Bharath UNIVERSITY
பாரத் பல்கலைக்கழகம்
BHARATH INSTITUTE OF HIGHER EDUCATION AND RESEARCH
(Declared as Deemed-to-be-University, u/s 3 of the UGC Act, 1956)

B. TECH -SOFTWARE ENGINEERING

CURRICULUM & SYLLABUS

2015

DEPARTMENT OF SOFTWARE ENGINEERING

BHARATH INSTITUTE OF SCIENCE AND TECHNOLOGY

No: 173, Agaram Road, Selaiyur,

Chennai -600 073, TamilNadu.

BHARATH INSTITUTE OF HIGHER EDUCATION AND RESEARCH

B. Tech. SOFTWARE ENGINEERING

SEMESTER -I

SUB.CODE	Subject Name	L	T	P	C
Theory					
BEN101	Technical English-I	3	1	0	3
BMA101	Mathematics-I	3	1	0	3
BPH101	Engineering Physics-I	3	0	0	3
BCH101	Engineering Chemistry-I	3	0	0	3
BCS101	Fundamentals of Computing and Programming	3	0	0	3
BFI101	Foreign/Indian Language	3	0	0	3
BCS102	Computer Graphics	2	2	0	3
BEE101	Basic Electrical and Electronics Engineering	2	0	0	2
Practical					
BCS1L1	Computer Practice Laboratory	0	0	3	2
BEE1L1	Basic Electrical and Electronics Engineering Practices Laboratory	0	0	3	2
		Total Credits			**27**

SEMESTER -II

SUB.CODE	SUBJECT NAME	L	T	P	C
Theory					
BEN 201	Technical English-II	3	0	0	3
BMA 201	Engineering Mathematics-II	3	1	0	3
BPH 201	Engineering Physics-II	3	0	0	3
BCH 201	Engineering Chemistry-II	3	0	0	3
BCS 201	Internet Programming and Web Design	2	0	0	2
BBA201	Personality Development	1	1	0	2
BCE 201	Basic Civil Engineering	2	0	0	2
BBT202	Biology for Engineers	2	0	0	2
BME 201	Basic Mechanical Engineering	2	0	0	2
Practical					
BCS 2L1	Internet Practices Lab	0	0	3	2
BCM 2L1	Basic Civil and Mechanical Engineering Practices Laboratory	0	0	3	2
BPC 2L1	Physics and Chemistry Laboratory-II	0	0	3	2
		Total Credits			**28**

BHARATH INSTITUTE OF HIGHER EDUCATION AND RESEARCH

B. Tech. SOFTWARE ENGINEERING

SEMESTER -III

SUB.CODE	SUBJECT NAME	L	T	P	C
Theory					
BMA 301	Mathematics – III	3	1	0	4
BCS301	Data Structures and Algorithms	3	1	0	3
BCS302	Computer Network	3	0	0	3
BCS303	Computer Organization and Architecture	3	0	0	3
BCS306	Software Engineering	3	0	0	3
Practical					
BEC305	Electronic Circuits	3	0	0	3
BCS3L1	Data Structures Lab	0	0	3	2
BEC3L2	Electronics Lab	0	0	3	2
BCS3L2	Object Oriented Programming Using C++ Lab	0	0	3	2
BCS3S1	Technical Seminar – I	0	0	2	1
				Total Credits 26	

SEMESTER -IV

SUB.CODE	SUBJECT NAME	L	T	P	C
Theory					
BMA402	Numerical Methods	3	1	0	4
BCS401	Database Management System	3	0	0	3
BSE401	UML and Design Patterns	3	0	0	3
BCS402	System Modelling and Simulation	3	0	0	3
BSE403	Software Architecture	3	0	0	3
BCS405	Operating Systems	3	0	0	3
Practical					
BCS4L1	DBMS Laboratory	0	0	3	2
BSE4L2	UML and Design Patterns Lab	0	0	3	2
BCS4L3	Multimedia Lab	0	0	3	2
BCS4S1	Technical Seminar-II	0	0	2	1
					Total Credits 26

SEMESTER -V

SUB.CODE	SUBJECT NAME	L	T	P	C
Theory					
BMA 503	Mathematics – IV	3	1	0	4
BCS 502	Neural Networks	3	0	0	3
BSE 501	Linux Internals	3	0	0	3
BCS503	Distributed Computing	3	0	0	3
BCE503	Environmental Studies	3	0	0	3
BBA501	Principles of Management	3	0	0	3
Practical					
BCS 5L1	Programming in Java Lab	0	0	3	2
BSE 5L1	Linux Internals Laboratory	0	0	3	2
BCS5L3	Networking Laboratory	0	0	3	2
BSE5S1	Industrial Training	0	0	3	1
				Total Credits	**26**

SEMESTER -VI

SUB.CODE	SUBJECT NAME	L	T	P	C
Theory					
BCS605	Data Warehousing and Data Mining	3	0	0	3
BSE601	Software Measurement and Metrics	3	0	0	3
BSE602	Cloud Computing	3	0	0	3
BCS604	Artificial Intelligence& Expert System	3	0	0	3
BSE602	Mobile and Pervasive Computing	3	0	0	3
BCS606	Principles of Compiler Design	3	0	0	3
Practical					
BCS6L3	Data Warehousing and Data Mining Laboratory	0	0	3	2
BCS6L2	C # and .Net Laboratory	0	0	3	2
BSE6L3	Mobile and Pervasive Computing Lab	0	0	3	2
BCS6P1	Mini Project – I	0	0	3	1
				Total Credits	**25**

BHARATH INSTITUTE OF HIGHER EDUCATION AND RESEARCH

B. Tech. SOFTWARE ENGINEERING

SEMESTER –VII

SUB.CODE	SUBJECT NAME	L	T	P	C
Theory					
BSE701	Software Testing	3	0	0	3
BCS702	Web Technology	3	0	0	3
BCS704	Information Security and Cyber Laws	3	0	0	3
BSE704	Cryptography and Network Security	3	0	0	3
BSE7E1	Elective I	3	0	0	3
BSE7E2	Elective II	3	0	0	3
Practical					
BCS7L1	Software Testing Laboratory	0	0	3	2
BCS7L2	Web Technology Laboratory	0	0	3	2
BSE7L1	Cryptography and Network Security Lab	*0*	*0*	*3*	*2*
BCS7P1	Project work Phase – I	0	0	6	3
				Total Credits	**27**

SEMESTER –VIII

SUB.CODE	SUBJECT NAME	L	T	P	C
Theory					
BSE801	Software Reliability	3	0	0	3
BSE8E3	Elective III	3	0	0	3
BCS8E3	Elective IV	3	0	0	3
Practical					
BSE8P1	Project Work and Viva Voce	0	0	18	6
				Total Credits	**15**

TOTAL CREDITS FOR THE PROGRAMME: 200

LIST OF ELECTIVES

SUB.CODE	SUBJECT NAME	L	T	P	C
ELECTIVE I					
BCS 001	Analysis Of Software Artifacts	3	0	0	3
BCS 002	Software Quality Management	3	0	0	3
BCS 003	Software Project Management	3	0	0	3
ELECTIVE II					
BCS 004	Parallel Computing	3	0	0	3
BCS 005	Real Time Systems	3	0	0	3
BCS 006	Distributed Operating System	3	0	0	3
BCS 007	Embedded Systems	3	0	0	3
BCS 008	Middleware Technologies	3	0	0	3
ELECTIVE III					
BCS 009	Pattern Recognition	3	0	0	3
BCS 010	Fuzzy and genetic algorithm	3	0	0	3
BCS 011	Natural Language Processing	3	0	0	3
BCS 012	Speech Technology	3	0	0	3
BCS 013	Soft computing	3	0	0	3
ELECTIVE IV					
BCS 014	TCP / IP Principles and Architecture	3	0	0	3
BCS 015	Performance Evaluation of Computer Systems& Networks	3	0	0	3
BCS 016	Advanced Computer Networks	3	0	0	3
BCS 017	Mobile Communication	3	0	0	3
BCS 018	High Speed networks	3	0	0	3
BCS 019	Virtual Reality	3	0	0	3
BCS 020	E-Commerce	3	0	0	3
BCS 021	Object Oriented Database Design	3	0	0	3
BCS 022	Component Based System Design	3	0	0	3
BCS 023	PHP Programming	3	0	0	3
BCS 024	Advanced Web Design	3	0	0	3
BCS 025	Advanced Databases	3	0	0	3
BCS 026	Human Computer Interaction	3	0	0	3
BBA 014	Entrepreneurship Development	3	0	0	3
BBA 024	Engineering Economics and Financial Accounting	3	0	0	3

BMA301 MATHEMATICS-III 3 1 0 4

UNIT-I

PARTIAL DIFFERENTIAL EQUATIONS 12

Formation - Solutions of standard types of first order equations - Lagrange's equation - Linear partial differential equations of second and higher order with constant coefficients

UNIT-II

FOURIER SERIES 12

Dirchlet's conditions - General Fourier Series - Half Range and Cosine series - Parseval's identity - Harmonic Analysis

UNIT-III

BOUNDARYVALUE PROBLEMS 12

Classification of second order linear partial differential equations – Solutions of cone - Dimensional wave equations, one-dimensional heat equations

UNIT-IV

LAPLACE TRANSFORM 12

Transforms of simple functions - Basic operational properties - Transforms of derivatives and integrals - Initial and Final value theorems - Inverse transforms - Convolution theorem - Periodic functions - Applications of Laplace Transforms for solving linear ordinary differential equations up to second order with constant coefficients and simultaneous equations for first order with constant coefficients

UNIT-V

FOURIER TRANSFORMS 12

Statement of Fourier integral theorem - Fourier transform pairs - Fourier Sine and Cosine transforms - Properties - Transforms of simple functions -Convolution theorem - Parseval's identity

TOTAL NO OF PERIODS: 60

TEXT BOOKS:

1. Kreyszig. E, "Advanced Engineering Mathematics", 8th Edition, John Wiley and Sons (Asia) Pvt. Ltd., Singapore 2000.
2. Grewat B.S., "Higher Engineering Mathematics", 35th Edition, Khanna Publishers, Delhi 2000.

