisites: Software Engineering

UNIT – I   **12**
Introduction and Project Evaluation: Introduction to Software Project Management and Other Types of Projects – Problems With Software Projects– Project Evaluation and Programme Management – Project Portfolio Management– Risk Evaluation and Programme Management

UNIT – II   **12**
Project Planning and Effort Estimation: An overview of Project Planning– Step Wise Project Planning– Selection of an Appropriate Project Approach– Choosing Methodologies and Technologies – Software Effort Estimation – Techniques– Function Points– Cost Estimation

UNIT – III   **12**
Activity Planning and Risk Management: Objectives –Project Schedule– Sequencing and Scheduling Activities – Network Planning Models – Formulating Network – Time Dimensions – Forward and Backward Pass– Critical Path – Critical Activities– Categories of Risk

UNIT – IV   **12**
Resource Allocation, Monitoring and Control: Resource Allocation – Identifying Resource Requirements – Scheduling Resources Creating Critical Paths – Counting the Cost and Cost Schedules – Scheduling Sequence – Monitoring and control– Creating Framework– Review– Earned Value Analysis

UNIT – V   **12**
Managing Contracts and People, Organizing Teams: Types of Contracts– Stages– Terms of Contract– Managing People in Software Environments– Understanding Behaviour– Selecting the Right Person– – Working in Teams– Becoming a Team – Decision Making –Organization and Team Structures– Communication– Leadership

                                     TOTAL: 60

TEXT BOOKS:
1. Cotterell Mike and Hughes Bob, "Software Project Management", 5th Edition, Tata McGraw Hill, New Delhi, 2012.

REFERENCE BOOKS:
1. Nina S. Godbole, "Software Quality Assurance: Principles and Practice", 2nd Edition, Narosa Publishing House Pvt. Ltd., 2012.
2. Gobalswamy Ramesh, "Managing Global Software Projects: How to Lead Geographically Distributed Teams, Manage Process and use Quality Models", 4th Edition, Tata McGraw Hill, New Delhi, 2008.

Course Outcomes:
On completion of the course the students will be able to
- understand project management activities and steps in project planning
- create an effective cost estimation technique that suits all types of projects
- analyze software risks and risk management strategies
- define and analyze the different ways of project monitoring and control
- negotiate contracts

14IST64 COMPUTER GRAPHICS

4   0   0   4

UNIT – I   12
Introduction to Computer Graphics: A Survey of Computer Graphics–Overview of Graphics Systems– Output Primitives: Points and Lines, DDA, Bresenham's Algorithms – Properties of Circles and Ellipse – Circle and Ellipse Drawing Algorithm

UNIT – II   12
Two Dimensional Geometric Transformations: Basic Transformations– Matrix Representations– Composite Transformations– Two Dimensional Viewing: Line Clipping – Polygon Clipping– Curve Clipping – Text Clipping

UNIT – III   12
Three– Dimensional Concepts and 3D Transformations: Three– Dimensional Display Methods – Parallel and Perspective Projection– Depth Cueing– Visible Line Surface and Identification– Surface Rendering– Three Dimensional Graphics Packages– Three Dimensional Geometric and Modeling transformations.

UNIT – IV   12
Three Dimensional Viewing: Viewing Pipeline– Coordinates– Transformation from World to Viewing Coordinates –Projections – General Projections – Clipping– Hardware Implementation– 3D Viewing– Visible Surface Detection Methods.

UNIT – V   12
Color Models And Animation: Color Models and Color Applications: Properties of Light– Standard Primaries and the Chromaticity Diagram– Intuitive Color Concepts– RGB – YIQ – CMY – HSV– HLS. Computer Animation: Animation Sequences– Animation Functions – Morphing– Simulating Accelerations– Motion Specifications

TOTAL : 60

TEXT BOOKS:
1.   Donald Hearn and Baker Pauline M., "Computer Graphics", C Version, 2nd Edition, Prentice Hall of India, New Delhi, 2014.

REFERENCE BOOKS:
1.   Foley James D., Van Dan Andries, Feiner Stevan K. and Hughes John F., "Computer Graphics:Principles and Practices in C", 2nd Edition, Pearson Education, New Delhi, 2012.
2.   Harrington Steven, "Computer Graphics : A Programming Approach", 2nd Edition, McGraw-Hill, New York, 2011.

Course Outcomes:
On completion of the course the students will be able to
- understand the basics of computer graphics and applications of computer graphics
- understand 2D graphics and algorithms
- demonstrate 2D and 3D geometrical transformations
- gain knowledge in computer animation
- attain various surface detection methods

14ISL61 ADVANCED JAVA PROGRAMMING LABORATORY

                                                    0   0   4   2

LIST OF EXPERIMENTS /EXERCISES:

1. To retrieve IPAddress, Port number, Domain name

2. Program to display the contents of the HTML page

3. Client server Communication with TCP Protocol

4. Client server Communication with UDP Protocol

5. Simple Servlet Program

6. Servlet Program to accept input from user

7. Program to connect servlet with database

8. Simple JSP Program

9. JSP web page with validatin

10. Program in JSP to connect database

                                                    TOTAL: 60

REFERENCES / MANUALS / SOFTWARE:

1. Java, Eclipse/Netbeans, MsAccess/MySQL/Oracle

Course Outcomes:

On completion of the course the students will be able to

- design network program using java
- implement web application using servlets and JSP
- interact with the database

14ISL62 DATABASE APPLICATIONS LABORATORY

0   0   4   2

LIST OF EXPERIMENTS /EXERCISES:

1. Practicing basic tools in a front– end tool
2. Designing user interfaces
3. Connectivity of back– end database with front– end tool
4. Usage of stored procedures
5. Application for Employee payroll system
6. Application for Library management system
7. Application for sales order processing
8. Implementation of transactions along with commit and rollback statements
9. Application for electricity billing system (using JDBC)
10. Student mark sheet preparation (using JDBC)

TOTAL : 60

REFERENCES / MANUALS/SOFTWARE:

1. Oracle SQL 10g, Visual studio, Java

2. Satish Asnani, "Oracle Database 11g : Hands– On SQL & PL/SQL", PHI Learning, 2010.

3. Kelvin Loney, "Oracle Database 11g: The Complete Reference", McGraw-Hill, Oracle Press,2008.

4. http://docs.oracle.com/cd/B28359_01/index.htm

Course Outcomes:

On completion of the course the students will be able to

- design user interface
- connect database with front-end tool
- implement database oriented applications

14ISL63 COMPUTER GRAPHICS LABORATORY

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LIST OF EXPERIMENTS /EXERCISES:

1. Implement line drawing Algorithms

2. Implement Cohen Sutherland 2D line clipping algorithm

3. Perform animation effects using C

4. Applying basic tools in Adobe Photoshop

5. Design a poster using Adobe Photoshop

6. Implement animation effects using Flash

7. Develop a Presentation using Flash

8. Develop a simple game using Flash

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TOTAL : 30

</div>

REFERENCES / MANUALS/SOFTWARE:
1. Donald Hearn and M. Pauline Baker, 'Computer Graphics C Version', 2nd Edition, Prentice Hall of India, New Delhi, 2007.
2. "Macromedia Flash MX2004: Complete Reference", Tata McGraw Hill Publishing Company Ltd., New Delhi, 2005.
3. "Adobe Photoshop CS2", Pearson Education, New Delhi ,2006.
4. http://helpx.adobe.com/photoshop/topics.html
5. www.macromedia.com

Course Outcomes:
On completion of the course the students will be able to
- understand the foundations of computer graphics
- create poster and multimedia presentation
- develop simple games

14IST81 DATA MINING AND DATA WAREHOUSING

4   0   0   4

Pre– requisites: Database Management Systems

UNIT – I   **12**
Data Warehousing: Introduction – Data Mining – Evolution – Kinds of Data – Kinds of Patterns – Data Warehousing and Online Analytical Processing: Basic Concepts – Data Warehouse Modeling: Data Cube and OLAP

UNIT – II   **12**
Data Preprocessing: Need for Data Preprocessing – Major Tasks – Data Cleaning – Data Integration – Data Reduction – Data Transformation and Data Discretization

UNIT – III   **12**
Association Rule Mining: Mining Frequent Patterns, Associations and Correlations – Basic Concepts – Frequent Itemset Mining Methods – Pattern Evaluation Methods – Constraint– Based Frequent Pattern Mining

UNIT – IV   **12**
Classification: Basic Concepts – Decision Tree Induction – Bayes Classification Methods – Rule– Based Classification – Bayesian Belief Networks – Classification by Backpropagation

UNIT – V   **12**
Clusters analysis: Requirements – Partitioning Methods – Hierarchical Methods – Outliers and Outlier Analysis – Outlier Detections Methods – Statistical Approaches

TOTAL: 60

TEXT BOOKS:
1. Jiawei Han, Micheline Kamber and Jian Pei, "Data Mining Concepts and Techniques", 3rd Edition, Elsevier, 2012.

REFERENCE BOOKS:
1. K.P. Soman, Shyam Diwakar and V. Ajay, "Insight into Data mining Theory and Practice", Easter Economy Edition, Prentice Hall of India, 2009.
2. G. K. Gupta, "Introduction to Data Mining with Case Studies", 3rd Edition, Easter Economy Edition, Prentice Hall of India, 2014.

Course Outcomes:
On completion of the course the students will be able to
- fathom the importance of data mining and data warehousing
- preprocess the data for mining
- mine frequent itemsets in association rule mining
- inculcate the knowledge in classification methods
- master the basic concepts and methods of cluster analysis

14IST82 NETWORK SECURITY

4   0   0   4

Prerequisite : Computer Networks

UNIT – I   **12**
Introduction: OSI Security Architecture – Attacks – Services – Mechanisms – Model for network security – Symmetric cipher model – Substitution and transposition techniques – DES – Strengths – Block Cipher design principles.

UNIT– II   **12**
Public Key Cryptography: Advanced Encryption Standard –   Principles of public key crypto systems – RSA algorithm – Diffie Hellman key Exchange – ElGamal – Elliptic curve arithmetic, cryptography.

UNIT –   **12**
III
Hash Functions: Cryptographic hash Functions – Applications – Simple hash functions – Requirements and Security – Secure Hash Algorithm. Message Authentication Codes: Message Authentication Requirements – Functions – Message Authentication code (MAC) – Security of MAC.

UNIT– IV   **12**
Key Management and Distribution: Key Management and Distribution – Symmetric key distribution – Distribution of public keys – X.509 Certificates – Public key Infrastructure – User Authentication – Remote user authentication – Principles, Symmetric Encryption – Kerbores.

UNIT– V   **12**
Network Security Practice: IP security: overview and Policy – ESP – Security associations – Internet Key Exchange. Intruders – Intrusion detection – Password management – Malicious software– Types – Viruses –Worms – Distributed Denial of Service Attacks.

TOTAL: 60

TEXT BOOKS:
1. Stallings William, "Cryptography and Network Security: Principles and Practice", 6th Edition, Pearson Education, New Delhi, 2014.

REFERENCE BOOKS:
1. Rhodes Ousley, Mark, Bragg, Roberta and Strassberg, Keith, "Network Security-The Complete Reference", Tata McGraw-Hill, 2004.
2. Kaufman, Charlie, Perlman, Radia and Speciner, Mike, "Network Security-Private Communication in a Public World", 2nd Edition, Pearson Education, New Delhi, 2008.

Course Outcomes:
On completion of the course the students will be able to
- aware the methods of conventional encryption
- apply the concepts of public key encryption and number theory
- design authentication and hash functions
- familiarize the system level security
- acquire knowledge in security issues, services, goals and mechanism

14IST83 ADVANCED SOFTWARE ENGINEERING

4   0   0   4

Pre-requisites: Software Engineering

UNIT – I   12

Generic View and Agile Process: Process models–Specialized process models – Unified process–Agile view of software process – Agility – Agile process models – Agile modeling.

UNIT – II   12

Risk and Change Management: Software risks – Risk identification – Risk projection – RMMM plan – Change management – Software Configuration Management – SCM baseline – Software Configuration items – SCM repository – SCM process – Version control – Change control – Configuration auditing and status reporting

UNIT – III   12

Process, Project and Product Metrics: A frame work for product metrics – Metrics for requirements model – Metrics for design model – Metrics for source code – Metrics for testing – Metrics for maintenance – Process and project metrics – Software measurement – Metrics for software quality – Integrating metrics within the software process.

UNIT – IV   12

Cleanroom Software Engineering and SPI: Cleanroom software engineering – Cleanroom strategy – Functional specification – Cleanroom design –   Cleanroom testing – Software process improvement – SPI process – CMMI – People CMM other frameworks.

UNIT – V   12

Reengineering: Re– engineering – Business process Re– engineering – Software re– engineering – Reverse engineering – Restructuring – Code restructuring – Data restructuring – Forward engineering – Economics of reengineering

TOTAL: 60

TEXT BOOKS:
1. Pressman Roger, "Software Engineering: A Practitioner's Approach", 7th Edition, McGraw Hill, 2014.

REFERENCE BOOKS:
1. Ian Sommerville, "Software Engineering", 9th Edition, Pearson Education, New Delhi, 2012.
2. Jibitesh Mishra, Ashok Mohanty, "Software Engineering", Pearson Education, Chennai, 2012.

Course Outcomes:
On completion of the course the students will be able to
- choose appropriate process models
- manage risks in software development
- analyze project and product metrics
- understand process improvement
- apply software reengineering and reverse engineering concepts

14ISL81 DATA MINING LABORATORY

                                               0   0   4   2

LIST OF EXPERIMENTS /EXERCISES:

1. Perform data cleaning for a given data set

2. Perform data reduction for a given data set

3. Perform data transformation for a given data set

4. Extract the frequent item set

5. Find the strong association rule for the frequent item set found

6. Find the classification rule and classification accuracy using decision tree algorithm

7. Find the classification rule and classification accuracy using Bayesian classification algorithm

8. Compare the performance of the above two classification algorithms for any four data sets

9. Implement the partition based clustering algorithm

10. Find the outliers using various outlier detection methods

                                                          TOTAL : 60

REFERENCES / MANUALS / SOFTWARE:
1. MATLAB / WEKA / Rapid Miner / R Programming

Course Outcomes:

On completion of the course the students will be able to
- implement various preprocessing techniques of data mining
- instrument the data mining algorithms for various data mining problems
- explore the effect of tools to mine data in real time environment

14ISL82 COMMUNICATION SKILLS AND CAREER DEVELOPMENT LABORATORY III

0 0 2 1

LIST OF EXPERIMENTS:

1. LISTENING
   1. Techniques for Effective Listening
   2. Listening Activities

2. SPEAKING
   1. Short talk on strength and weakness
   2. Group Discussion
   3. Answering Interview Questions

3. READING
   1. Reading Comprehension
   2. Reading about Advanced Technology

4. WRITING
   1. Job Application letter and Resume
   2. Short project reports

Total : 30

REFERENCES / MANUALS / SOFTWARE:

1. Kumar, Sanjay and Pushpa Lata, "Communication Skills", 2nd Edition, New Delhi: Oxford University Press, 2017.
2. Orell Digita Language Lab Software

Course Outcomes:

On completion of the course, the students will be able to

- acquire adequate levels of English Language Proficiency skills
- update technical knowledge through effective reading
- enhance writing skills required for the workplace
- become well equipped software professionals with good communication skills

14IST91 OPEN SOURCE SYSTEMS

4   0   0   4

Pre-requisites: Basic knowledge Web Technology and Database

UNIT – I **12**

Introduction and Programming with PHP: Basic Syntax – Sending Data to Web Browser – Writing Comments – What are Variables? – Introduction Strings – Concatenating Strings – Introducing Numbers – Introducing Constants – Single vs Double Quotation Marks – Basic Debugging Steps – Creating HTML Form – Handling an HTML Form – Conditionals and Operators – Validating Form Data – Introducing Arrays – For and While Loops.

UNIT – II **12**

Introduction to MySQL: Naming Database Elements – Choosing Your Column Types – Choosing Other Column Properties – Accessing MySQL – Creating Databases and Tables – Inserting Records – Selecting Data – Using Conditionals – Using LIKE and NOT LIKE – Sorting Query Results – Limiting Query Results – Updating Data – Deleting Data – Using Functions.

UNIT – III **12**

Data base Design, Error Handling: Normalization – Creating Indexes – Using Different Table Types – Languages and MySQL – Time Zones and MySQL – Foreign Key Constraints – Error Types and Basic Debugging – Displaying PHP Errors – Adjusting Error Reporting in PHP – Creating Custom Error Handlers – PHP Debugging Techniques – SQL and MySQL Debugging Techniques.

UNIT – IV **12**

PHP with MySQL: Modifying the Templates – Connecting to MySQL – Executing Simple Queries – Retrieving Query Results – Ensuring Secure SQL – Counting Returned Records – Updating Records with PHP – Sending Values to a Script – Using Hidden Form Inputs – Editing Existing Records – Paginating Query Results – Making Sortable Displays.

UNIT – V **12**

Web Application, Cookies and Sessions: Sending Email – Handling File Uploads – PHP and JavaScript – Understanding HTTP Headers – Date and Time Functions – Making a Login Page – Making the Login Functions – Using Cookies – Using Sessions – Improving Session Security.

TOTAL : 60

TEXT BOOKS:
1. Larry Ullman, "PHP and MySQL for Dynamic Web Sites", 4th Edition, Pearson Education, New Delhi, 2015.

REFERENCE BOOKS:
1. Welling, Luke, "PHP and MYSQL Web Development", 3rd Edition, Pearson Education, New Delhi, 2005.
2. Schlossnagle, George, "Advanced PHP Programming", Pearson Education, New Delhi, 2004.
3. Vaswani, Vikram, "My SQL: Complete Reference", Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2011.

Course Outcomes:

On completion of the course the students will be able to
*   demonstrate the concepts of PHP
*   design database using MySQL
*   handle the errors and exception raised in web form
*   normalize the tables used in designing application
*   design an interactive web application with session and cookies

14IST92 DISTRIBUTED COMPUTING

4   0   0   4

Pre-requisites: Basic knowledge in programming paradigms and networks

UNIT – I   **12**

Introduction and Models of Distributed System: Characterization of Distributed Systems: Examples of distributed systems – Resource Sharing and the Web – Challenges. System Models: Architectural Models – Fundamental Models.

UNIT – II   **12**

Interprocess Communication and Distributed Objects: Interprocess Communication: The API for the Internet Protocols – External data representation and marshalling – Client– server communication – Group communication. Distributed Objects – Communication between distributed objects – Remote procedure call.

UNIT – III   **12**

Synchronization: Time and global states: Introduction – Clocks, events and process states – Synchronizing physical clocks – Logical time and logical clocks – Global states – Distributed debugging. Coordination and Agreement: Distributed mutual exclusion – Elections – Multicast Communication.

UNIT – IV   **12**

Transactions: Transaction and Concurrency Control: Transactions – Nested transactions – Locks. Distributed Transactions: Introduction – Flat and nested distributed transactions – Atomic commit protocols.

UNIT – V   **12**

Distributed transactions and Replication: Concurrency control in distributed transactions – Distributed deadlocks – Transaction recovery. Replication: System model and group communications – fault– tolerant services.

TOTAL: 60

TEXT BOOKS:
1. Coulouris George, Dollimore Jean and Kindberg Tim, "Distributed Systems Concepts and Design", 4th Edition, Pearson Education, 2012.

REFERENCE BOOKS:
1. Tanenbaum A.S. and Steen M. Van., "Distributed Systems: Principles and Paradigms", 2nd Edition, Prentice Hall, New Delhi, 2012.
2. Liu M.L., "Distributed Computing: Principles and Applications", 1st Edition, Pearson Education, 2013.

Course Outcomes:
On completion of the course the students will be able to
- identify the limitations of distributed systems
- implement the APIs for group and multicast communication
- analyze the algorithms used in synchronization
- recognize the architecture of distributed systems
- demonstrate the method for concurrency control in distributed transactions

14ISL91 OPEN SOURCE SYSTEMS LABORATORY

0	0	4	2

LIST OF EXPERIMENTS /EXERCISES:

1. Program with control and looping structures.

2. Program on User defined PHP functions

3. Design a web page using HTML controls and read the input through PHP script

4. String Functions and Regular Expressions

5. Program using DateTime functions

6. PHP program to trace errors and exceptions

7. Validate the input form through javascript and PHP script

8. Connect the Web page to MySQL database

9. Publish the result of the student using PHP and MySQL

10. Create a web page to automate the sales and marketing system

TOTAL: 60

REFERENCES / MANUALS / SOFTWARE:
1. Wamp/Xamp Server, MySQL/PHPMyadmin

Course Outcomes:
On completion of the course the students will be able to
- design a web page with validation
- manage and maintain sessions and cookies
- integrate back end database and web forms

14ISL92 SOFTWARE APPLICATION DEVELOPMENT LABORATORY

           0   0   4   2

LIST OF EXPERIMENTS /EXERCISES:

1. Prepare SRS for any one of the following
   - Sales order processing
   - Simple banking system
   - Library Management System

2. Construct the design along with DFD,UML & ERD for
   - Employee Details and Pay roll maintenance
   - Hospital Management System

3. Create a Web application for online shopping

4. Develop a simple android application

5. Generate test cases and apply various testing methods on any of the above mentioned applications

TOTAL: 60

REFERENCES / MANUALS/SOFTWARE:

1. PHP, Sun Java
2. Visual Studio
3. Oracle

Course Outcomes:

On completion of the course the students will be able to

- create software requirement specification for the application
- design and develop web application
- apply various testing techniques

14ISE01 NETWORK PROTOCOLS

3 0 0 3

Pre-requisites: Computer Networks

UNIT – I   **9**

Protocol Suite And IPv4 Addresses: The OSI Model and the TCP/IP Protocol Suite: Protocol Layers – The OSI Model – TCP/IP Protocol Suite – Addressing. IPv4 Addresses: Introduction – Classful and Classless Addressing – Special Address – NAT.

UNIT – II   **9**

IP and IPv4: Delivery and Forwarding of IP Packets: Delivery – Forwarding – Structure. Internet Protocol Version 4 (IPv4): Introduction – Datagrams – Fragmentation – Options – Checksum – IP over ATM – Security – IP Package.

UNIT – III   **9**

ARP, ICMPv4 and BGP: Address Resolution Protocol(ARP): Address Mapping – Protocol – ATMARP – Package. Internet Control Message Protocol Version 4: Messages – Tools – ICMP Package –BGP.

UNIT – IV   **9**

UDP and TCP: User Datagram Protocol: Introduction – Datagram – Services – Applications – Package. Transmission Control Protocol(TCP): Services – Features – Segment – Connection – State Transition – Windows – Control – Timers – Options – Package.

UNIT – V   **9**

DHCP and IPv6: Host Configuration: DHCP: Introduction – Operation – Configuration. IPv6 Addressing: Introduction – Allocation – Addresses – Auto configuration – Renumbering. IPv6 Protocol: Introduction – Format – Transition.

TOTAL: 45

TEXT BOOKS:
1. Behrouz A. Forouzan, "TCP/IP Protocol Suite", 4th Edition, Tata McGraw-Hill Education Pvt. Ltd., 2012.