REFERENCE BOOKS:

1. Kandasamy P, Thilgavathy K. and Gunavathy K, "Engineering Mathematics, Vol. II and III", 4th Revised Edition, S. Chand & Co., New Delhi 2001.
2. Narayanan S, Manicavachagam Pillay, T.K, Ramanaiah G, "Advanced Mathematics for Engineering Students, Vol. II and III", 2nd Edition, S, Viswanathan Printers & Publishers Pvt Ltd, 1992.
3. Venkataraman M. K., "Engineering Mathematics, Vol. III - A & B", 13th Edition, National publishing Co.,Chennai, 1998

BCS301 DATA STRUCTURES AND ALGORITHMS 3 1 0 4

OBJECTIVES

This course demonstrate familiarity with major algorithms and data structures and analyze performance of algorithms. It is used to choose the appropriate data structure and algorithm design method for a specified application and determine which algorithm or data structure to use in different scenarios.

OUTCOMES

- Demonstrate understanding of the abstract properties of various data structures such as stacks, queues, lists, trees and graphs
- Demonstrate understanding of various sorting algorithms, including bubble sort, insertion sort, selection sort, heap sort and quick sort.
- Understand and apply fundamental algorithmic problems including Tree traversals, Graph traversals, and shortest paths.

UNIT I **12**

INTRODUCTION

Data objects and structures- The linear list data structure-Array Representation- Vector Representation – Performance analysis- Space complexity – Time complexity

UNIT II **12**

DATA REPRESENTATION

Singly linked list– Circular lists- Doubly liked list – Stacks – Abstract Data Type – Array Representation – Linked representation – Queues.

UNIT III **12**

BINARY AND OTHER TREES

Trees – Binary trees – Properties of binary trees – Representation of binary trees – Binary tree traversal – Priority queues- Linear lists – Heap – Binary search tree- Binary search tree implementations –AVL trees -Graph – Graph search methods

UNIT IV **12**

THE GREEDY METHOD

Optimization problems – Greedy method – Applications – Divide and conquer - The method – Applications – Lower bounds on complexity.

UNIT V **12**

DYNAMIC PROGRAMMING

The method – Applications – Backtracking - The method – Applications – Branch and bound - The method – Applications.

TOTAL NO OF PERIODS: 60

TEXT BOOK:

1. Sartaj Sahni, "Data Structures, Algorithms and Applications in C++", Second Edition, Universities Press.2005

REFERENCE BOOKS:

1. Horowitz, Sahni, Mehta**,** "Fundamentals of Data Structures in C++", 2nd Edition, Universities Press, 2007.
2. Aho, Hopcroft, Ullman, "Data Structures & Algorithms", Pearson Education, 2005.

BCS 302 COMPUTER NETWORKS 3 0 0 3

OBJECTIVES

Computer Networking is the vital part of any organization these days. This course provides a foundation to understand various principles, protocols and design aspects of Computer Networks and also helps to achieve the fundamental purpose of computer networks in the form of providing access to shared resources.

OUTCOMES

Understand the evolution of computer networks using the layered network architecture.

Design computer networks using sub-netting and routing concepts

Understand the various Medium Access Control techniques and also the characteristics of physical layer functionalities

UNIT I 9

INTRODUCTION TO NETWORKS

Introduction: The uses of computer networks - Network hardware - Network software - Reference models - Example of networks- Network standardization.

The Physical Layer: The theoretical basis for data communication – Guided Transmission media - Wireless transmission – PSTN - Mobile telephone - Communication satellite.

UNIT II 9

`DATALINK LAYER

The Data Link Layer: Data link layer design issues - Error detection and correction - Elementary data link protocols - Sliding window protocols - Example of data link protocols- ETHERNET – 802.11, 802.16, Bluetooth- Data link layer Switching.

UNIT III 9

NETWORK LAYER

The Network layer: Network layer design issues - Routing algorithms - Congestion control algorithms -Approaches to Congestion Control-Traffic-Aware Routing-Admission Control-Traffic Throttling-Load Shedding - Internetworking- Network layer in Internet.

UNIT IV 9

TRANSPORT LAYER

The Transport layer: Transport layer design issues-Addressing,Connection Establishment-Connection Release-Error Control and Flow Control - Transport protocols - Simple transportprotocol - Internet transport protocols UDP, TCP.

UNIT V **9**

APPLICATION LAYER

The Application layer: Domain name system - Electronic mail - World wide web-Architectural Overview-Static Web Pages-Dynamic Web Pages and Web Applications-HTTP—The HyperText Transfer Protocol-The Mobile Web-Web Search – Multimedia – Cryptography, Digital signature- Communication Security.

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1. Andrew S. Tanenbaum, "Computer Networks", Pearson Education, 5th edition 2010.
2. Behrouz A. Forouzan, "Data and Computer Communications", 4th Edition, McGraw Hill,2007

REFERENCE BOOKS:

1. William Stallings, "Data and Computer Communications", 8th Edition, Pearson Education,2006
3. Douglas E. Comer, "Internetworking with TCP/IP, Volume-I", 6th Edition, Pearson Education,2013.

BCS303 COMPUTER ORGANIZATION AND ARCHITECTURE 3 0 0 3

OBJECTIVES:

- To have a thorough understanding of the basic structure and operation of a digital computer. To discuss in detail the operation of the arithmetic unit including the algorithms & implementation of fixed-point and floating-point addition, subtraction, multiplication & division.
- To study the different ways of communicating with I/O devices and standard I/O interfaces.
- To study the hierarchical memory system including cache memories and virtual memory

OUTCOMES:

- Students will have thorough knowledge about
- Basic structure of a digital computer
- Arithmetic operations of binary number system
- The organization of the Control unit, Arithmetic and Logical unit, Memory unit and the I/O unit.

UNIT-I
REVIEW OF FUNDAMENTALS 9

Functional units – CPU Registers–CPU Organization-Different Types of Memory-Memory Hierarchy- Memory operations –Instruction Format – Addressing modes – Basic I/O operations-Evaluating CPU Performance

UNIT-II
CPU ARCHITECTURE 9

Instruction sets of different machines –Parallel Processing-Flynnn's Classification-Pipelining-Arithmetic Pipeline-Instruction Pipeline- -Pipelining Hazards- CISC Vs RISC - Super Scalar Architecture

UNIT-III
MEMORY SYSTEM 9

Basic concepts – Semiconductor RAMs – ROMs – Speed – size and cost –Cache Memory-Mapping Techniques-Virtual memory-Evaluating Memory Performance-Secondary Storage-Multiprocessor

UNIT-IV
I/O ORGANIZATION 9

Input-Output Interface-I/O Performance Measures-I/O Modes of Transfer-Direct Memory Access-Input Output Processor-Interfacing to different types of I/O devices

UNIT-V
PARALLEL ARCHITECTURE 9

Data flow –Static Dataflow-Dynamic Dataflow-Dataflow Graph-Vector Processors – CRAY-1 Vector Processor-EPIC

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1. David A. Patterson and John L. Hennessy, "Computer Architecture-A Quantitative Approach", Elsevier, a division of reed India Private Limited, Fifth edition, 2012

2. M. Mano, "Computer System Architecture", Third Edition, Pearson Education,2008.

REFERENCE BOOKS:

1. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, "Computer Organization",McGraw-Hill, 5th Edition, Reprint 2012
2. Ghosh T. K., "Computer Organization and Architecture", Tata McGraw-Hill,Third Edition, 2011
3. John P. Hayes, "Computer Architecture and Organization", Tata McGraw Hill, Third Edition, 1998
4. Behrooz Parahami, "Computer Architecture", Oxford University Press, EighthImpression, 2011

BCS 306 SOFTWARE ENGINEERING 3 0 0 3

OBJECTIVE:
This course is intended to provide the students with an overall view over Software Engineering discipline and with insight into the processes of softwaredevelopment.

OUTCOMES:
1. To learn about generic models of software development process.
2. To understand fundamental concepts of requirements engineering and Analysis Modelling.
3. To understand the different design techniques and their implementation.
4. To learn various testing and maintenance measures

UNIT I **9**

INTRODUCTION

Software Engineering Process paradigms - Project management - Process and Project Metrics – software estimation - Empirical estimation models - Planning - Risk analysis - Software project scheduling.

UNIT II **9**

REQUIREMENTS ANALYSIS

Requirement Engineering Processes – Feasibility Study – Problem of Requirements – Software Requirement Analysis – Analysis Concepts and Principles – Analysis Process – Analysis Model – Software Prototyping – Selecting the Prototyping Approach – Prototyping Methods and Tools – Specification – Software Requirement Specification – Specification Review.

UNIT III **9**

SOFTWARE DESIGN

Software design - Abstraction - Modularity - Software Architecture - Effective modular design - Cohesion and Coupling - Architectural design and Procedural design - Data flow oriented design.

UNIT IV **9**

USER INTERFACE DESIGN AND REAL TIME SYSTEMS

User interface design - Human factors - Human computer interaction - Human - Computer Interface design - Interface design - Interface standards. Programming languages and coding - Language classes – Code documentation - Code efficiency - Software Configuration Management.

UNIT V **9**

SOFTWARE QUALITY AND TESTING

Software Quality Assurance - Quality metrics - Software Reliability - Software testing - Path testing – Control Structures testing - Black Box testing - Integration, Validation and system testing - Software Maintenance - Reverse Engineering and Re-engineering. CASE tools –projects management, tools - analysis and design tools - programming tools - integration and testing tool - Case studies.

TOTAL NO OF PERIODS: 45

TEXT BOOK:

1. Roger Pressman S., “Software Engineering: A Practitioner's Approach”, 7thEdition, McGraw Hill, 2010.

REFERENCE BOOKS:

1. I. Sommerville, “Software Engineering”, Eighth Edition, Pearson Education, 2007
2. Pfleeger, “Software Engineering-Theory & Practice”, 3rd Edition, Pearson Education, 2009
3. Carlo Ghezzi, Mehdi Jazayari, Dino Mandrioli, “Fundamentals of Software Engineering”, Pearson Education, 2003

BEC305 **ELECTRONIC CIRCUITS** **3 0 0 3**

OBJECTIVES:

The subject aims to provide the student with:

- An understanding of basic EE abstractions on which analysis and design of electrical and electronic circuits and systems are based, including lumped circuit, digital and operational amplifier abstractions.
- The capability to use abstractions to analyze and design simple electronic circuits.
- The ability to formulate and solve the differential equations describing time behavior of circuits containing energy storage elements.

OUTCOMES:

- Learn how to develop and employ circuit models for elementary electronic components, e.g., resistors, sources, inductors, capacitors, diodes and transistors.
- Become adept at using various methods of circuit analysis, including simplified methods such as series-parallel reductions, voltage and current dividers, and the node method.
- Appreciate the consequences of linearity, in particular the principle of superposition and ThevenинNorton equivalent circuits.