REFERENCE BOOKS:
1. Douglas E. Comer, "Internetworking with TCP/IP Vol.1: Principles, Protocols and Architecture", 6th Edition, Pearson Education, 2014.
2. Black, Uyless "Computer Networks–Protocols, Standards And Interfaces", 2nd Edition, Prentice Hall of India, Delhi, 2003.

Course Outcomes:

On completion of the course the students will be able to
- define different protocols used in various layers of computer networks
- identify the features of the protocols used in network communication
- compare the issues in different protocols
- demonstrate the features of different versions of IP protocol
- use the services of TCP and UDP protocol

14ISE02 COMPILER DESIGN

3   0   0   3

Pre-requisite: Operating Systems

UNIT – I   **9**
Introduction and Lexical Analysis: Compiler - Compiler Applications - Phases of a Compiler - Challenges in Compiler Design - Compilation Process - An Example – Lexical Analysis: Role of Lexical Analyzer - Specification of Tokens - Token Recognition - Regular Expression to NFA - Lexical Analysis Tool-Lex.

UNIT – II   **9**
Syntax Analysis: Role of Parser - Error Handling - Grammar - Top-down Parsing - Bottom-Up Parsing - LR Parsing - LALR Parser Generator-yacc- Syntax Directed Translation.

UNIT – III   **9**
Type Checking, Symbol Tables and Runtime Environment Management: Static vs. Dynamic Checking - Type Expressions - Type Checking - Type Equivalence - Type Conversion – Symbol Tables:Information in Symbol Table - Features of Symbol Tables - Simple Symbol Table - Scoped Symbol Table –Runtime Environment Management : Introduction - Activation Record - Display.

UNIT – IV   **9**
Intermediate and Target Code Generation: Intermediate Languages - Intermediate Language Design Issues - Intermediate Representation Techniques - Statements in Three Address Code - Implementation of Three Address Instructions - Three Address Code Generation. Target Code Generation: Factors Affecting Code Generation - Basic Block -Code Generation for Trees - Register Allocation - Cache Management - Code Generation using Dynamic Programming.

UNIT – V   **9**
Code Optimization: Need for optimization - Problems in Optimizing Compiler Design - Classification of Optimization - Factors Influencing Optimization - Themes Behind Optimization Techniques- Optimizing Transformations - Local Optimization - Global Optimization - Computing Global Data Flow Information - Setting Up Data Flow Equations - Iterative Data Flow Analysis.

TOTAL : 45

TEXT BOOKS:
1.   Santanu Chattopadhyay, "Compiler Design", 1st Edition, Prentice Hall of India, New Delhi, 2012.

REFERENCE BOOKS:
1.   Alfred V. Aho, Monica S. Lam, Ravi Sethi and Jeffrey D. Ullman, "Compilers: Principles, Techniques and Tools", 2nd Edition, Pearson Education (Singapore) Pvt. Ltd., Fifth Impression 2013.
2.   Srikant Y.N. and Priti Shankar, "The Compiler Design Handbook: Optimizations and Machine Code Generation", 2nd Edition, 2007.

Course Outcomes:
 On completion of the course the students will be able to
- learn the different phases of a compiler
- parse an expression using parsing techniques
- know about symbol table
- understand the code generation techniques
- optimize the codes using optimizing techniques

14ISE03 INFORMATION SYSTEM DESIGN

3   0   0   3

UNIT – I   9
Foundation Concepts: Foundations of information system in business– The real world of IS – Fundamental Roles of Information systems in Business – Types of IS–Managerial challenges of Information Technology – System concepts – Components of Information Systems – IS resources–IS Activities– Competing with IT–Fundamentals of strategic advantage – IT for Strategic advantage.

UNIT– II   9
e–Business System: Introduction– Cross functional Enterprise Applications–Transaction processing system– Functional business System. **Enterprise Business Systems:** Customer Relationship Management – Enterprise Resource Planning– Supply Chain Management.

UNIT – III   9
Developing Business/IT Strategies: Planning Fundamentals– Implementation Challenges– Developing business systems– system Analysis –System design– Implementing business system.

UNIT–IV   9
Decision Support in Business: Using decision support system– Executive Information System– enterprise portals and decision support– Artificial Intelligence Technologies in Business. Electronic Commerce System–E–Commerce fundamentals– Essential E–commerce process– E–Commerce Applications and Issues.

UNIT–V   9
Security and Ethical Challenges: Ethical responsibility of business professionals–computer crimes– privacy issues – other challenges – security management of IT – tools of security management– Internetworks security defenses – other security measures – system controls and audits.

TOTAL : 45

TEXT BOOKS:
1. O'Brien, James A. and Marakas George M., "Management Information Systems", 10th Edition, McGraw-Hill, New York, 2011.

REFERENCE BOOKS:
1. Oz Effy, "Management Information Systems", 3rd Edition, Vikas Publishing House, Bombay, 2008.
2. Kenneth C. Laudon, Carol Guercio Traver, "Management Information Systems", 12th Edition, Prentice Hall, New York, 2011.

Course Outcomes:

On completion of the course the students will be able to
- recognize the information system in management process
- identify the requirements of management strategies for decision making
- analyze the issues related to information system
- familiarize with enterprise business system
- effectively evaluate technology alternatives to solve problems in information system design

14ISE04 DISTRIBUTED OPERATING SYSTEMS

<div align="right">3   0   0   3</div>

Pre-requisites: Basic knowledge in Operating System

UNIT – I<div align="right">9</div>
Fundamentals of Distributed System: Distributed Computing System **-** Evolution of Distributed System – Distributed Computing System Models – Distributed Computing System Gaining Popularity - Distributed Operating System – Issues in Designing a Distributed Operating System – Introduction to Distributed Computing Environment (DCE).

UNIT – II<div align="right">9</div>
Message Passing: Introduction – Desirable Features of Good Message-Passing System – Issues in IPC by Message Passing – Synchronization – Buffering – Multidatagram Messages – Encoding and Decoding of Message Data – Process Addressing – Failure Handling – Group Communication.

UNIT – III<div align="right">9</div>
Distributed Shared Memory: General Architecture of DSM System – Design and Implementation Issues of DSM – Granularity – Structure of Shared Memory Space – Consistency Models – Replacement Strategy – Thrashing – Other approaches to DSM – Heterogeneous DSM – Advantages of DSM.

UNIT – IV<div align="right">9</div>
Resource and Process Management: Resource Management – Introduction – Desirable Features of Good Global Scheduling Algorithms – Task Assignment approach – Load-Balancing Approach – Load-Sharing Approach. Process Management: Introduction – Process Migration – Threads.

UNIT – V<div align="right">9</div>
Distributed File Systems: Introduction – Desirable features of a Good Distributed File System - File Models – File-Accessing Models – File-Sharing Semantics – File-Caching Schemes – File Replication – Fault Tolerance – Atomic Transactions – Design Principles.

<div align="right">**TOTAL: 45**</div>

TEXT BOOKS:
1. Pradeep K. Sinha, "Distributed Operating Systems Concepts and Design", PHI Learning Pvt. Ltd., Delhi, 2013.

REFERENCE BOOKS:
1. Tanenbaum Andrew S. and Herbert Bos, "Modern Operating Systems", 4th Edition, Pearson Education, Delhi, 2014.
2. Singhal, Mukesh and Shivaratri, Nirajan G., "Advanced Concepts in Operating Systems", Tata McGraw Hill, New Delhi, 2008.

Course Outcomes:
On completion of the course the students will be able to
- demonstrate the concept of distributed computing environment
- identify the message passing mechanisms
- classify memory models and replacement strategies
- apply resource and process management algorithms
- analyze the suitable file and transaction design

14ISE05 NETWORK MANAGEMENT

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Pre-requisites: Computer Networks

UNIT – I   **9**

Introduction and Fundamentals: Introduction: Network Management Requirements – Network Management Systems – Network Monitoring: Network Monitoring Architecture – Performance Monitoring – Fault Monitoring – Accounting Monitoring – Network Control: Configuration – Security Control.

UNIT – II   **9**

SNMPv1 Concepts and MIB: SNMP Network Management Concepts: Background – Basic Concepts. SNMP Management Information: Structure of Management Information– Standard MIBs: MIB-II – Ethernet Interface MIB.

UNIT – III   **9**

SNMP: Simple Network Management Protocol: Concepts – Protocol Specification – Transport Level Support – SNMP Group – Practical Issues.

UNIT – IV   **9**

RMON: Remote Network Monitoring: Statistics Collection: Concepts – Statistics Group - History – Host – HostTopN – Matrix – TokenRing Extensions to RMON.

UNIT – V   **9**

SNMPv2: SNMPv2: Management Information: Background – Structure of Management Information – SNMPv2:Protocol: Protocol Operations – Transport Mappings – Coexistence with SNMPv1.

TOTAL: 45

TEXT BOOKS:
1. William Stallings, "SNMP –SNMPv2, SNMPv3 & RMON 1 and 2", 3rd Edition, Pearson Education, 2004.

REFERENCE BOOKS:
1. Mani Subramanian, "Network Management Principles and Practice", 2nd Edition, Prentice Hall, 2012.
2. Divakara K. Udupa, "Network Management Systems Essentials", 1st Edition, Tata McGraw-Hill, 1998.

Course Outcomes:

On completion of the course the students will be able to
- demonstrate an understanding of network management concept, standards, and protocols
- apply network management standards to manage practical networks
- explain the basic concept of MIB
- analyze versions of SNMP protocol and its uses in managing and monitoring networks
- use Remote Network Monitoring in network management

14ISE06 ASP .NET PROGRAMMING

3	**0**	**0**	**3**

Pre-Requisites: .Net Programming

UNIT – I   **9**

Introduction: The .NET Framework – Learning the .NET Languages: The .NET Languages –Data types – Declaring Variables – Scope and Accessibility – Variable Operations – Object-based Manipulations – Conditional Structures –Loop Structures - Functions and Subroutines.

UNIT – II   **9**

IIS and ASP.NET Applications: Setting up ASP.NET and Internet Information Server (IIS): IIS Manager – Installing ASP.NET – Migrating from ASP. ASP.NET Applications – Code Behind – The Global .asax Application file – Understanding ASP.NET classes – ASP.NET Configuration.

UNIT – III   **9**

Web Form Fundamentals and Web Controls: A simple Page Applet – Improving the Currency Converter – HTML control classes – The Page class. Stepping Up To Web Controls - Web Control Classes – AutoPostBack and Web control Events – A Simple Web Page Applet – Assessing Web Controls.

UNIT – IV   **9**

Validation and Error Handling: Validation and Rich Controls: Validation – A Simple Validation Example – Understanding Regular Expressions – A Validated Customer Form. Tracing, Logging and Error Handling : Common Errors – The .NET Exceptions Object – Handling Exceptions.

UNIT - V   **9**

Overview of ADO.NET and Data Access: Introducing of ADO.NET and Data Management – Characteristics of ADO.NET – The ADO.NET Object Model. ADO .NET Data Access : SQL Basics – The SQL select statement – The SQL Update Statement – The SQL Insert Statement – The SQL Delete Statement – Accessing Data – Creating a Connection – Defining a Select Command – Using a Command With a Data Reader – Updating Data.

                                                                                                                                        TOTAL: 45

TEXT BOOKS:
1.   Matthew MacDonald, "ASP.NET: The Complete Reference", Tata McGraw-Hill Publishing Company, New Delhi, 2010.

REFERENCE BOOKS:
1.   Thuan Thai, ".Net Framework Essentials", 3rd Edition, Shroff Publishers & Distributors, Mumbai, 2011.
2.   Richard Leinecker, "Using Asp.Net", Pearson Education, Delhi, 2004.