UNIT I

INTRODUCTION **9**

Electronic Devices-Semi conductor- PN junction diode -BJT-FET IC fabrication.

UNIT II

AMPLIFIER CIRCUITS AND SYSTEMS **9**

Basic amplifier stages of Low frequencies - Frequency response of amplifiers-Concept of feedback-Properties of negative feedback amplifiers.

UNIT III

OPERATIONAL AMPLIFIER **9**

Architecture and characteristics - Parameters-Basic Operational amplifier applications- BIFET - BIMOS and MOS operational amplifier.

UNIT IV

WAVE FORM GENERATOR AND WAVE SHAPING 9

Sinusoidal Oscillators-Crystal Oscillators - Multivibrators - Comparators-Schmitt Trigger-square wave and triangular wave generation-Pulse generation-555 IC timer-Modulation of a square wave-Series regulator- Monolithic Voltage regulator.

UNIT V

SIGNAL CONDITIONING AND DATA CONVERSION 9

Signals and signal processing-Sample and Hold systems-Analog MUX and DEMUX-D/A converter-A/D converters-Integrator and Differentiator-Electronic Analog computations-Active RC filter- Butterworth and Chebyschev filter-Analog multiplier.

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1. Milman and Halkias, "Integrated Electronics", McGraw Hill, 2010.

2. Electronic Devices and Circuits by Anil K.Maini,Varsha Agarwal,Wiley Publications,2009

3. Allen Mottershed, "Electronic Devices and Circuits ", Prentice-Hall of India,1996**.**

REFERENCES:

1. Electronic Fundamentals: Circuits, Devices and its Application by Thomas L.Floyd, United states Edition,2006

BCS3L1 DATA STRUCTURES LABORATORY 0 0 32

1. Simple C++ programs -Control Structures -Functions - Aggregate data types- File handling
2. Implementation of-Lists, Stacks, Queues (Using Arrays, linked lists)-Trees - Searching and Sorting algorithms

TOTAL NO OF PERIODS: 30

BEC3L2 ELECTRONICS LABORATORY 0 0 32

1. Verification of Boolean Theorems-Implementation of Boolean Function - Adders/ Subtractors - Decoders -Encoders - Multiplexers -Demultiplexers - Comparators - Parity Checker/ Generator.
2. Registers - Counters - Shift Registers - General purpose shift registers - Data transmission.
3. Project - A mini project involving clocked sequential networks design.

TOTAL NO OF PERIODS: 30

BCS3L2 OBJECT ORIENTED PROGRAMMING LAB 0 0 32

1. Programs Using Functions
   - Functions with default arguments
   - Implementation of Call by Value, Call by Address and Call by Reference

2. Simple Classes for understanding objects, member functions and Constructors
   - Classes with primitive data members
   - Classes with arrays as data members
   - Classes with pointers as data members – String Class
   - Classes with constant data members
   - Classes with static member functions
3. Compile time Polymorphism
   - Operator Overloading including Unary and Binary Operators.
   - Function Overloading
4. Runtime Polymorphism
   - Inheritance
   - Virtual functions
   - Virtual Base Classes
   - Templates
5. File Handling
   - Sequential access
   - Random access

TOTAL NO OF PERIODS: 30

BCS3S1	**TECHNICAL SEMINAR-I**	**0 0 2 1**

TOTAL NO OF PERIODS: 30

BMA402 NUMERICAL METHODS 3 1 0 4

UNIT – I **12**

SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS
Linear interpolation methods (method of false position) – Newton's method – Statement of fixed point theorem – Fixed point iteration: x=g(x) method – Solution of linear system by Gaussian elimination and Gauss-Jordon methods - Iterative methods: Gauss Jacobi and Gauss-Seidel methods - Inverse of a matrix by Gauss Jordon method – Eigen value of a matrix by power method.

UNIT -II **12**

INTERPOLATIONANDAPPROXIMATION
Lagrangian Polynomials – Divided differences – Interpolating with a cubic spline – Newton's forward and backward difference formulas.

UNIT III **12**

NUMERICAL DIFFERENTIATION AND INTEGRATION
Derivatives from difference tables – Divided differences and finite differences – Numerical integration by trapezoidal and Simpson's 1/3 and 3/8 rules – Romberg's method – Two and Three point Gaussian quadrature formulas – Double integrals using trapezoidal and Simpsons's rules.

UNIT IV **12**

INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS
Single step methods: Taylor series method – Euler and modified Euler methods – Fourth order Runge – Kutta method for solving first and second order equations – Multistep methods: Milne's and Adam's predictor and corrector methods.

UNIT V **12**

BOUNDARY VALUE PROBLEMS IN ORDINARY AND PARTIAL DIFFERENTIALEQUATIONS
Finite difference solution of second order ordinary differential equation – Finite difference solution of one dimensional heat equation by explicit and implicit methods – One dimensional wave equation and two dimensional Laplace and Poisson equations.

TOTAL NO OF PERIODS:60

TEXT BOOKS

1. C.F. Gerald and P.O. Wheatley, 'Applied Numerical Analysis', Sixth Edition, Pearson Education Asia, New Delhi, 2002.

2. Introductory Methods of Numerical Analysis, S.S.Sastry, PHI Edition, 2012

REFERENCE BOOKS

1. P. Kandasamy, K. Thilagavathy and K. Gunavathy, 'Numerical Methods', S.Chand Co. Ltd., New Delhi, 2003.
2. R.L. Burden and T.D. Faires, 'Numerical Analysis', Seventh Edition, Thomson Asia Pvt. Ltd., Singapore, 2002.

BCS401 DATABASE MANAGEMENT SYSTEM 3 0 0 3

OBJECTIVES

- Most of the organizations depend on databases for storing the data and to share the data among different kinds of users for their business operations
- Persistent storage required and several users must be able to safely access the same data concurrently.
- Hence this course discusses about the problems with the file processing system and how it can be handled effectively in Database Systems through various design tools, design techniques and algorithms.

OUTCOMES

- Learn the fundamentals of Database management and to design the database for any given problem
- Understand the SQL and provide the proof of good database design
- Know the fundamentals of transaction processing, practical problems of Concurrency control and Recovery mechanisms

UNIT-I 9

INTRODUCTION

Introduction – Database System Applications-Purpose of Database Systems- View of Data- Data Abstraction- Instances and Schemas- Data Models-Database Languages - Relational Databases- Database Design- The Entity-Relationship Model - Data Storage and Querying - Transaction Management - Database Architecture -Database Users and Admininistrators.

UNIT-II 9

RELATIONAL DATABASES

Introduction to Relational model - Structure of Relational Databases - Database Schema - Keys - Schema Diagrams - Relational Query Languages - Relational Operations -Relational algebra - Introduction to SQL - Overview of the SQL Query Language - SQL Data Definition - Basic Structure of SQL Queries - Formal Relational Query Languages- The Relational Algebra-Relational calculus- Relational database design-Normal Forms- Functional dependency.

UNIT-III
DATA STORAGE AND QUERYING 9

Storage and File Structure - File Organization - Indexing and Hashing- Ordered Indices- Static Hashing- Dynamic Hashing- Query Processing- Overview- Measures of Query Cost-Selection-Sorting- Join Operation- Evaluation of Expressions- Query Optimization- Overview- Transformation of Relational Expressions- Estimating Statistics of Expression Results- Choice of Evaluation Plans

UNIT-IV

TRANSACTIONS 9

Transactions-Transaction Concept-A Simple Transaction Model-Storage Structure-Transaction Atomicity and Durability-Transaction Isolation-Serializability-Transaction Isolation and Atomicity-Transaction Isolation Levels-Transactions as SQL Statements-Concurrency Control-Lock-Based Protocols-Deadlock Handling-Multiple Granularity-Time Stamp-Based Protocols-Validation Based Protocols-Hierarchical model - Basic Concepts - Data-Structure Diagrams-Network model - Basic Concepts-Tree-Structure Diagrams -Parallel databases.

UNIT-V

OBJECT-BASED DATABASES 9

Overview-Complex Data Types-Structured Types and Inheritance in SQL-Table Inheritance-Array and Multiset Types in SQL-Object-Identity and Reference Types in SQL-Implementing O-R Features- Persistent Programming Languages-Object-Relational Mapping-Object-Oriented versus Object-Relational - Data warehousing and Data Mining - Decision-Support Systems-Data Warehousing- Data Mining-Classification-Association Rules-Other Types of Associations-Clustering-Other Forms of Data Mining

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1. Abraham Silberschatz, Henry. F. Korth and S. Sudharshan, “Database System Concepts”, 6th Edition, Tata McGraw Hill, 2011.
2. Ramez Elmasri, Shamkant B. Navathe, “Fundamentals of Database Systems", 6th Edition, Addison-Wesley,2010.

REFERENCE BOOKS:

1.Pakhira Malay.K, “Database Management System”,PHI publication,2012.
2.Narain Gehani, “The Database Book – Principles and Practice Using MySQL”, Universities Press,2008.
3. Hector Garcia - Molina, Jeff Ullman and Jennifer Widom, “Database systems: The Complete Book” 2nd Edition, Pearson Education,2008.
4. C. J. Date, A. Kannan and S. Swamynathan, “An Introduction to Database Systems”, Pearson Education, 8th Edition,2006.

BCS402 UML AND DESIGN PATTERNS 3 0 0 3

OBJECTIVE:

- Create a requirements model using UML class notations and use-cases based on statements of user requirements the OO Create design of a system from the requirements model in terms of a high-level architecture description
- Comprehend enough Java to see how to create software the implements the OO designs modelled using UML.
- Comprehend the nature of design patterns by understanding a small number of examples from different pattern categories Given OO design heuristics, patterns or published guidance, evaluate a design for applicability, reasonableness

UNIT I **9**

INTRODUCTION TO UML

Introduction to UML: Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture, Software Development Life Cycle.

UNIT II **9**

MODELLING TECHNIQUES

Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams. Advanced classes, advanced relationships, Object diagrams: common modeling techniques.

UNIT III **9**

BEHAVIORAL MODELLING

Behavioral Modeling: Interactions, Interaction diagrams. Use cases, Use case Diagrams, Activity Diagrams, Events and signals, Advanced Behavioral Modeling: Architectural Modeling:Components, Deployment, Component diagrams and Deployment diagrams, Common modeling techniques for component and deployment diagrams

UNIT IV **9**

DESIGN PATTERNS

What Is a Design Pattern?- Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.

UNITV **9**

PATTERNS IN UML

Creational Patterns: Abstract Factory, Builder, Factory Method, Prototypeand Singleton,Structural Patterns: Adapter, Bridge, Composite, Decorator, Façade, Flyweight, Proxy. Behavioral Patterns: Chain of Responsibility, Command, Interpreter, Iterator, Mediator, Memento, Observer, Strategy, Template Method, What to Expect from Design Patterns.

TOTAL NO.OF PERIODS: 45

TEXT BOOKS

1. The unified Modeling language user guide by Grady Booch, James Rumbaugh and Ivar Jacobson, Pearson Edition,2013
2. Design Patterns by Erich Gamma, Pearson Education,2014

REFERENCE BOOK

1. Satzinger: Object Oriented analysis and Design,2010

BCS402 SYSTEM MODELING AND SIMULATION 3 0 0 3

Objectives:
The overall aim of the course is to provide an understanding of methods, techniques and tools for modeling, simulation and performance analysis of complex systems such as communication and computer networks.
Outcomes:

- Define basic concepts in modeling and simulation (M&S)
- Classify various simulation models and give practical examples for each category
- Construct a model for a given set of data and motivate its validity
- Generate and test random number varieties and apply them to develop simulation models
- Analyze output data produced by a model and test validity of the model

UNIT I 9
INTRODUCTION TO SIMULATION

Advantages and disadvantages of simulation, areas of application, System environment, Components of a system. Discrete and continuous systems, model of a system. Types of models. Stes in a simulation study, simulation examples: simulation of queuing systems, simulation of inventory systems. Discrete event simulation, general principles and computer simulation languages. FORTRAN, SIMSCRIPT, GPSS.

UNIT-II 9
STATISTICAL MODELS IN SIMULATION

Review of terminology and concepts. Useful statistical models, discrete distributions, continuous distributions. Poisson process, Empirical distributions, Queuing models: Characteristics of queuing systems, queuing notations. Transient and steady state behaviour of queues, steady-state behaviour of infinite population, Markovan models, Steady state behaviour of finite population models.

UNIT-III 9
INVENTORY SYSTEMS

Measures of effectiveness, inventory policies, deterministic systems probabilistic systems, simulation in inventory analysis. Random number generation. Properties of random numbers. Generation of pseudo-random numbers. Tests for random numbers. Random variate generation: Inverse transform technique, Direct transform for the normal distribution, convolution method. Acceptance-Rejection technique.

UNIT-IV9
INPUT DATA ANALYSIS

Data Collection, Identifying the distribution, Parameter estimation, Goodness-of-fit tests, Verification and validation of simulation models: Models Building, calibration and validation of models.

UNIT-V **9**
OUTPUT ANALYSIS FOR A SINGLE MODEL

Stochastic nature of 0/1 data, types of simulations with respect to O/P analysis, Measures of performance and their estimation, O/P analysis for terminating simulations, O/P analysis for steady-state simulations.

TOTAL NO OF PERIODS: 45

TEXT BOOKS

1) Jerry Banks, Carson. J.S., and Nelson B.L., "Discrete Event System Simulation", Prentice Hall of India, New Delhi, 2006.

2) Karian, Z. A., Dudewicz, E. J. (112121), "Modern statistical systems, and GPSS simulation: the first course", W. H. Freeman and Company, New York, 2005.

REFERENCES

1) System Modelling and Simulation ,V.P.Singh, New Age International Publishers,2009

BSE403 SOFTWARE ARCHITECTURE 3 0 0 3

OBJECTIVES

This course discuss about the detailed knowledge of software architecture, and design patterns and frameworks in particular and insight into software testing and test-driven development

OUTCOMES

- To study about shared information systems
- To understand the concepts of architecture design
- To learn about user interface architecture
- Implementation of tools for architectural design

UNIT –I

INTRODUCTION 9

Introduction - Software Architecture - Definition - Prospects - State of Art - Architectural Styles - Pipes andFilters - Layered Systems - Repositories - Process Control - Other familiar Architecture – HeterogeneousArchitectures.

UNIT-II

SHARED INFORMATION SYSTEMS 9

Shared Information Systems - DB Integration - Integration in Software Development Enviroments – Integrationand Design of Building - Architecture Structures for Shared Information Systems.

UNIT-III

ARCHITECTURE DESIGN 9

Architectural design and Mapping - Round trip engineering - Architecture design patterns - Object OrientedOrganization.

UNIT-IV

USER INTERFACE ARCHITECTURE 9

Architecture design guidance - User Interface Architecture - Quantified design space - Formalizing architecturaldescription language - First class connectors - Adding implicit invocation to traditional programming languages.

UNIT-V

TOOLS **9**

Tools for Architectural design - Unicon, A4 - Exploiting style in architectural design – ArchitecturalInterconnection - Case Studies.

TOTAL NO OF PERIODS: 45

TEXT BOOK

1. Mary Shaw David Garlan, " Software Architectural Perspectives on an emerging discipline ",EEE, PHI 2003.

REFERENCE:

1. Wolfgang pree, " Design patterns for object Oriented Software Development ", Addison Wesley, 2000.

BCS 405 OPERATING SYSTEMS 3 0 0 3

OBJECTIVES :

Every computer professional should have a basic understanding of how an operating system controls the computing resources and provide services to theusers. This course provides an introduction to the operating system functions,design and implementation.

OUTCOMES:

- To understand the structure and functions of OS
- To learn about Processes, Threads and Scheduling algorithms
- To understand the principles of concurrency and Deadlocks
- To learn various memory management schemes
- To study I/O management and File systems

UNIT I 9

INTRODUCTION TO OPERATING SYSTEM

Introduction: What operating systems do? – Computer System Organization - Computer System Architecture – Single processor systems - Multiple processor systems – Clustered Systems – Operating System Structure – Operating System Operations – Special purpose systems: Real Time Embedded Systems, Multimedia Systems and Handheld Systems.Operating System Services: System Calls – System Programs –Virtual Machines - Operating System Design and Implementation.

UNIT II 9

PROCESS MANAGEMENT

Process Management: Process Concept – Process Scheduling – Operation on Process – Cooperating Processes and Inter-process Communication. Threads: Overview – Multithreading Models. Process Synchronization: The Critical Section Problem – Synchronization Hardware – Semaphores – Classical Problems of Synchronization. Deadlocks: System Model – Deadlock Characterization – Methods for handling Deadlocks – Deadlock Prevention – Deadlock Avoidance – Deadlock Detection – Recovery from Deadlock.

UNIT III 9

CPU SCHEDULING

CPU Scheduling: Basic Concepts – Scheduling Criteria – Scheduling Algorithms. Memory Management: Background – Swapping –Contiguous Memory Allocation –Paging - Segmentation – Segmentation with paging. Virtual Memory: Demand paging – Page Replacement – Thrashing – Allocation of Frames.

UNIT IV ***9***

FILE HANDLING

File Systems: File Concepts - Access Methods – Directory Structure – File System Mounting – File Sharing – Protection. File System Structure – File System Implementation – Allocation Methods - Free-Space Management – Directory implementation – Recovery.

UNIT V ***9***

LINUX

Secondary Storage Management: Disk Structure – Disk Scheduling – Disk Management – Swap Space managementCase Study: Linux System – Components of Linux Systems – Process Management – Process Scheduling – Security.

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1. Silberschatz, Galvin, Gagne, "Operating System Concepts", 8thedition, John Wiley & Sons, Inc., 2009.
2. William Stallings, "Operating Systems", Pearson Education, 6th Edition. 2006.

REFERENCE BOOKS:

1. D.M.Dhamdhere, "Operating Systems: A Concept-Based Approach", 2nd Edition, Tata McGraw Hill, 2006.
2. Charles Crowley, "Operating Systems: A Design Oriented Approach", Tata McGraw Hill,1999.
3. Andrew S. Tanenbaum, "Modern Operating Systems", Pearson Education, 3rd Edition.2005.

BCS4L1 DBMS LABORATORY 0 0 32

1. Data Definition, Manipulation of base tables and views
2. High level programming language extensions.
3. Front end tools.
4. Forms-Triggers-Menu Design.
5. Reports.
6. Database Design and implementation
7. An exercise using Open Source Software like MySQL

TOTAL NO OF PERIODS: 30

BCS4L2 UML AND DESIGN PATTERN LABORATORY 0 0 32

1. To create a UML diagram of ATM APPLICATION
2. To create a UML diagram of LIBRARY MANAGEMENT SYSTEM
3. To create a UML diagram of ONLINE BOOK SHOP
4. To create a UML diagram of RAILWAY RESERVATION SYSTEM
5. To create a UML diagram of BANKING SYSTEM
6. To design a Document Editor
7. Using UML, design Abstract Factory design pattern
8. Using UML, design Builder design pattern
9. Using UML, design Façade design pattern
10. Using UML, design Bridge design pattern
11. Using UML, design Decorator design pattern
12. User gives a print command from a word document. Design to represent this chain of responsibility design pattern

TOTAL NO OF PERIODS: 30

BCS4L3 MULTIMEDIA LABORATORY 0 0 3 2

Multimedia

1. To perform animation using any Animation software (Create Frame by Frame Animations using multimedia authoring tools)

2. To perform basic operations on image using any image editing software

3. To develop a presentation for a product using techniques like Guide Layer, masking and onion Skin using authoring tools.

4. To create a Jpeg image that demonstrates the various features of an image editing tool.

TOTAL NO OF PERIODS: 30

BCS4S1 TECHNICAL SEMINAR-II 0 0 2 1

TOTAL NO OF PERIODS: 30

BMA503 MATHEMATICS-IV 3 1 0 4

UNIT-I

LOGIC 12

Statements - Truth Tables - Connectives - Normal forms - Properties calculus - Inference theory for statement Calculus and Predicate Calculus

UNIT-II

COMBINATORIES 12

Review of Permutation and Combination - Mathematical Induction - Pigeon hole Principle - Principle of inclusion and exclusion - Generating function - Recurrence relations.

UNIT-III

GROUPS 12

Semigroups- Monoids-Groups-Permutation group-Consets-Lagrange's theorem - Group homomorphism- Kernal - Rings and Fields (Definitions and Examples only)

UNIT-IV

LATTICES 12

Partial ordering - Posets - Hasse diagram - Lattices - Properties of Lattices - Sub Lattices - Special Lattices - Boolean, Algebra

UNIT-V

GRAPHS 12

Introduction of Graphs - Graph terminology - Representation of Graphs - Graph Isomorphism- Connectivity- Euler and Hamilton Paths.