Course Outcomes:

On completion of the course the students will be able to
- demonstrate the concepts of .NET framework
- setup an environment to work with ASP under .NET framework
- create a web form with HTML and web controls
- validate the web form with appropriate controls
- separate page code from content by using code-behind pages, page controls, and components
- design an interactive web applications with ADO.NET

14ISE07   PROFESSIONAL ETHICS AND HUMAN VALUES

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UNIT – I   9
Understanding: Morals – Values-Ethics– Honesty – Integrity – Work Ethic – Service Learning – Civic Virtue – caring – Sharing – Courage – Valuing Time – Co-operation – Commitment – Empathy –Self-Confidence – Character – Spirituality-Senses of 'Engineering Ethics' - variety of moral issues - types of inquiry.

UNIT – II   9
Moral dilemmas – moral autonomy – Kohlberg's theory – Gilligan's theory – consensus and controversy – Models of Professional Roles – theories about right action – Self-interest – customs and religion- uses of ethical theories. Meaning of Engineering experimentation - engineers as responsible experimenters.

UNIT – III   9
Codes of ethics for engineers - a balanced outlook on law - the challenger case study. Safety and risk - assessment of safety and risk - risk benefit analysis and reducing risk, Bhobal Gas Tragedy and Chernobyl case studies.

UNIT – IV   9
Collegiality and loyalty – respect for authority – collective bargaining – confidentiality – conflicts of interest – occupational crime – professional rights – employee rights – discrimination – Intellectual Property Rights (IPR) – Multinational corporations – Environmental ethics.

UNIT – V   9
Computer ethics – weapons development-engineers as managers-consulting engineers-engineers as expert witnesses and advisors -moral leadership-sample code of Ethics like ASME, ASCE, IEEE, Institution of Engineers (India), Indian Institute of Materials Management, Institution of Electronics and Telecommunication Engineers(IETE).

TOTAL : 45

TEXT BOOKS:
1.   Martin Mike and Schinzinger Roland, "Ethics in Engineering", 4th Edition, Tata McGraw-Hill, New Delhi, 2014.
2.   Govindarajan M., Natarajan S. and Senthil Kumar V.S., "Engineering Ethics", Prentice Hall of India, New Delhi, Reprint 2013.

REFERENCE BOOKS:
1.   Fleddermann Charles D., "Engineering Ethics", 4th Edition, Pearson Education, New Jersey, 2014.
2.   Harris Charles E., Protchard Michael S. and Rabins Michael J., "Engineering Ethics: Concepts and Cases", 5th Edition, Wadsworth Thompson Learning, United States, 2014.
3.   Seebauer Edmund G and Barry Robert L., "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2014.

Course Outcomes:
On completion of the course the students will be able to
*   comprehend the terminologies associated with ethics and values
*   exhibit the knowledge of interpersonal and organizational issues in ethics
*   acquired knowledge on ethical theories and their application
*   comprehend ethical issues in workplace situations
*   appreciate the components of ethics as codified by professional bodies

14ISE08 SOFTWARE METRICS

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Pre-requisites: Software Engineering

UNIT – I   **9**

Basic Metrics for Software: Fundamentals of measurement – Measurements in Software Engineering – Scope of Software metrics – Representation theory of measurement- Metrics and models-Measurement scales and Scale Types.

UNIT – II   **9**

Investigation Procedures: Empirical investigation – principles of Empirical studies– Planning Experiments –Process Model for Performing experiments-Key Experimental design concepts –Types of experiment design-Selecting experiment design

UNIT – III   **9**

Software Measurement Data Collection: Defining good data – Data collection for incident reports-How to collect data- Reliability of Data Collection Procedures-Analyzing Software Measurement Data -Statistical distributions and Hypothesis testing-Examples of simple Analysis techniques.

UNIT – IV   **9**

Measurement of Software Attributes: Measurement of internal product attributes: Size- Properties of software size-code size- Design size-Functional size measures and estimators. Measurement of internal product attributes: structure – control flow structure of program units.

UNIT – V   **9**

Software Quality Metrics: Measuring External Product attributes – Modeling software quality– Measuring aspects of quality-Usability measures-Maintainability measures-Security measures.

<div align="right">

TOTAL : 45

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TEXT BOOKS:
1. Norman Fenton, James Bieman, "Software Metrics: A Rigorous and Practical Approach", 3rd Edition, CRC Press, A Chapman and Hall Book, 2014.

REFERENCE BOOKS:
1. Kan Stephen H., "Metrics and Models in Software Quality Engineering", 2nd Edition, Addison Wesley, New York, 2009.
2. Fenton Norman E., "Software Metrics: A Regimes Approach", 2nd Edition, Chapmen & Hall, London, 1991.

Course Outcomes:

On completion of the course the students will be able to
- gain knowledge about the fundamental software measurement and scale for measurement
- explore how to collect data
- understand how to measure software engineering data
- gain knowledge of measuring the code and structure of software attributes
- explore about quality metrics in software

14ISE09 HIGH SPEED NETWORKS

3   0   0   3

Pre-requisites: Computer Networks

UNIT – I   **9**
Introduction: Frame Relay: Packet Switching – Frame Relay Networks. Asynchronous Transfer Mode: ATM Protocol Architecture – ATM Logical Connections – ATM Cells – ATM Service Categories – ATM Adaptation Layer.

UNIT – II   **9**
High Speed LANs and Congestion Control: High Speed LANs: Emergence of High-Speed LANs – Ethernet – Fibre Channel – Wireless LANs. Congestion Control in Data Networks and Internets: Effects – Congestion and Control – Traffic Management – Congestion Control.

UNIT – III   **9**
Flow and Error Control: Link-Level Flow and Error Control: Need for Flow and Error Control – Link Control Mechanisms – ARQ Performance.

UNIT – IV   **9**
Traffic Control: TCP Traffic Control: TCP Flow Control – TCP Congestion Control – Performance of TCP over ATM.

UNIT – V   **9**
ATM Networks: Traffic and Congestion Control in ATM Networks: Requirements – ATM Traffic-Related Attributes – Traffic Management Framework – Traffic Control – ABR Traffic Management – GFR Traffic Management.

TOTAL: 45

TEXT BOOKS:
1.   Stallings William, "High Speed Networks and Internets Performance and Quality of Service", 2nd Edition, Pearson Education, 2008.

REFERENCE BOOKS:
1.   Stallings William, "High-Speed Networks TCP/IP and ATM Design Principles", Prentice Hall, 2006.
2.   Selvi M. Phemina, "High Speed Networks", Lakshmi Publications, Chennai, 2009.

Course Outcomes:
On completion of the course the students will be able to
- get an introduction about High speed LAN and frame relay
- use congestion control mechanisms for traffic management in high speed LANS
- apply suitable flow and error control mechanism for different applications
- know the techniques involved in traffic control of TCP
- manage traffic and congestion in ATM networks

14ISE10   SOFTWARE QUALITY ASSURANCE

3   0   0   3

Prerequisites: Software Engineering

UNIT – I   **9**
Introduction and Managing Software Quality: Introduction-Meaning-Quality Challenge-Quality Control Vs Quality Assurance-Quality Assurance at each Phase of SDLC-SQA in Software Support Projects-SQA Functions-Quality Management System in an Organization-Various Expectations-Need for the SQA

UNIT – II   **9**
Planning For SQA, Product and Process Quality: SQA Plans-Organizational 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

UNIT – III   **9**
Software Measurements and Metrics: 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: Walkthrough and Inspections

UNIT – IV   **9**
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

UNIT – V
Software CMM Models and Careers in Quality: Overview-CMM Model for Software-Practices-CMM and ISO-Types of CMM-CMMI-Other Models-P-CMM - Careers in Quality-Overview –P-CMM and Careers-People Issues-Finding a Mentor to Shape Your Career-Roles for Quality Professionals-Quality Certifications

TOTAL : 45

TEXT BOOKS:
1. Godbole, Nina S., "Software Quality Assurance: Principles and Practice", Narosa Publishing House, New Delhi, Eighth Reprint 2012.

REFERENCE BOOKS:
1. Pressman Roger S., "Software Engineering: A Practitioner's Approach", 7th Edition, McGraw-Hill, New York, 2014.
2. Ince, Darrel, "ISO 9001 and Software Quality Assurance", 2nd Edition, Tata McGraw Hill, New Delhi, 2003.

Course Outcomes:
On completion of the course the students will be able to
* establish software quality assurance practice in the software development process
* understand the concepts of measurements and metrics
* gain knowledge about configuration management activities
* know the ISO standards
* follow commitment to quality, Integrity and Insistence on measurable results

14ISE11 PRINCIPLES OF MANAGEMENT

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UNIT – I   9
Nature and Functions of Management: Management – Definition – Nature– Importance –Functions – Contribution by Henry Fayol – Taylor – Scientific Management techniques.

UNIT – II   9
Planning: Planning – Meaning – Importance – Limitations – Process of Planning – Types of plan – Single use plan – Repeated use plan. Decision Making – Definition – Types of Decisions – Factors involved in decision making – Methods of evaluation of alternatives.

UNIT – III   9
Organising: Organisation – Meaning – Characteristics – Process – Importance – Types – Structure – Line Organisation – Line and Staff Organisation – Functional Organisation – Committee Organisation –Matrix Organisation.

UNIT – IV   9
Staffing: Recruitment – Meaning – Sources – Internal – External – Selection Process – Training – Needs for training – Methods of training.

UNIT – V   9
Directing and Controlling: Directing – Meaning – Span of Control – Factors determining span of supervision – Controlling – Meaning – Control process – Characteristics of an ideal control system – Control devices–Traditional – Modern devices.

TOTAL : 45

TEXT BOOKS:
1.   Dinkar Pagare, "Business Management", 5th Edition, Sulthon Chand & Sons, 2010.

REFERENCE BOOKS:
1.   P.C.Tripathi P.N. Reddy, "Principles of Management", 4th Edition, Tata McGraw-Hill Education, 2008.
2.   Harold Koontz and Weihrich Heinz, "Essentials of Management", 8th Edition, Tata McGraw Hill, 2010.

Course Outcomes:
On completion of the course the students will be able to
- familiarize the management concepts planning, organising, staffing and controlling
- apply the basic functions, strategies of management
- identify and differentiate between the various tools and processes used in planning
- anticipate decision making for managerial problems
- differentiate between the various types of organizational structures and patterns
- integrate management principles into management practices

14ISE12 ARTIFICIAL INTELLIGENCE

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Pre-requisites: Data Structures

UNIT – I
9

Introduction And Problem Spaces: What is Artificial Intelligence? : AI Problems – Assumption – Technique – Model – Criteria – Problems, Problem Spaces and Search: Definition – Production Systems – Characteristics - Issues in the Design of Search Programs.

UNIT – II
9

Heuristic Search Techniques: Heuristic search techniques: Generate and Test – Hill Climbing – Best- first Search – Problem Reduction – Constraint Satisfaction – Means-ends Analysis.

UNIT – III
9

Fundamentals of Knowledge Representation: Knowledge Representation Issues: Representations and Mappings – Approaches –Issues – Frame problem. Using Predicate Logic: Representing Simple Facts in Logic – Instance and ISA Relationships – Functions and Predicates – Resolution – Deduction.

UNIT – IV
9

Knowledge Representation and Structures: Representing Knowledge Using Rules: Procedural Versus Declarative Knowledge – Logic Programming – Reasoning – Matching – Control Knowledge. Weak Slot and Filler Structures: Semantic Nets – Frames. Strong Slot-and-Filter Structures: Conceptual Dependency – Scripts – CYC.

UNIT – V
9

Reasoning: Symbolic Reasoning Under Uncertainty: Nonmonotonic Reasoning – Logics - Issues – Problem Solver – Implementation – DFS –BFS. Statistical Reasoning: Probability and Bayes' Theorem – Certainty Factors and Rule – based Systems – Bayesian Networks – Dempster – Shafer Theory – Fuzzy Logic.