TOTAL NO OF PERIODS: 60

TEXT BOOKS:

1. Tremblay J.P and Manohar R, "Discrete Mathematical Structures with Application to Computer Science", McGraw Hill Book Company, International Edition, 1987, Sections 1-2,1 to 1-2,4; 1-2, 6 to 1-2,14; 1-3,1 to 1-3,5; 1-4,1 to 1-4,3; 1-5,- to 1-5,5:1-6, 4 and 1-6,5 for logic. Section 3:- 1,1 to 3-2, 3; 3-5,1 to 3-5, 5 for Groups Rings and Fields. Sections: 2, 3-8 and 2-3, 9; 4-1, 1 to 4-2, 2 for Lattices.

2. Kenneth H. Rosen, "Discrete Mathematics and its applications", McGraw Hill Book Company 1999, Section 3, 3, 4, 3, 6, 1, 6, 2, 6, 4, 6, 5, 7, 1-7, 5, 8, 1-8, 5

REFERENCE BOOKS:

1. Ralph P., Grimaldi, "Discrete and Combinatorial Mathematics", Pearson Education, Fifth Edition.
2. Venkataraman M.K, Discrete Mathematics", The National Publishing Company 2000.
3. Iyengar S. N, Chandrasekaran V. M, Venkatesan K.A. and Arunachalam PS., "Discrete Mathematics", Vikas Publishing House Pvt. Ltd.

BCS502 NEURAL NETWORKS 3 0 0 3

Objectives:

This course aims to introduce students to a range of topics in the field of artificial neural networks, and to provide them with hands-on familiarity with three of these areas.

Outcomes:

- Be able to analyze a problem for NN solution in terms of these methods.
- Have an awareness of the computational theory underlying NN.
- Have a working knowledge of a typical neural network simulation
- Experience in programming NN applications from scratch.

UNIT-I **9**

BACK PROPAGATION

Introduction to Artificial Neural systems - Perception - Representation - Linear Separability - Learning - Training algorithm - The back propagation network - The generalized data rule - Practical considerations - BPN applications.

UNIT-II **9**

STATISTICAL METHODS

Hopfield nets - Cauchy training - Simulated annealing-The Boltzmann machine. Associative memory - Bidirectional associative memory -Applications.

UNIT-III **9**

COUNTER PROPAGATION NETWORK & SELF ORGANISATION MAPS
CRN building blocks - CPN data processing. SQM data processing - Applications

UNIT-IV **9**

ADAPTIVE RESONANCE THEORY AND SPATIO TEMPORAL PATTERN CLASSIFICATION
ART network description - ART1 -ART2-Application. The formal avalanche - Architecture of station temporal networks - The sequential competitive avalanche field - Applications of STNs.

UNIT-V **9**

NEO-CONGNITRON

Cognitron - Structure & training - The neocognitron architecture - Data processing - Performance - Addition of lateral inhibition and feedback to the neocognitron. Optical neural networks - Holographic correlators.

TOTAL NO OF PERIODS: 45

TEXTBOOKS

1. James Freeman A and David Skapura M. "Neural Networks – Algorithms, Applications & Programming Techniques", Pearson Education, 2005.
2. Yegnanarayana B., "Artificial Neural Networks", Prentice Hall of India Private Ltd, 2003

REFERNCES

1) Neural Network Design, Martin T Hagan, 2nd edition, 2014.
2) Principle of neural science, Eric R.Kandel, 5th edition, 2012.

BSE 501 LINUX INTERNALS 3 0 0 3

OBJECTIVE:

To study the basic and administration concepts in Linux.

OUTCOMES:

1. To introduce Linux server and various distributions.
2. To understand user administration and make use of internet and intranet services.
3. To learn Linux process control and shell programming.

UNIT I - INSTALLING LINUX AS A SERVER 9

Linux Distributions –Open source software and GNU- Difference betweenWindows and Linux , Installing Linux in a server configuration, GNOME and KDE– X window system, Managing software.

UNIT II - SINGLE – HOST ADMINISTRATION 9

Managing users – User text files –User management tools, Command Line, Bootloaders, File Systems, Core System services, Compiling Linux kernel, LinuxFirewall.

UNIT III - INTERNET SERVICES 9

DNS, FTP-Mechanics- Installing and customizing the server, setting up webserver using Apache, SMTP - Install, configure and run postfix server, POP andIMAP, SSH - public key cryptography, creating a secure tunnel.

UNIT IV -INTRANET SERVICES 9

NFS – enable and configure NFS server and client, NIS – configuring Master and secondary NIS server and Client -NIS tools, SAMBA – Administration, Printing – Install cups – add and manage print jobs, DHCP, Virtualization.

UNIT V - LINUX PROCESS CONTROL & SHELL PROGRAMMING 9

Linux process environment – login process – parent child relationship – process variable- process monitoring – Invoking foreground and background process – terminating process - Daemons .Introduction to Shell programming – Shell scripts– executing shell scripts - creating scripts – simple examples.

TOTAL NO OF PERIODS: 45

TEXT BOOKS

1. Wale Soyinka, *"Linux Administration A Beginners Guide"*, 5th edition, Tata McGraw-Hill, 2009.
2. Mc Kinnon, Mc Kinnon, "*Installing and Administrating Linux*", 2nd edition, Wiley, 2004.

REFERENCES

1. Richard Petersen, "Linux:The Complete Reference", 6 th edition, Tata McGraw-Hill, 2007.
2. Mark G. Sobell. "Practical Guide to Fedora and Red Hat Enterprise Linux", 6th Edition, Prentice Hall, 2011.

BCS 503 DISTRIBUTED COMPUTING 3 0 0 3

OBJECTIVES

- The differences among: concurrent, networked, distributed, and mobile.
- Resource allocation and deadlock detection and avoidance techniques.
- Distributed Transaction Processing system
- Cryptography and Domain Name system

OUTCOMES

- Develop, test and debug RPC based client-server programs in Unix/Linux.
- Design and build application programs on distributed systems.
- Improve the performance and reliability of distributed programs.
- Design and build newer distributed file systems for any Operating Systems.

UNIT I

INTRODUCTION 9

Characterization of Distributed Systems – Examples – Resource Sharing and the Web – Challenges – System Models – Architectural and Fundamental Models – Networking and Internetworking – Types of Networks – Network Principles – Internet Protocols – Case Studies

UNIT II 9

PROCESSES AND DISTRIBUTED OBJECTS

Inter–process Communication – The API for the Internet Protocols – External Data Representation and Marshalling – Client –Server Communication – Group Communication – Case Study – Distributed Objects and Remote Invocation – Communication Between Distributed Objects – Remote Procedure Call – Events and Notifications – Java RMI – Case Study

UNIT III **9**

OPERATING SYSTEM ISSUES

The OS Layer – Protection – Processes and Threads – Communication and Invocation – OS Architecture – Security – Overview – Cryptographic Algorithms – Digital Signatures – Cryptography Pragmatics – Case Studies – Distributed File Systems – File Service Architecture – Sun Network File System – The Andrew File System

UNIT IV

DOMAIN NAME SYSTEM AND LOCKS **9**

Name Services – Domain Name System – Directory and Discovery Services – Global Name Service – X.500 Directory Service – Clocks – Events and Process States – Synchronizing Physical Clocks – Logical Time And Logical Clocks – Global States – Distributed Debugging – Distributed Mutual Exclusion – Elections – Multicast Communication Related Problems.

UNIT V **9**

DISTRIBUTED TRANSACTION PROCESSING

Transactions – Nested Transactions – Locks – Optimistic Concurrency Control – Timestamp Ordering – Comparison – Flat and Nested Distributed Transactions – Atomic Commit Protocols – Concurrency Control in Distributed Transactions – Distributed Deadlocks – Transaction Recovery – Overview of Replication And Distributed Multimedia Systems.

TEXT BOOKS

1. George Coulouris, Jean Dollimore and Tim Kindberg, “Distributed Systems Concepts and Design”, 3rd Edition, Pearson Education, 2002.
2. Andrew S. Tanenbaum, Maartenvan Steen, Distributed Systems, “Principles and Pardigms”, Pearson Education, 2002.

REFERENCES

1.Sape Mullender, “Distributed Systems”, 2nd Edition, Addison Wesley, 1993.

2.Albert Fleishman, Distributes Systems, “Software Design and Implementation”, Springer, Verlag, 1994.

3.M. L. Liu, “Distributed Computing Principles and Applications”, Pearson Education, 2004.

4.Mugesh Singhal, Niranjan ,G Shivaratri, “Advanced Concepts in Operating Systems”, Tata McGraw Hill Edition, 2001.

BCE503 ENVIRONMENTAL STUDIES 3 0 0 3
(COMMON TO ALL BRANCHES)

OBJECTIVES

This course discuss about the fundamental physical and biological principles that govern natural processes. And provide fundamental concepts from the social sciences and the humanities underlying environmental thought and governance.

OUTCOMES

- Integrate and apply perspectives from across the natural sciences, social sciences, and the humanities in the context of complex environmental problems.
- Communicate integrated perspectives on complex environmental problems in the form of written and oral argument to both professional and lay audiences.
- Design and conduct independent research that contributes to environmental thought and/or problem solving.

UNIT-1 THE MULTI-DISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES 9

Definition, scope and importance, Need for public awareness.

NATURAL RESOURCES:

RENEWABLE AND NON-RENEWABLE RESOURCES

Nature resources and associated problems

a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effect on forests and tribal people.

b) Water resources, use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

e) Energy resources; Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources, case studies

f) Land resources: Land as a resources, Land degradation, man induced landslides, soil erosion and desertification

- Role of an individual in conservation of natural resources,
- Equitable use of resources for sustainable lifestyles.

UNIT II **9**

ECOSYSTEMS

Concepts of an ecosystem, Structure and function of an ecosystem, producers, consumers and decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids, introduction, types, characteristic features, structure and function of the following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT III

BIODIVERSITY AND ITS CONSERVATION 9

Introduction Definition genetic, species and ecosystem diversity, Bio-geographically classification of India, Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values, Biodiversity at global, national and local levels. India as a mega-diversity nation, Hot-spots of biodiversity. Threats to biodiversity, habitat, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India, Conservation biodiversity In-situ and Ex-situ conservation of biodiversity.

ENVIRONMENTAL POLLUTION **9**

Definition, Causes, effects and control measures of:- Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards, Solids waste Management: Causes, effects and control measures of urban and Industrial wastes Role of an individual in prevention of pollution, Pollution case studies. Disaster management: floods, earthquake, cyclone and landslides.

UNIT IV

SOCIAL ISSUES AND THE ENVIRONMENT **9**

From Unsustainable to Sustainable development, Urban problems related to energy, Water conservation rain water harvesting, watershed management, Resettlement and rehabilitation of people its problems and concerns Case studies. Environmental ethics: Issues and possible solutions, Climate change, global warming, acid rain, ozone layer depletion nuclear accident and holocaust, Case studies, Wasteland reclamation, Environment Protection Act, Air {Prevention and Control of pollution) Act, Water (prevention and control of Pollution) Act, Wildlife protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation, Public awareness".

UNIT V

HUMAN POPULATION AND THE ENVIRONMENT **9**

Population growth, variation among nations, population explosion- Family Welfare programme, Environment and human health, Human Rights, Value Education, HIV / AIDS, Women and Child Welfare, Role of Information Technology in Environment and human health. Case Studies.

TEXT BOOKS:

1. Environmental Studies. Dr. Benny Joseph, TATA McGraw Hill

TOTAL NO OF PERIODS : 45

REFERENCES:

a) Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd.,Ahmedabad – 380 013, India, Email:mapin@icenet.net (R)
b) Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
c) Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)
d) Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumabai, 1196p
e) Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford Univ. Press. 473p
f) Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p.
g) Mckinney, M.L. & School, R.M. 1996. Environmental Science systems & Solutions, Web enhanced edition. 639p.
h) Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p
i) Rao M N. & Datta, A.K. 1987. Waste Water treatment. Oxford & IBH PublCo. Pvt. Ltd. 345p.
j) Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut

BBA501 PRINCIPLES OF MANAGEMENT 3 0 0 3

OBJECTIVES

This course is designed to be an overview of the major functions of management. Emphasis is on planning, organizing, controlling, directing, and communicating. Upon Completion, students should be able to work as contributing members of a team utilizing these functions of management

OUTCOMES

- To gain a basic understanding of principles of management including planning, organizing and controlling.
- To gain a basic understanding of concepts for managing people including human resources, motivation, leading, and communications.
- To improve your ability to examine managerial issues and problems and to develop feasible alternatives that can result in better decision-making.
- To develop an awareness of multiple approaches that can be used to resolve managerial issues and problems.
- To examine and discuss the ethical issues involved in management decision making.

UNIT-I 9

INTRODUCTION TO MANAGEMENT

Nature of Management – Definition - Theory and practice - effective management - Management: Science or Art - Management in India.. Development of Management thoughts - Taylor's - Henry Fayol - Hawthorne experiment - Barnard & Social system - Herbert Simon - Peter Drucker-Various approaches -Management Thoughts.

UNIT-II 9

BUSINESS ETHICS

Management Process and coordination - Functions of management -Managers and environment - external and internal. Business Ethics- Planning- Fundamentals - Definitions & Features - Steps in planning - Types of planning. Objectives-Concepts and features-Hierarchy of objectives- role - Process of MBO. Policy & Strategy - Decision making - process - Individual Vs group decisions.

UNIT-III **9**

MANPOWER PLANNING

Organizing - Theory & approach - Organization Structure - Authority & Responsibility - Delegation - Centralization & Decentralization. Line & Staff Relationship - Staffing - Fundamentals - systems approach - manpower planning - Recruitment & selection - Training and Development - Performance appraisal - Direction - fundamentals - motivation - theories of motivation -Maslow's, Herzberg's, MaClelland's, Theory X, Y&Z. Leadership-Theories and Styles- Communication - Types - Controlling - System and Process.

UNIT-IV **9**

ORGANIZATIONAL BEHAVIOUR

Organisational behaviour- Definition - Organization-Managerial Role and Functions - Organisational Approaches, individual Behaviour - Causes -Environmental effect - Behaviour and performance, Perception -Organisational implications, Personality - contributing Factors - Dimension, Motivation - Need Theories - Process Theories - Job satisfaction. Learning and Behaviour - Learning curves, Work design and Approaches.

UNIT-V **9**

GROUP BEHAVIOUR

Group Behaviour - Groups - Contributing factors - group norms, types- causes - Intergroup relations - conflict and resolution - Change process - Resistance to change

TOTAL NO OF PERIODS: 45

TEXT BOOK:

1. L. M. Prasad, "Principles and Practice of Management", 8th edition.2012.

REFERENCES:

1. Herald knootz and Heinz Weihhch, "Essentials of Management", McGraw Hill Publishing Company. Singapore International Edition, 1980.

2. Ties AF, Stoner and R. Edward Freeman, "Management", 6th Edition, Pearson Education, 2005.

3. Joseph I. Massie, "Essentials of Management", Prentice Hall of India Pvt., Ltd., NewDelhi 110011. 1985.

BCS 5L1 PROGRAMMING IN JAVA LABORATORY 0 0 32

JAVA PROGRAMS USING FOLLOWING CONCEPTS

1. Class & Object.
2. Constructors & Destructors.
3. Methods Overloading.
4. Inheritance.
5. Interface.
6. Multithreading.
7. Package.
8. Creating Java Applets.
9. Creating HTML File.

TOTAL NO OF PERIODS: 30

BSE 5L1 LINUX INTERNALS LAB 0 0 3 2

1. Basic UNIX commands
2. Shell Programming
3. Grep, sed, awk
4. File system related system calls.
5. Process management – Fork, Exec.
6. Message queues
7. Pipe, FIFO's
8. Signals.
9. Shared memory
10. Semaphores

TOTAL NO OF PERIODS: 30

BCS5L3 NETWORKING LAB 0 0 3 2

1. Implement a simple TCP client-server where in a server acts as a time and date server.
2. Print a client address at server end.
3. Write a program in which a process is made to handle posix signals.
4. Program a echo UDP Server.
5. Create a daemon.
6. Create a simple Chat Program.
7. Create a simple out of band Sending and Receiving program.
8. Program to capture each packet and examine its checksum field.

TOTAL NO OF PERIODS: 30

BSE5S1 INDUSTRIAL TRAINING 0 0 3 1

DATA WAREHOUSING AND DATA MINING 3 0 0 3

BCS 605

OBJECTIVES

Dramatic advances in data capture, processing power, data transmission, and storage capabilities are enabling organizations to integrate their various databases into data warehouses.

Data mining is primarily used by the companies with a strong consumer focus. It enables these companies to determine the factors such as price, product positioning, or staff skills, and economic indicators, competition, and customer demographics.

OUTCOMES

- Provide efficient distribution of information and easy access to data
- Create user friendly reporting environment.
- Find the unseen pattern in large volume of historical data that helps to mange an organization efficiently
- Understand the concepts of various data mining Techniques

UNIT I

DATAWAREHOUSE9

Data Warehouse Roles and Structures – What is a Data Warehouse? – Multi Dimensional Data Model- Data Stores,Warehouses and Marts - The Data Warehouse Environment – Data Warehouse Characteristics - The Data Warehouse Architecture – Meta Data, Metadata Extraction - Implementing the Data Warehouse - OLAP Engine - Data Warehouse Backend Process – Data Warehouse Project Success Factors.

UNIT II

INTRODUCTION TO DATA MINING 9

Basic Data Mining Tasks, Data Mining versus Knowledge Discovery in Data Bases, Data Mining Issues, Data Mining Metrics. Social Implications of Data Mining. Data Mining from a Database Perspective.
Data Mining Techniques - Introduction – A Statistical Perspective on Data Mining – Similarity Measures – Decision Trees – Neural Networks – Genetic Algorithms.

UNITIII9

CLASSIFICATION

Introduction - Statistical Based Algorithms- Distance Based Algorithms – Decision Tree Based Algorithms - Neural Networks Based Algorithms – Rule Based Algorithms – Combining Techniques.

UNITIV **9**

ASSOCIATION RULES

Introduction-Large Itemsets- - Methods to Discover Association Rules - Apriori Algorithm - Partition Algorithm.

CLUSTERING TECHINQUES

Introduction – Outliers – Clustering Paradigms –Hierarchical Algorithm-Partitional Algorithms - Clustering Large Databases.

UNITV **9**

WEB MINING
Introduction-Web Mining – Web Content Mining –Crawlers,Harvest System,Virtual Web View -Web Structure Mining –Page Rank, Web Usage Mining-Preprocessing, Data Structures, Pattern Discovery and Pattern Analysis.

TOTAL NO OF PERIODS: 45

TEXT BOOKS
1. Arun K.Pujari., “Data Mining Techniques”, Universities Press,2013.
2. Margaret H. Dunham , S.Sridhar, “Data Mining Introductory and Advanced Topics”, Pearson Education,2006.
3.*K.P.Soman,Shyam Diwakar,V.Ajay,”Data Mining: Theory And Practice” , PHI Learning Pvt. Ltd., 2006.*

REFERENCE BOOKS
1. “Express Learning - Data Warehousing and Data Mining”, ITL ESL,Pearson Education, 2012.
2. N.Venkatesan,S.Prabhu,”Data Mining and WareHousing”, New Age International (P) Limited, 2010.
3. George M. Marakas, “Modern Data Warehousing, Mining and Visualization: Core concepts”, Pearson Education,2003.

BSE601 SOFTWARE MEASUREMENT AND METRICS 3 0 0 3

OBJECTIVES:

- To provide a solid background knowledge about software Metrics.
- To educate various metrics and models to assess software.
- To provide hands on experience to use and implement metrics

OUTCOMES

At the end of this student can able to

- Knowledge of how software metrics can be used for controlling, managing and predicting the software development processes.
- An understanding of the value of a scientific approach to software measurement
- Awareness of problems related to applying software measurement
- Experiences in setting up metrics and models.

UNIT I 9

THE HISTORY AND EVOLUTION OF SOFTWARE METRICS

Evolution of the software industry and evolution of software measurements – The cost of counting function point metrics – The paradox of reversed productivity for high Level languages- The Varieties of functional metrics – Variations in application size and productivity rates – Future Technical Developments in Functional Metrics- Software measures and metrics not based on function points.