TOTAL: 45

TEXT BOOKS:
1. Elaine Rich, Kevin Knight, Shivashankar B. Nair, "Artificial Intelligence", 3rd Edition, McGraw Hill Education Pvt. Ltd., 2010.

REFERENCE BOOKS:
1. Russell Stuart, Norvig Peter, "Artificial Intelligence: A Modern Approach", 3rd Edition, Pearson Education, 2010.
2. Janakiraman V.S., Sarukesi K. and Gopalakrishnan P., "Foundations Of Artificial Intelligence And Expert Systems", Macmillan India Limited, 2005.

Course Outcomes:
On completion of the course the students will be able to
- develop fundamental understanding of artificial intelligence
- understand the basic principles, techniques, and applications of artificial intelligence
- demonstrate various searching algorithms commonly used in artificial intelligence software
- apply knowledge representation techniques and problem solving strategies to common AI applications
- demonstrate working knowledge of reasoning in the presence of incomplete and/or uncertain information

14ISE13 MULTI CORE ARCHITECTURE

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Pre-requisites: Basic knowledge in Computer Architecture

UNIT – I   **9**

Fundamentals of Quantitative Design and Analysis: Classes of Computers – Trends in Technology, Power and Energy in Integrated Circuits – Trends in Cost – Dependability – Measuring, Reporting and Summarizing Performance – Quantitative Principles of Computer Design.

UNIT – II   **9**

Instruction Level Parallelism: Concepts and Challenges – Basic Compiler Techniques for Exposing ILP – Reducing Branch Costs with Advanced Branch Prediction – Overcoming Data Hazards with Dynamic Scheduling – Dynamic Scheduling: Examples and Algorithms – Hardware-Based Speculation.

UNIT – III   **9**

DLP in Vector, SIMD and GPU Architectures: Vector Architecture – SIMD Instruction Set Extensions for Multimedia – Graphics Processing Units - Detecting and Enhancing Loop Level Parallelism.

UNIT – IV   **9**

TLP and Multiprocessors: Centralized Shared Memory Architectures – Performance of Symmetric Shared Memory Multiprocessors - Distributed Shared Memory and Directory-Based Coherence – Synchronization: The Basics – Models of Memory Consistency.

UNIT – V   **9**

RLP and DLP in Warehouse Scale Architectures: Programming Models and Workloads for Warehouse Scale Computers – Architecture for Warehouse Scale computers – Physical Infrastructure and Costs – Cloud Computing: The Return of Utility Computing.

<div align="right">**TOTAL: 45**</div>

TEXT BOOKS:
1. John L. Hennessy, David A. Patterson, "Computer Architecture – A Quantitative Approach", 5th Edition, Morgan Kaufmann Publishers, Elsevier, 2012.

REFERENCE BOOKS:
1. Kai Hwang, "Advanced Computer Architecture", 2nd Edition, Tata McGraw-Hill Education, 2013.
2. Richard Y. Kain, "Advanced Computer Architecture: A Systems Design Approach", Prentice Hall, 2011.
3. David E. Culler, Jaswinder Pal Singh, "Parallel Computing Architecture: A Hardware/ Software Approach", Morgan Kaufmann, Elsevier, 1997.

Course Outcomes:

On completion of the course the students will be able to

- demonstrate the technology, cost and performance issues
- identify the limitations of ILP and the need for multi core architectures
- analyze the issues related to multiprocessing
- summarize the salient features of different multi core architectures and how they exploit parallelism
- recognize the architecture of Warehouse scale computers

14ISE14 SOFT COMPUTING

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UNIT - I   9
Artificial Intelligence: AI Definition - Problems - Characteristics - Issues in designing search programs – Heuristic search– Types of heuristic search.

UNIT – II   9
Neural Network: Fundamentals: Basic concepts – Neural network architectures – Characteristics – Back propagation network: Architecture - Back propagation Learning.

UNIT – III   9
Fuzzy Set Theory: - Fuzzy versus Crisp - Crisp sets - Fuzzy sets - Crisp relations – Fuzzy relations – Fuzzy systems - Crisp logic - Predicate logic - Fuzzy logic - Fuzzy rule based System - Defuzzification Methods.

UNIT - IV   9
Genetic Algorithms: Genetic algorithms - History - Basic concepts - Creation of offspring – Working principle - Encoding -Fitness function -Reproduction – Genetic modeling: Inheritance operators –Cross over - Inversion and deletion - Mutation operator.

UNIT - V   9
Genetic Algorithm based Back propagation Networks: Integration – Neural network , Fuzzy logic, Genetic Algorithms hybrids - Preview – GA based weight determination

TOTAL: 45

TEXT BOOKS:
1. Elaine Rich, Kevin Knight, Shivashankar B. Nair, "Artificial Intelligence", 3rd Edition, McGraw Hill Education Pvt. Ltd., 2010.
2. S.Rajasekaran and G.A.V.Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithms", PHI, 2004.

REFERENCE BOOKS:
1. D.K. Pratihar, "Soft Computing: Fundamentals and Applications", Alpha Science International Ltd., 2015.

Course Outcomes:
On completion of the course the students will be able to
- apply various types of heuristic searching
- understand neural networks
- know about fuzzy set theory
- gather basic knowledge in genetic algorithms
- get awareness about simple hybrid techniques

14ISE15 XML AND WEB SERVICES

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Pre-requisites: Web Technology

UNIT – I   **9**
XML Extending the Enterprise: The Role of XML – XML and Web – XML Basics – SOAP – Web Services – XML: The Three Revolutions: The Data Revolution – The Architectural Revolution – The Software Revolution - Combination and Collaboration.

UNIT – II   **9**
XML Technology Family: XML Technologies – Leveraging the XML Technology Family: XML 1.0-XML Namespaces - Structuring with Schemas: DTD – XML Schema – XML processing – DOM – SAX. Presentation Technologies: CSS-XSL – XFORMS – XHTML – VoiceXML – Transformation: XSLT – XLINK – XPATH – XQuery.

UNIT – III   **9**
SOAP: The Road to SOAP – HTTP - XML-RPC – SOAP: Background-Protocol – SOAP Message Structure – Message Paths –SOAP Intermediaries – SOAP and Actors – SOAP Design Patterns – SOAP Faults –SOAP with Attachments.

UNIT – IV   **9**
Web Services And .NET, J2EE: Web Services: Web Services Technologies-UDDI –WSDL – ebXML – ebXML Technologies - .NET, J2EE and Beyond: SOAP, Web Services and E-Commerce – .NET and J2EE- IBM-BEA-HP-Oracle.

UNIT – V   **9**
XML Security and XML in Practice: Security Overview –Canonicalization –XML Security Framework –XML Encryption –XML Digital Signature –XKMS Structure –Guidelines for Signing XML Documents - XML in Practice: Vertical Industry Data Descriptions - Configuration and Action - The Third Wave: Power Through Combination.

<div align="right">**TOTAL : 45**</div>

TEXT BOOKS:
1.   Frank P. Coyle, "XML,Web Services and the Data Revolution", Pearson Education, New Delhi, 2012.

REFERENCE BOOKS:
1.   Ron Schmelzer, Travis Vandersypen, Jason Bloomberg, Madhu Siddalingaiah, Sam Hunting, Michael D Qualls, David Houlding, Chad Darby, Diane Kennedy, "XML and Web Services: Unleashed", Pearson Education, New Delhi, 2014.
2.   Nagappan Ramesh, Skoczylas Robert and Sriganesh Rima Patel, "Developing Java Web Services", Wiley Publishing Inc., New York, 2008.

Course Outcomes:
On completion of the course the students will be able to
- demonstrate the various basic concepts of XML
- impart the XML technology and its applications in the web world
- implement the SOAP architecture
- know how to build web services
- gain knowledge about practical applications of XML

14ISE16 MULTIMEDIA SYSTEMS

3   0   0   3

Prerequisites: Computer Graphics

UNIT – I   9
Framework: Introduction – Multimedia and Personalized Computing – Emerging Applications Industry– Perspective and Key Challenges – Architecture and Issues for Distributed Multimedia Systems – Synchronization and QOS – Standards and Framework

UNIT – II   9
Digital Audio and Digital Video: Digital Audio Representation and Processing – Digital Representation of Sound, Transmission and Processing of Audio Signal Processing – Digital Music Making – Brief Survey of Speech Recognition and Generation Video Technology – Color Fundamentals and Video Performance Measurements – Artifacts – Video equipment – TV standards.

UNIT – III   9
Compression: Digital Video and Image Compression – Introduction – Video Compression Techniques – JPEG – H.261 – MPEG – DVI Technology –Time Based Media Representation and Delivery – Models of Time – Time and Multimedia Requirements – Support for System Timing Enforcement.

UNIT – IV   9
Operating System Support: Operating System Support for Continuous Media Applications – Limitations in Workstation O.S. – New OS support – Experiments Using Real Time Mach – Middleware System Services Architecture – Goals-Views-Classes and Objects-Media Stream Protocol.

UNIT – V   9
Multimedia Devices and File System: Multimedia Devices, Presentations Services and the User Interface – Multimedia Services and Window System, Client Device Control – Temporal Coordination and Composition-Tool kits – Hyper Applications-Multimedia File Systems and Information Models – File System Support – Data Models – Multimedia Presentation and Authoring – Current State of the Industry – Design Paradigms and User Interfaces.

TOTAL : 45

TEXT BOOKS:
1.   Koegel Buferd, John F., "Multimedia Systems", Pearson Education, New Delhi, 2004.

REFERENCE BOOKS:
1.   Parekh, Ranjan, "Principles of Multimedia", 2nd Edition, Tata McGraw-Hill, New Delhi, 2013.
2.   Tay Vaughan, "Multimedia: Making It Work", 7th Edition, McGraw-Hill Professional, 2008.

Course Outcomes:
On completion of the course the students will be able to
- gain knowledge about multimedia systems framework
- acquire various compression standards
- understand the concepts of operating systems support in media applications
- familiar with multimedia content description and presentation
- analyze and explain various technologies involved to support multimedia application development

14ISE17 CLOUD COMPUTING

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Pre-requisites: Computer Networks, Distributed Computing

UNIT – I   **9**
Introduction: Cloud Computing at a glance – Historical developments – Building cloud computing environments – Computing platforms and technologies – Principles of Parallel and distributed computing.

UNIT – II   **9**
Virtualization: Virtualization – Introduction – Characteristics of virtual environment – Taxonomy of virtualization techniques – Virtualization and cloud computing – Technology Examples.

UNIT – III   **9**
Cloud Computing Architecture: Introduction – Cloud reference models – Types of clouds – Economics of the cloud – Open challenges – Aneka: Cloud Application platform.

UNIT – IV   **9**
Data Intensive computing: Characterizing data intensive computations – Technologies for data intensive computing – Aneka MapReduce programming.

UNIT – V   **9**
Cloud Security: Cloud security challenges – Software–as–a–Service security – Security management – Governance – Risk management – Assessment –Security portfolio management – Awareness – Policies – SecSDLC – Security Monitoring – Security Architecture Design – Data privacy, governance, security – Application security – Security–as–a–service the new MSSP.

                                                                         TOTAL: 45

TEXT BOOKS:
1. Rajkumar Buyya, Christian Vecchiola, Thamarai Selvi S., "Mastering Cloud Computing", Tata McGraw Hill, 2013.
2. John Rittinghouse and James Ransome, "Cloud Computing, Implementation, Management and Strategy", CRC Press, 2009.

REFERENCE BOOKS:
1. Michael Miller, "Cloud Computing: Web–Based Applications That Change the Way You Work and Collaborate", Que Publishing, 2009.
2. Kai Hwang, Geoffrey C. Fox, Jack G. Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.