UNIT II 9

MEASURING SOFTWARE QUALITY

Quality control and international competition – Defining quality for measurement and estimation – Five steps to software quality control- Measuring software defect removal- Measuring Defect removal efficiency – Measuring the costs of defect removal – Evaluating defect prevention methods – Measuring customer reported defects- Measuring invalid defects, Duplicate defects and special cases- Reliability Models - The Rayleigh Model- Reliability Growth Models.

UNIT III **9**

PROCESS METRICS

In-Process Metrics for Software Testing - Test Progress S Curve - Testing Defect Arrivals Over Time - Product Size Over Time - CPU Utilization - Effort/Outcome Model. Complexity Metrics and Models - Lines of Code - Halstead's Software Science - Cyclomatic Complexity. - Syntactic Constructs - Structure Metrics. Metrics for Object-Oriented Projects.

UNIT IV **9**

MEASUREMENT TECHNIQUES

Software Assessments – Software Baselines – Software Benchmarks- What a Baseline analysis covers – Developing or Acquiring a baseline data collection Instrument – Administering the data collection questionnaire – Analysis and aggregation of the Baseline data. Measuring and Analyzing Customer Satisfaction - Surveys - Data Collection - Sampling Methods - Analyzing Satisfaction Data. Conducting In-Process Quality Assessments - Preparation - Evaluation - Quantitative Data - Qualitative Data - Evaluation Criteria - Overall Assessment.

UNIT V **9**

MEASUREMENT,METRICS AND INDUSTRY LEADERS

Measures and metrics of industry leaders – Measures, metrics and innovation – Measurements, metrics and outsource litigation – Measurements, metrics and behavioral changes – Commercial software measurement tools. Measuring Process Maturity - Process Capability -Value of Process Improvement - Process Adoption – Process Compliance-Function Point Metrics to Measure Software Process Improvement - Software Process Improvement Sequences.

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1. Caper Jones, "Applied Software Measurement: Global Analysis of Productivity and Quality", Third Edition, McGraw Hill Companies, 2008.
2. Stephen H. Kan, "Metrics and Models in Software Quality Engineering", Addison Wesley, 2011.

REFERENCE BOOKS:

1.Mark Lorenz, Jeff Kidd, "Object-Oriented Software Metrics", Prentice Hall, 2000.
2. Naresh Chauhan, "Software Testing Principles and Practices", Oxford University Press, 2010.
3.Ravindranath Pandian C, "Software Metrics A Guide to planning, Analysis, and Application", Auerbach, First Indian Reprint, 2011.

BSE 602 CLOUD COMPUTING 3 0 0 3

OBJECTIVES:

- To impart fundamental concepts in the area of cloud computing.
- To impart knowledge in applications of cloud computing.

OUTCOMES:

- Understanding the systems, protocols and mechanisms to support cloud computing.
- Develop applications for cloud computing.
- Design and implement a novel cloud computing applications.

UNIT I

UNDERSTANDING CLOUD COMPUTING 9

Cloud Computing – History of Cloud Computing – Cloud Architecture – Cloud Storage –Why Cloud Computing Matters – Advantages of Cloud Computing – Disadvantages OfCloud Computing – Companies in the Cloud Today – Cloud Services

UNIT II

DEVELOPING CLOUD SERVICES 9

Web-Based Application – Pros and Cons of Cloud Service Development – Types ofCloud Service Development – Software as a Service – Platform as a Service – WebServices – On-Demand Computing – Discovering Cloud Services Development Servicesand Tools – Amazon Ec2 – Google App Engine – IBM Clouds

UNIT III

CLOUD COMPUTING FOR EVERYONE 9

Centralizing Email Communications – Collaborating on Schedules – Collaborating onTo-Do Lists – Collaborating Contact Lists – Cloud Computing for the Community –Collaborating on Group Projects and Events – Cloud Computing for the Corporation

UNIT IV

USING CLOUD SERVICES 9

Collaborating on Calendars, Schedules and Task Management – Exploring Online Scheduling Applications – Exploring Online Planning and Task Management – Collaborating on Event Management – Collaborating on Contact Management – Collaborating on Project Management – Collaborating on Word Processing - Collaborating on Databases.

UNIT V

OTHER WAYS TO COLLABORATE ONLINE 9

Collaborating via Web-Based Communication Tools – Evaluating Web Mail Services – Evaluating Web Conference Tools – Collaborating via Social Networks and Groupware – Collaborating via Blogs and Wikis

TOTAL NO OF PERIODS: 45

TEXTBOOK

1. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.

REFERENCES

1. Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pvt Limited, July 2008.

BCS 604 ARTIFICIAL INTELLIGENCE & EXPERT SYSTEMS 3 0 0 3

OBJECTIVE

The purpose of this course is to impart concepts of Artificial Intelligence and Expert System.

OUTCOMES

- To study the concepts of Artificial Intelligence.
- To learn the methods of solving problems using Artificial Intelligence.
- To introduce the concepts of Expert Systems and machine learning.

UNIT I

PROBLEMS AND SEARCH 9

What is artificial intelligence? - Problems, problem spaces and search – Searching strategies- Uninformed Search- breadth first search, depth first search, uniform cost seart, depth limited search, iterative deepening search, bidirectional search - Informed Search- Best first search ,Greedy Best first search , A* search – Constraint satisfaction problem , Local searching strategies.

UNIT II 9

REASONING

Symbolic Reasoning Under Uncertainty- Statistical Reasoning - Weak Slot-And-Filler-Structure - Semantic nets – Frames- Strong Slot-And-Filler Structure- Conceptual Dependency-Scripts- CYC.

UNIT III 9

KNOWLEDGE REPRESENTATION

Knowledge Representation - Knowledge representation issues - Using predicate logic - Representing Knowledge Using Rules.Syntactic- Semantic of Representation – Logic & slot and filler - Game Playing – Minimal search- Alpha beta cutoffs –Iteratic deepening planning – component of planning system – Goal stack planning

UNIT IV 9

NATURAL LANGUAGE PROCESSING

Natural Language Processing –Syntactic processing, semantic analysis-Parallel and Distributed AI-Psychological modeling- parallelism and distributed in reasoning systems – Learning -Connectionist Models – Hopfield networks, neural networks

UNIT V **9**

EXPERT SYSTEMS

Common Sense –qualitative physics, commonsense ontologies- memory organization -Expert systems –Expert system shells- explanation – Knowledge acquisition - Perception and Action – Real time search- robot architecture

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1. Elaine Rich, Kevin Knight, "Artificial Intelligence", 3/e, Tata McGraw Hill, 2009.
2. Russell , " Artificial intelligence :A modern Approach , Pearson Education ,2nd edition,2013.

REFERENCE BOOK:

1. Nilsson N.J., "Principles of Artificial Intelligence", Morgan Kaufmann.2000.

BSE602 MOBILE AND PERVASIVE COMPUTING 3 0 0 3

OBJECTIVE

This course discuss about knowledge and skills about a new trend in mobile Computing.

OUTCOMES

- To study about creating a ubiquitous environment.
- To learn WAP and voice technology.

UNIT I

MOBILE NETWORKS 9

Cellular Wireless Networks – GSM – Architecture – Protocols – connection establishment – FrequencyAllocation – Routing – Mobility Management – Security – GPRS.

UNIT II

WIRELESS NETWORKS 9

Wireless LANs and PANs – IEEE 802.11 Standard – Architecture – Services –Network – HiperLAN – BlueTooth- Wi-Fi – WiMAX

UNIT III

ROUTING 9

Mobile IP – DHCP – AdHoc– Proactive and Reactive Routing Protocols – MulticastRouting.

UNIT IV

TRANSPORT AND APPLICATION LAYERS 9

Mobile TCP– WAP – Architecture – WWW Programming Model– WDP – WTLS – WTP – WSP – WAE – WTAArchitecture – WML – WMLScripts.

UNIT V

PERVASIVE COMPUTING 9

Pervasive computing infrastructure applications- Device Technology - Hardware, Human machineInterfaces, Biometrics, and Operating systems– Device Connectivity – Protocols, Security, and Device Management- Pervasive Web Application architecture
Access from PCs and PDAs - Access via WAP

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1. Jochen Schiller, "Mobile Communications", PHI, Second Edition, 2003.
2. Jochen Burkhardt, Pervasive Computing: Technology and Architecture of MobileI nternet Applications, Addison Wesley Professional; 3rd edition 2007.

REFERENCES:

Frank Adelstein, Sandeep KS Gupta, Golden Richard, Fundamentals of Mobile and Pervasive Computing, TMH, 2005
2. Debashis Saha, Networking Infrastructure for Pervasive Computing: EnablingTechnologies, Kluwer Academic Publisher, Springer; First edition, 2002
3. Introduction to Wireless and Mobile Systems by Agrawal and Zeng, Brooks/ Cole(Thomson Learning), First edition, 2002
4. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober Principles of Mobile Computing, Springer, New York, 2003.

BCS606 PRINCIPLES OF COMPILER DESIGN 3 0 0 3

OBJECTIVES

This course introduces the major concept areas of language translation and compiler design and to enrich the knowledge in various phases of compiler ant its use, code optimization techniques, machine code generation, and use of symbol table. It uses to extend the knowledge of parser by parsing LL parser and LR parser and provide practical programming skills necessary for constructing a compiler.

OUTCOMES

- To design & conduct experiments for Intermediate Code Generation in compiler.
- To design & implement a software system for backend of the compiler.
- To deal with different translators.
- To develop program to solve complex problems in compiler
- To learn the new code optimization techniques to improve the performance of a program in terms of speed & space.
- To acquire the knowledge of modern compiler & its features.
- To learn & use the new tools and technologies used for designing a compiler
- To use the knowledge of patterns, tokens & regular expressions for solving a problem in the field of data mining.

UNIT –I

INTRODUCTION 9
Basic Concepts – Grammar - Language-Parts of a Compiler-Compiler Construction Tools.

UNIT –II

LEXICAL ANALYZER 9
Role of a Lexical Analyzer-Specification and Recognition of tokens-finite Automata-Regular Expression to Finite Automation-Use of a tool for Generating Lexical Analyzer.

UNIT –III

SYNTAX ANALZER 9
Role of Parser-Context Free Grammar-Top Down Parsing-Bottom Up Parsing-Use of a Tool to Generate Parsers.

UNIT –IV

INTERMEDIATE CODE GENERATION 9

Intermediate Languages-declaration-Assignment Statements-Boolean expressions-Flow Control statements-Back Patching.