Course Outcomes:
On completion of the course the students will be able to
- articulate the main concepts, key technologies, strengths and limitations of cloud computing
- identify the architecture, infrastructure and delivery models of cloud computing
- explain the Security issues of cloud computing
- familiar in cloud application platform
- acquire knowledge on the systems, protocols and mechanisms to support cloud computing

14ISE18 INFORMATION SECURITY

3   0   0   3

Prerequisites : Computer Networks, Operating System, DBMS

UNIT – I   **9**
Computer Security and Authentication: Computer Security –Attacks – Computer criminals – Methods of defense. Cryptography – Terminology and Background –Substitution ciphers – Transpositions – Data Encryption Standard.

UNIT-II   **9**
Operating System Security: Designing Trusted operating system – Security policies – Models of security – Trusted operating system design – Assurance in Trusted Operating Systems.

UNIT-III   **9**
Databases Security: Introduction –Security Requirements – Reliability and Integrity – Sensitive data –Inference – Multilevel databases – Proposals of multilevel security-Data Mining.

UNIT-IV   **9**
Networks Security: Threats in Networks – What makes a network vulnerable– Categories of attack – Who attacks network– Reconnaissance – Pinging– Threats in Transit Network – Packet Sniffing – Protocol Flows – Impersonation – TCP session hijacking –Message confidential threats – Message Integrity Threats – DoS, DDoS – Secure E-mail.

UNIT-V   **9**
Network Security Controls: Network Security Controls – Threat Analysis – Encryption – Content integrity – Strong Authentication – Access Controls – Honeypots – Firewalls – Intrusion detection systems.

TOTAL: 45

TEXT BOOKS:
1. Pfleeger Charles P., Shari Lawrence Pfleeger, "Security in Computing", 4th Edition, Pearson Prentice Hall, New Delhi, 2013.

REFERENCE BOOKS:
1. Stallings William, "Cryptography and Network Security: Principles and Practice", 6th Edition, Pearson Education, New Delhi, 2014.
2. Rhodes Ousley Mark, "Information Security: The Complete Reference", 2nd Edition, McGraw Hill, 2013.

Course Outcomes:
On completion of the course the students will be able to
- understand about security threats on operating system, network, databases
- identify the threats to information security
- gain knowledge on authentication, access control and cryptography
- familiar on various defense mechanisms for security
- anticipate security and its management are important for any modern organization security
- show how to protect information recourses

14ISE19 MODERN INFORMATION RETRIEVAL

3   0   0   3

Pre-requisites: DBMS, Data Mining, Multimedia

UNIT – I   9

Introduction: Basic Concepts – Retrieval Process – Modeling – Classic Information Retrieval – Set Theoretic, Algebraic and Probabilistic Models – Structured Text Retrieval Models-Models for Browsing

UNIT – II   9

Querying: Languages – Key Word Based Querying – Pattern Matching – Structural Queries – Query Operations – User Relevance Feedback – Local and Global Analysis – Text and Multimedia Languages

UNIT – III   9

Text Operations, Indexing and Searching: Document Preprocessing – Clustering – Text Compression-Comparing Text Compression Techniques- Indexing and Searching –Inverted Files – Other Indices for text - Boolean Queries – Sequential Searching – Pattern Matching

UNIT – IV   9

Multimedia Information Retrieval: Data Models – Query Languages – Spatial Access Methods – Generic Approach – One Dimensional Time Series – Two Dimensional Color Images – Feature Extraction

UNIT – V   9

Applications: Searching the Web – Challenges – Characterizing the Web – Search Engines – Browsing – Meta-searchers – Online IR systems – Online Public Access Catalogs – Digital Libraries – Architectural Issues – Document Models, Representations and Access – Prototypes and Standards

TOTAL : 45

TEXT BOOKS:
1. Ricardo Baeza-Yate, Berthier Ribeiro-Neto, "Modern Information Retrieval", 2nd Edition, Pearson Education Asia, 2011.

REFERENCE BOOKS:
1. Christopher D. Manning, Prabhakar Raghavan, Hinrich Schutze, "Introduction to Information Retrieval", 1st South Asian Edition, Cambridge University Press, 2012.
2. Stefan Buttcher, Charles L.A. Clarke, Gordon V. Cormack, "Information Retrieval Implementing and Evaluating Search Engines", The MIT Press, Cambridge, 2010.

Course Outcomes:
On completion of the course the students will be able to
- gain an understanding of the basic concepts and techniques in information retrieval
- familiar themselves with the relevance feedback and query expansion techniques
- understand the most popular indexing and searching methods of information retrieval systems
- acquire the ability to evaluate information retrieval systems
- develop web applications with retrieval capabilities

14ISE20 UBIQUITOUS COMPUTING

3   0   0   3

Pre-requisites: Computer Networks

UNIT – I   **9**
Introduction: Introduction: Basics and visions – Living in a digital world – Modeling key for Ubiquitous computing properties – Ubiquitous system environment interaction – Architectural design for Ubicom system.

UNIT – II   **9**
Smart Devices and Services: Introduction–Service Architectural Model– Service Provision Life cycle–Service invocation–Service composition–Virtual Machines and Operating Systems.

UNIT – III   **9**
Human Computer Interaction: Introduction–User interface and interactions– Hidden UI via basic smart devices– Hidden UI via wearable and implanted devices–Human centred design(HCD)– User models: Acquisition and representation– iHCI design.

UNIT – IV   **9**
Context Aware Systems: Introduction – Modelling – Mobility awareness – Spatial awareness – Temporal awareness – ICT system awareness– Autonomous Systems– Intra acting system– Reflective and self aware systems– Self management and Autonomic computing–Complex systems.

UNIT – V   **9**
Communication Technologies: Audio networks–Data networks – Wireless data networks – Ubiquitous networks – Service oriented networks – Network design issues – Challenges and outlook– Overview – Smart Devices – Smart Interaction– Physical environment device interaction–Smart human machine interaction–Human intelligence versus machine intelligence–Social Issues.

TOTAL: 45

TEXT BOOKS:
1.   Stefan Poslad, "Ubiquitous Computing – Smart Devices, Environment and Interactions", John Wiley & Sons, New York, Reprint 2014.

REFERENCE BOOKS:
1.   Adelstein F. and Gupta S.K.S., "Fundamentals of Mobile and Pervasive Computing", Tata McGraw Hill, New Delhi, 2013.
2.   Mohammad S. Obaidat, Mieso Denko, Isaac Woungang, "Pervasive Computing and Networking", Wiley, 2011.

Course Outcomes:
On completion of the course the students will be able to
- articulate the main concepts, key technologies of ubiquitous computing
- identify the architecture, smart devices and services
- explain challenges and issues in smart devices
- familiar in context aware system
- impart communication technologies employed in ubiquitous computing

14ISE21 CYBER FORENSICS

<div align="right">3   0   0   3</div>

Pre-requisites: Computer Networks, Network Security

UNIT – I   **9**

Introduction: Computer forensics fundamentals – Introduction– Forensics in Law Enforcement – Computer Forensics Assistance – Computer Forensics Services –Benefits – Steps Taken by Computer Forensics Specialists – Types of computer forensics technologies.

UNIT – II   **9**

Computer Forensics Evidence Capture: Data recovery –Data Recovery Defined –Data Backup and Recovery –The Role of Backup in Data Recovery –The Data Recovery Solution –Evidence collection and data seizure- Duplication and prevention of Digital evidence.

UNIT – III   **9**

Computer Forensics Analysis: Discovery of electronic evidence – Electronic Document Discovery Identification of data –Time travel –Forensic Identification and Analysis of Technical Surveillance Devices–Reconstructing past events– Networks.

UNIT – IV   **9**

Information Warfare: Information warfare Arsenal and Tactics of military – Military Tactics – Offensive Ruinous IW Tools and Tactics – Offensive Containment IW Tools and Tactics – Defensive Preventive IW Tools and Tactics – Defensive Ruinous IW Tools and Tactics – Defensive Responsive Containment IW Tools and Tactics – Countering Sustained Terrorist IW Tactics – Dealing with Random Terrorist IW.

UNIT – V   **9**

Surveillance Tools: Surveillance Tools for Information Warfare of the Future –Monitoring Everything –Cyber Surveillance – The Cyber Footprint and Criminal Tracking –The Implications of Cookies and Integrated Platforms –Wintel Inside–Data Mining for What–The Internet Is Big Brother –The Wireless Internet.

<div align="right">**TOTAL: 45**</div>

TEXT BOOKS:
1. John R. Vacca, "Computer Forensics: Computer Crime Scene Investigation", 1st Edition, Charles River Media Inc., 2014.

REFERENCE BOOKS:
1. Marjie T. Britz , "Computer Forensics and Cyber Crime: An Introduction", 2nd Edition, Pearson Education, 2008.
2. Marie-Helen Maras, "Computer Forensics: Cybercriminals, Laws, and Evidence", 2nd Edition, Jones & Bartlett Publishers, 2015.

Course Outcomes:
On completion of the course the students will be able to
- apply the concepts of computer forensics
- handle threats associated with security and information warfare
- familiar in tools and tactics associated with cyber forensics
- identify and apply current practices for data discovery recovery and acquisition
- understand the need to maintain the chain of evidence in criminal investigations
- apply forensic tools in different situations

14ISE22 HUMAN RESOURCE MANAGEMENT

3	**0**	**0**	**3**

UNIT – I   **9**
Introduction: Nature and Scope of Human Resource Management – Objectives and Functions of HRM. Human Resource Planning – Objectives – Process – Problems – Job analysis and Design – Process – Methods of data collection – job design.

UNIT-II   **9**
Recruitment: Factors affecting recruitment – Sources of recruitment – Recruitment process – Selection –Need for scientific selection –Process –Placement– Induction – Internal mobility – Promotion – Transfer – Demotions –Separation.

UNIT -III   **9**
Training: Need for training – Importance–Steps in training programme – Performance appraisal – Purpose – Approaches – Process – Methods – Problems – Making performance appraisal more effective.

UNIT-IV   **9**
Wage and Salary Administration: Objectives – Principles – Components – Methods of wage payments –Theory of wages –Incentives and benefits.

UNIT–V   **9**
Maintenance and Control: Employee Grievances – Cause – Procedure – Human Resource Information System – Need – Advantages–Uses of HRIS – Designing of HRIS –Limitations – International HRM.

TOTAL : 45

TEXT BOOKS:
1.   S.S. Khanka, " Human Resource Management", S.Chand Publications, 2013.

REFERENCE BOOKS:
1.   V.S.P. Rao, "Human Resource Management", 3rd Edition, Excel Books, New Delhi, 2010.
2.   Aswathappa, "Human Resource Management", 6th Edition, Tata McGraw Hill, New Delhi, 2010.

Course Outcomes:
On completion of the course the students will be able to
- reflect on the importance of HRM in the current scenario
- demonstrate techniques in employee selection and training
- develop and evaluate employee training program
- exhibit skill in employee development and appraisal
- summarize the activities involved in evaluating and managing employee performance
- strategically plan for the human resources needed to meet organizational goals and objectives

14ISE23 BIG DATA ANALYTICS

3	0	0	3

Pre-requisites: Data Mining and Data Warehousing

UNIT – I   **9**
Big Data Analytics: Types of Digital Data – Introduction to Big Data - Characteristics – Evolution – Definition – Challenges – Big Data Analytics - Importance – Data Science – Terminologies used in Big Data Environments

UNIT – II   **9**
Hadoop & MapReduce Programming: Introduction to Hadoop – RDBMS versus Hadoop – Distributed Computing Challenges – Hadoop Overview – Use Case of Hadoop - HDFS - Processing Data with Hadoop – Managing Resources and Applications with Hadoop YARN - Interacting with Hadoop Ecosystem – Introduction to MapReduce Programming

UNIT – III   **9**
MongoDB and Cassandra: Introduction to MongoDB – Data Types in MongoDB – MongoDB Query Language – Introduction to Cassandra – Features – CQL Data Types – CQLSH – Keyspaces - CRUD Operations – Collections – Using a Counter – Time to Live (TTL) – Alter Commands – Import and Export – Querying System Tables

UNIT – IV   **9**
HIVE and PIG: Introduction to Hive – Architecture – Data Types – File Format – Hive Query Language(HQL) – Introduction to Pig – Pig on Hadoop – Data Types – Running Pig – Execution Modes of Pig – HDFS Commands – Relational Operators – Eval Function – Complex Data Types

UNIT - V   **9**
Machine Learning: Introduction to Machine Learning – Machine Learning Algorithms – Regression Model – Clustering – Collaborative Filtering – Association Rule Mining – Decision Tree- NoSQL
                                                                                                        TOTAL: 45

TEXT BOOKS:
1.   Seema Acharya, Subhashini Chellappan "Big Data and Analytics", 1st Edition, Wiley, 2015.
REFERENCE BOOKS:
1.   "Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data", EMC Education Services, John Wiley and Sons, 2015.
2.   Frank J. Ohlhorst, "Big Data Analytics: Turning Big Data into Big Money", Wiley and SAS Business Series, 2012.

Course Outcomes:
On completion of the course the students will be able to
- understand big data analytics
- decipher the basics of Hadoop and MapReduce programming
- explore the NoSQL databases, MongoDB and Cassandra
- enrich the knowledge by working with Hive and Pig
- build familiarity with machine learning algorithms

14ISE24 AGILE SOFTWARE ENGINEERING

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Pre-requisites: Software Engineering

UNIT - I   **9**

Introduction: Introduction to Agile software development - Overview and objectives – Three perspectives on software engineering- Agile manifesto- Application- Data - Agile software development learning environments. Teamwork –Overview and Objectives-   Role in Agile Teams - Implementation of the Role Scheme - Dilemmas in teamwork- Teamwork in learning environments

UNIT – II   **9**

Time management: Customers and Users - Overview - The customer - The user- Customers and users in learning environments -Time   - Overview and objectives- Time-related problems in software projects- Tightness of software development methods- Sustainable pace- Time management of Agile projects- Time in learning environments

UNIT – III   **9**

Measures: Measures - Overview and objectives- Need of measures – Questions in measures -Measures in learning environments - Quality- Overview and objectives- The Agile approach to quality assurance- Test-Driven Development- Measured TDD

UNIT - IV   **9**

Learning: Learning - Overview and objectives- Support of Agile software development in learning processes- Abstraction- Abstraction levels in Agile software development –Roles in agile teams –Stand up meeting – Design and refactoring

UNIT - V   **9**

Trust: Trust - Overview and Objectives- Software intangibility and process transparency- Game theory perspective in software development- Ethics in agile teams- Diversity - Globalization- Overview and objectives- The agile Approach in global software development- Application of agile principles in non-software projects- Globalization in learning environments

<div align="right">**TOTAL: 45**</div>

TEXT BOOKS:
1. Orit Hazzan and Yael Dubinsky, "Agile Software Engineering", Springer-Verlag London Ltd., 2008.

REFERENCE BOOKS:
1. Thomas Stober , Uwe Hansmann, "Agile Software Development: Best Practices for Large Software Development Projects", Springer-Verlag London Ltd., 2010.
2. Mike Cohn, "Succeeding with Agile : Software Development Using Scrum", Pearson Education, 2010.

Course Outcomes:

On completion of the course the students will be able to
  * learn agile software development environments
  * organize and work in agile teams
  * understand agile approach to quality assurance
  * realize the roles in agile teams
  * know the ethics in agile process

14ISO01 E-COMMERCE

3   0   0   3

UNIT – I
9

Introduction to E-Commerce: The Scope of E-Commerce – Definition-E-Commerce and the Trade Cycle – Electronic Market – Electronic Data Interchange – The Internet Commerce – E-Commerce in Perspective. Business Strategy: The Value Chain – Supply Chains – Porter's Value Chain Model – The Inter Organizational Value Chains.

UNIT – II
9

Business Strategies: Introduction to Business Strategy – Strategic Implications of IT – Technology – Business Environment – Business Capability – Existing Business Strategy – Strategy Formulation and Implementation Planning – e-Commerce Implementation –e-Commerce Evaluation. The Inter Organizational Transactions – The Credit Transaction Trade Cycle. A Variety of Transactions – Pens and Things.

UNIT – III
9

Electronic Data Interchange E-Markets : Markets – E-Markets-Usage of E-Markets-Advantages and Disadvantages of E-Markets . EDI : Introduction to EDI– EDI Definition - Benefits of EDI – EDI Standards – EDI Communications-EDI Implementation – EDI Agreements – EDI Security.

UNIT – IV
9

EDI and Business: EDI trading patterns-EDI transactions-EDI adoption and EDI Maturity-IOS, EDI and Internet e-commerce- Inter Organizational e-commerce - Business to Consumer E-Commerce.

UNIT – V
9

The Elements of E-commerce and E-Business: The elements of e-commerce- E-Business-Introduction - The Internet Bookshops – Grocery Supplies - Software Supplies and Support – Electronic Newspapers – The Internet Banking - The Virtual Auctions – Online Share Dealing – Gambling on the Net – e-Diversity.

TOTAL: 45

TEXT BOOKS:
1. David Whiteley, "E-Commerce – Strategy, Technology & Applications ", Tata McGraw-Hill, 2008.

REFERENCE BOOKS:
1. Kalakota, Ravi and Whinston, Andrew B., "Frontiers of Electronic Commerce", Pearson Education, 2009.
2. Awad, Elias M., "Electronic Commerce From Vision to Fulfillment", 3rd Edition, Prentice Hall of India, Delhi, 2007.

Course Outcomes:
On completion of the course the students will be able to
- know the basics of ecommerce
- understand the e-business strategies
- employ the latest techniques in internet e-business technology in transacting online business
- understand Business-to-business electronic data interchange
- understand the elements of E-commerce

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Pre-requisites: Software Engineering

UNIT - I   **9**
User Interface Analysis and Design: The Golden Rules – User Interface analysis and Design – Interface analysis – Interface design steps – Applying design steps – UID patterns – Design evaluation

UNIT – II   **9**
Taxonomy: Introduction – A taxonomy of software design – Goal directed design – User's Goal – The essence of user interface design. The three models – Manifest model –Visual interface design – Visual processing – Visual patterns – Restricting the vocabulary – Canonical vocabulary

UNIT – III   **9**
Behavior: Orchestration and flow – Techniques for inducing and maintaining flow– Characteristic of good user interfaces – Posture and types– States of windows – Idiocy – The weapon of interface design – Task coherence

UNIT – IV   **9**
The Interaction: The interaction - Pointing and clicking – Mouse operations – Selection – Object verb – Concrete and discrete data – Insertion and replacement – Additive and group selection – Visual indications. Direct manipulation - Manipulating Gizmos – Repositioning – Resizing and reshaping – Arrowing – Direct manipulation visual feedback

UNIT - V   **9**
Menus: Meaning of menus - Command line and hierarchical menu interface - Menus - Types - Dialog boxes – Modal and modeless dialog box - Modeless dialog problem and two solution –Property – Function – Bulletin – Process dialog boxes - Dialog box etiquette

TOTAL: 45

TEXT BOOKS:
1. Cooper Alan, "The Essentials of User Interface Design", Wiley Dream Tech Ltd., New Delhi, 2008.
2. Pressman Roger, "Software Engineering: A Practitioner Approach", 7th Edition, McGraw Hill, 2014.
REFERENCE BOOKS:
1. Sheiderman Ben and Catherine Plaisant, "Designing the User Interface", 4th Edition, Pearson Education, New Delhi, 2008.
Course Outcomes:
On completion of the course the students will be able to
- understand UID rules
- design the menus and dialog boxes properly
- know about the UI design patterns
- maintain the process-flow of the application
- apply UID concepts during GUI oriented application development

14ISO03 SOFTWARE REUSE

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Pre-requisites: Software Engineering

UNIT – I   **9**

Introduction to Software Reuse: Introducing software reuse - Definition and basic essentials-Further Introductory essential-Systematic reuse - Reusable software assets: software asset - characteristics of reusable assets.

UNIT – II   **9**

Reuse Repository: Managing software asset - Assets vs Objects- Needs for repository - Requirements for reuse repository - Repositories on the internet - Tool category on the market.

UNIT– III   **9**

Reuse process: Reuse process we need -Starting a corporate Reuse Programme - Practising reuse – Asset Production and Application Production Processes .

UNIT– IV   **9**

Reuse Management and Metrics: The management issues - To Reuse or not to Reuse - Reuse for all and all for Reuse-Adapting the work structure – Reuse Metrics: General Aspects of a Metrics programme - A typical Reuse Metrics Programme .

UNIT – V   **9**

Reuse Techniques and Technologies: Rationale-Reuse enabling Architecture-Object-oriented Techniques-Design Patterns-Object-Oriented frameworks-component based development-Agent based systems.

TOTAL: 45

TEXT BOOKS:
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", 3rd Impression, Pearson Education, 2009.
2. Stephen H. Kan, "Metrics and models in Software Quality Engineering", 2nd Edition, 2009.

Course Outcomes:

On completion of the course the students will be able to
- explore the fundamental concept of reuse and reengineering process
- provide insight on architectural and common reuse process
- gain knowledge about the reuse repository
- understand the importance of measuring and managing reuse techniques and technologies
- explore the techniques used for reuse

14ISO04 PAIR PROGRAMMING

                                                                3   0   0   3

Pre-requisites: Advanced Software Engineering

UNIT - I   9
Introduction: Pair or not to pair decision - A pair programming timeline - The seven myths of pair programming - The seven synergistic behaviors of pair programming - Pair pressure, Pair negotiation, Pair courage, Pair reviews, Pair debugging, Pair learning and pair trust.

UNIT – II   9
Motivation: Overcoming management resistance to pair programming – Motivations – Goals - Gaining support and acceptance from peers - Transitioning to pair programming by choice - Green and Hevner's findings - Advice for management and programmers problems: Dependency – Scheduling - The Ever-Popular expert – Co-location - Noise and facility considerations – Concentration – Disagreements – Overconfidence – Rushing - Skill imbalances

UNIT – III   9
Getting Started with Pair Programming: Workplace layout - Basic needs - Workplace enhancements – Inter-pair communications - Development environments -Noise considerations - Pair rotation, Communication, Knowledge management, and training - Other issues to consider: Performance appraisals - Group size - Quality assurance - Functional and system testing - Maintaining and enhancing code

UNIT - IV   9
Pair Programming Partner Picking Principles: Expert-Expert pairing – Intent - Characteristics of success – Challenges -Personal scenarios - Expert-Average pairing -Intent - Characteristics of success – Challenges - Expert-Novice Pairing - Novice-Novice Pairing - Extrovert-Extrovert Pairing - Extrovert-Introvert Pairing - Introvert-Extrovert Pairing

UNIT - V   9
The Professional Driver Problem: Gender nonissue - Culture nonissue - The professional driver problem - Ego Problems – Case studies of pair programming in a software process - Pair programming in a software process - Case study: Extreme Programming (XP) - XP needs pair programming - Pair programming in a software process - Seven habits of Effective pair programmers

                                                                TOTAL: 45

TEXT BOOKS:
1. Laurie Williams, Robert R. Kessler, "Pair Programming Illuminated", Pearson Education, 2003.

REFERENCE BOOKS:
1. Stephan Salinger, Lutz Prechelt, "Understanding Pair Programming: The Base Layer", Books on Demand, Germany, 2013.
2. Jutta Eckstein, "Agile Software Development with Distributed Teams: Staying Agile in a Global world", Dorset Housing Publishing, NewYork, 2010.

Course Outcomes:
On completion of the course the students will be able to
- understanding myths and behavior of pair programming
- know about various pairing techniques
- solve Partner picking problems
- manage ego problems in pair programming
- apply extreme programming concepts

14ISO05 ADHOC AND SENSOR NETWORKS

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Pre-requisites: Mobile Communications

UNIT - I   **9**

Introduction: Ad hoc Wireless Networks - Introduction - Applications - Issues in ad hoc wireless networks - MAC protocols: Introduction – Issues – Classification – Contention based protocols -MACAW

UNIT – II   **9**

Routing Protocols: Routing protocols for ad hoc wireless networks – Issues – Classification – Table Driven, On demand and Hybrid protocols - Hierarchical and power aware routing protocols

UNIT – III   **9**

Transport Layer   Protocols: Transport layer protocols – Issues – Design goals – Classification of solutions – TCP over ad hoc networks – Ad hoc TCP

UNIT - IV   **9**

Security: Security in ad hoc networks – Network security requirements – Issues and challenges – Network security attacks – Key management – Secure routing

UNIT - V   **9**

Wireless Sensor Networks: Wireless sensor networks – Introduction – Architecture – Data dissemination – Directed diffusion – Data gathering.

TOTAL: 45

TEXT BOOKS:

1. C. Siva Ram Murthy and B.S. Manoj, "Ad Hoc Wireless Networks: Architectures and Protocols", Pearson Education, 2011.

REFERENCE BOOKS:

1. Subir Kumar Sarkar, Basavaraju T.G. and Puttamadappa C., "Ad Hoc Mobile Wireless Networks", CRC Press-Taylor & Francis Group, 2007.
2. Perkins Charles E., "Ad Hoc Networking", Pearson Education, 2008.

Course Outcomes:

On completion of the course the students will be able to

*   understand the features of ad hoc networks
*   choose appropriate routing algorithm
*   know the TCP variations for ad hoc networks
*   manage security concerns in ad hoc networks
*   get awareness sensor networks

14ISO06 SOFTWARE MAINTENANCE

                                                                    3   0   0   3

Pre-requisites: Software Engineering

UNIT – I   **9**

View of Maintenance and Problem Reporting: Introduction-Product Life Cycle Activities - Different Types of Software Products - Deployment Models -An Overview of Corrective Maintenance-Other Forms of Maintenance.Problem Reporting: Introduction-Customer-side Preliminary Activities-Customer Support Group Role-Defects-Logistics and Tooling-Skillsets - Challenges, Best Practices and Pitfalls- Measurements of Effectiveness in Problem Reporting.

UNIT – II   **9**

Problem Resolution and Fix Distribution: Introduction-High Level Overview- Categorising - Prioritising -Identifying the Right Developer for Fixing the Problem-Reproducing -Making the Fix and Testing It -Scheduling for Release-Skill sets-Challenges, Best Practices and Pitfalls-Measurements of Effectiveness. Fix Distribution: Introduction-A High Level Overview -Choosing the Method of Distribution-Composing the Fixes-Preparing and Testing the Shipment Unit -Scheduling for Release-People Issues - Challenges, Best Practices and Pitfalls-Tools and Measurements.

UNIT – III   **9**

Software Maintenance from the Customer's Perspective: Introduction-Types of Customer Organisations-Common Roles -Typical Customer Perceptions-Conclusions. Maintenance of Mission-Critical Systems : Introduction-Mission-critical Systems Important to a Software Product Organisation-Requirements of Large Mission-Critical Systems-Product and Environment Issues to Address while Supporting Mission-Critical Systems-Process Changes- People Changes Required for Maintenance Supporting Mission Critical Systems -Conclusions.

UNIT – IV   **9**

Global Maintenance Teams: Introduction-Roles, Responsibilities and Skillsets in Maintenance-Effects and Opportunities Because of Globalisation-Organisation Structures Estimation of People Resources for Maintenance-Typical People Issues Faced in Maintenance-How the Processes Get Changed for Different Organisation Structures and Models-Compensation and Reward Systems-Best Practices and Pitfalls.

UNIT – V   **9**

Forms of Maintenance and Other Life Cycle Activities: Other Forms of Maintenance - Introduction-Effect of Requirements Gathering on Maintenance-Design and Maintenance-Programming, Debugging and Maintenance-Testing and maintenance-Putting it all together.

                                                                    TOTAL : 45

TEXT BOOKS:
1. Gopalaswamy Ramesh and Ramesh Bhattiprolu, "Software Maintenance", Tata McGraw-Hill Publishing, New Delhi, 2009.

REFERENCE BOOKS:
1. Alain April, Alain Abran, "Software Maintenance Management: Evaluation and Continuous Improvement", John Wiley & Sons Publication, 2008.
2. Donald J. Reifer, "Software Maintenance Success Recipes", CRC Press, 2011.

Course Outcomes:
On completion of the course the students will be able to
*   elucidate the importance of maintenance
*   know how to resolve problems in software maintenance
*   acquire the managerial and technical aspects of software maintenance
*   gain knowledge of software maintenance from customer perception
*   understand the life cycle activities of software maintenance

14ISO07 SERVICE ORIENTED ARCHITECTURE

3   0   0   3

Pre-requisites: Web Technology

UNIT – I   **9**

Introduction to SOA with Web Services: The Service-Oriented Enterprise – Service-Oriented Development - Service-Oriented Architecture - SOA & Web Services – Rapid Integration – Multi-Channel Access – Business Process Management – Extended Web Services Specifications

UNIT – II   **9**

Service-Oriented Architecture: Service-Oriented Business and Government – Service-Oriented Architecture Concepts – Service Governance, Processes, Guidelines, Principles, Methods and Tools – Key Service Characteristics – Technical Benefits - Business Benefits

UNIT – III   **9**

SOA and Web Services: – The Web Services Platform – Service Contracts – Service-Level Data Model – Service Discovery – Service-Level Security – Service-Level Interaction Patterns – Atomic Services and Composite services – Generating Proxies and Skeletons from Service Contracts - Service-Level Communication and Alternative Transports – A Retrospective on Service-Oriented Architectures

UNIT – IV   **9**

SOA & Web Services for Integration and Multi-Channel Access: Overview – Integration and Interoperability using XML and Web Services – Two Approaches for Integration and Interoperability – Applying SOA and Web Services for Integration – .NET & J2EE Interoperability, Service Enabling Legacy Systems, Enterprise Service Bus Pattern – Business Benefits of SOA & Multi-Channel Access – SOA for Multi-Channel Access – Client/Presentation Tier – Channel Access Tier – Communication Infrastructure – Business Service Access Tier – Business Service Tier

UNIT – V   **9**

SOA and Business Process Management: Basic Business Process Management Concepts - Example Business Process – Combining BPM, SOA and Web Services – Orchestration and Choreography Specifications – Example of Web Services Composition

TOTAL : 45

TEXT BOOKS:

1. Eric Newcomer, Greg Lomow, "Understanding SOA with Web Services", Pearson, 2009.

REFERENCE BOOKS:

1. Shankar Kambhampaly, "Service – Oriented Architecture for Enterprise Applications", Wiley India Pvt. Ltd., 2013.
2. Thomas Erl, "Service Oriented Architecture Concepts, Technology and Design", Pearson, 2008.

Course Outcomes:

On completion of the course the students will be able to

- know the basic principles of service oriented architecture
- understand the architecture of web services
- discern the relationship between SOA and web services
- integrate SOA with web services and provide multi-channel access to business services
- perceive the service design and business process management

14ISO08 INTERNET OF THINGS

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Pre-requisites: Basic knowledge in Web Technology, Distributed Computing

UNIT – I   **9**

The Third ICT Wave and Ubiquitous IoT Applications: Rise of the Machines – The IoT Kaleidoscope – Defining Internet of Things – IoT: A Web 3.0 View – A Panoramic view of IoT Applications – Important Vertical IoT Applications.

UNIT – II   **9**

Pillars and DNA of IoT: The Horizontal, Verticals and Four Pillars – M2M: The Internet of Devices – RFID: The Internet of Objects – WSN: The Internet of Transducers – SCADA: The Internet of Controllers – DCM: Device, Connect and Manage – Device: Things That Talk – Connect: Via Pervasive Networks.

UNIT – III   **9**

Middleware and IoT: Manage: To Create New Business Value – An Overview of Middleware – Communication Middleware for IoT – LBS and Surveillance Middleware.

UNIT – IV   **9**

Protocol Standardization for IoT: Web of Things versus Internet of Things – IoT Protocol Standardization Efforts – Unified Data Standards: A Challenging Task.

UNIT – V   **9**

Architecture Standardization of IoT: Platform Middleware for IoT – Unified Multitier WoT Architecture – WoT Portals and Business Intelligence – Challenges of IoT Information Security.

<div align="right">**TOTAL: 45**</div>

TEXT BOOKS:
1. Honbo Zhou, "Internet of Things in the Cloud A Middleware Perspective", CRC Press, Taylor and Francis Group, 2013.

REFERENCE BOOKS:
1. Olivier Hersent, David Boswarthick, Omar Elloumi, "The Internet of Things", Wiley Publication, New York, 2012.
2. Adrain Mcfwen and Hakim Cassimally, "Designing the Internet of Things", John Wiley and Sons Ltd., 2014.

Course Outcomes:

On completion of the course the students will be able to
- describe the applications of Internet of Things
- define the building blocks of IoT
- identify the middleware used in communication
- demonstrate the protocol used in IoT
- summarize the architecture and security challenges of Internet of Things

14ISO09 UNIX INTERNALS

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Pre-requisites: Operating Systems

UNIT – I   **9**

Introduction to Kernel and Files: Architecture of the Unix Operating System - Introduction to System Concepts- Kernel Data Structures- System Administration - Internal Representation of Files**:** Inodes- Structure of a regular file- Directories- Conversion of a path name to an Inode – Super block – Inode assignment to a new file – Allocation of disk blocks – Other file types.

UNIT – II   **9**

System Calls for the File System and Processes: Open- Read- Write- File and Record locking- Lseek- Close- File creation- Creation of special files- Changing Directory and Root- Changing Owner and Mode- STAT & FSTAT - Pipes- DUP-Mounting and Unmounting File System- Link- Unlink - File System Abstractions - File system maintenance.

UNIT – III   **9**

The Structure of Processes: Process States and Transitions- Layout of System Memory - Context of a Process- Saving the Context of the Process- Manipulation of the Process Address Space – Sleep.

UNIT – IV   **9**

Process Control: Process Creation - Signals- Process Termination – Awaiting Process Termination - Invoking other Programs- User ID of Process - Changing the Size of a Process- The Shell - System Boot and init Process.

UNIT - V   **9**

Interprocess Communication and Memory Management: Interprocess Communication: Process tracing – System V IPC. Memory Management Policies: Swapping- Demand Paging.

<div align="right">**TOTAL: 45**</div>

TEXT BOOKS:

1.   Maurice J. Bach, "The Design of the UNIX Operating System", PHI, New Delhi, Reprint 2012.

REFERENCE BOOKS:

1.   Rosen, Kenneth H., Host, Douglas A., Klee, Rachel, and Rosinski, Richard R., "UNIX: The Complete Reference", 2nd Edition, Tata McGraw Hill, 2007.
2.   Uresh Vahalia, "UNIX Internals: The New Frontiers", Pearson Education, New Delhi, 2010.

Course Outcomes:

On completion of the course the students will be able to

- analyze the kernel and files representation
- elucidate various system information using unix system structure and system calls
- understand the structure of process and process controls
- learn inter process communication
- recall the memory management policies and I/O operations