UNIT –V

CODE GENERATION 9

Introduction to Optimization Techniques - Issues in the Design of a Code generator-Run Time Storage Management – Design of a Simple code generator

TOTAL NO OF PERIODS: 45

TEXT BOOK

1. A. V. Aho, Ravi Sethi, J.D. Ullman, “Compilers: Principles, Techniques & Tools”, Pearson Education, Second Edition. 2007

REFERENCE BOOKS:

1. Allen I. Holub, “Compiler Design in C”, PHI Learning. 2009
2. Fisher Leblanc, “Crafting a Compiler with C”, Pearson Education.
3. Jean. Paul Trembley & Paul G. Sorenson, “Compiler Writing – Theory and Practice”, B.S. Publications.

BCS6L3 DATA WAREHOUSING AND DATA MINING LABORATORY 0 0 3 2

The objective of the lab exercises is to use data mining techniques and to use standard databases available tounderstand DM processes (using any DM tool).

1. Listing applications for mining
2. File format for data mining
3. conversion of various data files
4. Training the given dataset for an application
5. Testing the given dataset for an application
6. Generating accurate models
7. Data pre-processing – data filters
8. Feature selection
9. web mining
10. Text mining
11. Design of fact & dimension tables
12. Generating graphs for star schema.

TOTAL NO OF PERIODS: 30

BCS6L2 C# AND .NET LABORATORY 0 0 3 2

Programs using C# and .NET for the following concepts:

1. Classes and objects
2. Inheritance
3. Operator overloading
4. Threading
5. Events and delegates
6. Working with windows forms controls
7. Validating data
8. Creating custom dialog box
9. Designing an MDI application with menu
10. Retrieving data from a SQL database
11. Manipulating data in a connected environment
12. Manipulating data in a disconnected environment.

TOTAL NO OF PERIODS: 30

BSE6L3 **MOBILE AND PERVASIVE COMPUTING LAB** **0 0 32**

LIST OF EXPERIMENTS

1. STUDY EXPERIMENT

To explore overall view about
- Pervasive Computing Architecture
- Communication protocols
- Software infrastructure
- Security mechanisms

2. STUDY OF MIDDLEWARE, APPLICATION LEVEL, NETWORK, SYSTEM SOFTWARE
- To design the software for mobile phones using J2ME
- J2ME basics
- User interface design
- Control structures
- Files and databases
- Communication
- Interoperability between Mobile phones

To design the software for mobile phones using SYMBION OS
- Text string handling
- Graphical application
- Dialog application
- Drawing application
- File handling operations.

3. APPLICATION LEVEL
To study new HCI techniques for small mobile devices and embedded devices.

4. CASE STUDIES. PROJECTS IN PERVASIVE COMPUTING
To explore wearable and handheld computing and their enabling technologies

TOTAL NO OF PERIODS: 30

BCS6P1 **MINI PROJECT – I** **0 0 3 1**

BSE 701 SOFTWARE TESTING 3 0 0 3

OBJECTIVES

- Purpose of testing
- Path testing
- Data flow testing, domain testing
- Regular expressions and flow anomaly
- Logic based testing
- Testability tips

OUTCOMES

- The students understands the process to be followed in the software development life cycle
- find practical solutions to the problems
- solve specific problems alone or in teams
- manage a project from beginning to end
- work independently as well as in teams
- define, formulate and analyze a problem

UNIT I
INTRODUCTION 9

Software testing – Role of software testing – A structural approach to testing – Test strategy – methods for developing test strategy Testing methodologies.

UNIT II
LIFE CYCLE TESTING APPROACH 9

Test plan – Requirements testing – Walk through test tool – Risk matrix test tool – Testing for requirements phase and design phase – Design renew test tool – Test data and volume test tools.

UNIT III
INSTALLATION 9

Installation phase testing – Tools for acceptance test – Software acceptance process – Software maintenance – Methodologies for testing – Training and change installation.

UNIT IV
TESTING METHODS 9

Tools and techniques – Cost estimate – For testing – Testing phase of life cycle – Point accumulation tracking system – Performance analysis of testing – Inspection plan and test plan documents.

UNIT V

TESTING STRATEGY **9** Rapid prototyping – Spiral testing – Tool selection processes – Structural system testing – Documentation of test results – Test effectiveness evaluation – Test measurement process – Test metrics.

TOTAL NO OF PERIODS: 45

TEXT BOOK:

1. William Perry, "Effective Methods for Software Testing", 3/e, John Wiley & Sons/ Wiley India, 2006.

REFERENCE BOOKS:

1. Ron Patton, "Software Testing", Techmedia,2005
2. A.P.Mathur, "Foundations of Software Testing", Pearson Education. 2008
3. Rajni, Renu; Oak, Pradeep, "Software Testing: Effective Methods, Tools and Techniques", Tata McGraw Hill, 2004

BCS 702 WEB TECHNOLOGY 3 0 0 3

OBJECTIVES

This course discusses about the Client / server model and basic concepts of Internet principles.

OUTCOMES

- To understand the concepts of common gateway interface programming
- To Learn about socket program
- Implementation of on-line applications

UNIT I

INTRODUCTION 9

Internet principles – Basic Web concepts – Client/Server model – Retriving data from Internet – HTML and Scripting Languages – Standard Generalized Markup language-Next Generation Internet - Protocols and applications.

UNIT II

COMMON GATEWAY INTERFACE PROGRAMMING 9

HTML forms – CGI concepts – HTML tags Emulation – Server-Browser communication – E-mail generation – CGI client side Applets – CGI Server side Applets – Authorization and Security.

UNIT III

SOCKET PROGRAMMING 9

Streaming – Networking Principles – Sockets – Protocols handlers – Content handlers – Multicasting – Remote method invocation.-Activation-Serialization-Marshal streams.

UNIT IV

SERVER SIDE PROGRAMMING 9

Dynamic Web content – Cascading Style Sheets, XML – Structuring Data-VRML-Server side includes- communication – Active and Java Server Pages.-Firewalls-Proxy Servers-XML with HTML

UNIT V

ON-LINE APPLICATIONS 9

Simple applications – On-line Databases – Monitoring user events – Plugins – Database Connectivity-Internet information Systems-EDI application in business-Internet commerce-Customization of Internet commerce.

TOTAL NO OF PERIODS:45

TEXT BOOKS:

1. Justin Hunter,William Crawford, ”Java Servlet Programming”, O’Reilly Publications, 2nd Edition, 2001.
2. Ravi Kalakola and Andrew B Whinston, “Frontiers of Electronic commerce”, Pearson Education.,1999

REFERENCE BOOKS:

1. Jeff Frantzen and Sobotka, “Java Script”, Tata McGraw Hill, 2002.
2. Eric Ladd, Jim O’Donnell, “Using HTML 4, XML and JAVA”, Prentice Hall of India – QUE, 1999.
3. N.P.Gopalan & J.Akilandeswari, “Web Technology: A Developer’s Perspective”, PHI Learning,2008.

BCS704 INFORMATION SECURITY AND CYBER LAWS 3 0 0 3

OBJECTIVE

The goal of this course is for students to maintain an appropriate level of awareness, knowledge and skill to allow them to minimize the occurrence and severity of information security incidents. To provide suitable coverage of the international standards of cyber security and cyber laws. The rapid development of IT industry has made conventional methods of investigation of cyber crimes futile. This course is designed to extend employment, education and entrepreneurial opportunities to the students. It enables the students to gain in depth knowledge in the field of Information Security and Cyber Laws with a foundation in Computer Science.

OUTCOMES

1. They can help the organization to continue its commercial activities in the event of significant information security incidents.
2. Students can establish responsibility and accountability for information security in organizations.
3. The students will be able to design security procedures and policies.
4. They can be well versed in various security standards and security testing techniques

UNIT -I 9

CYBERCRIME

Crimes of this millennium – Checks and balances against arbitrary arrests. Cyber Crime and Criminal Justice: Concept of 'Cyber Crime' and the IT Act- Hacking – Teenage Web Vandals – Cyber Fraud and Cyber Cheating – Virus on the Internet- Other IT Act offences – Network Service Providers-Criminal Justice in India and Implications.

UNIT -II 9

CYBERLAWS

Contracts in the Infotech World: Click-Wrap and Shrink-Wrap contracts – Contract formation under the Indian Contract Act – Contract formation on the Internet – Terms and conditions of the Contract.
Jurisdiction in the Cyber World: Jurisdiction and Information Technology Act– Foreign Judgements in India – IPR Disputes – Misuse of the Law of Jurisdiction – Jurisdictional disputes with respect to the Internet in the USA.

UNIT -III **9**

COPYRIGHTS

Concept of Domain Name and Reply to Cyber Squatters – Meta-Tagging – Copyright ownership and assignment – License of copyright – Copyright term and respect for foreign works – Copyright infringement remedies and offences – Copyright protection of content on the Internet – Computer software piracy

UNIT- IV **9**

TAXATION

Concept of 'Permanent Establishment' – PE in cross border E-Commerce - The United Nations model Tax treaty – The Law of double taxation avoidance agreements – Tax Agents of non-residents under the Income tax act and the relevance to E commerce – Impact of the Internet on customs duties – Taxation policies in India

UNIT -V **9**

DIGITAL SIGNATURES

Digital signatures – Digital signature certificate – Certifying authorities and liability in the event of Digital signature compromise – Status of Electronic records as Evidence – Proving Digital signatures – Proof of Electronic agreements – Proving electronic messages – Goods and services – Consumer complaint – Defect in goods and deficiency in services restrictive and unfair trade practices – Reliefs under CPA – Consumer Foras, Jurisdictions and Implications on Cyber Consumers in India.

TOTAL NO OF PERIODS: 45

TEXT BOOK:

1. Vivek Sood, "Cyberlaw Simplified", Tata McGraw Hill, 2001.

REFERENCE BOOKS:

1. Kamlesh K Bajaj, Debjani Nag, "E-Commerce – The Cutting Edge of Business", Tata McGraw Hill, Second Edition, 2006
2. Harish Chander ,Cyber Law & IT Protection, Eastern Economy Edition
3. Jonathan Rosenor.Cyber Law : the law of Internet.

BSE 704 CRYPTOGRAPHY AND NETWORK SECURITY 3 0 0 3

OBJECTIVES

This course is designed to cater all student knowledge needs, from elementary networking concepts, to intermediate network monitoring and security techniques.

OUTCOMES

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

1. Understand Network Devices functions and configurations hub, switch, tap and routers)
2. Understand Network Security Devices (IDS, Firewall..etc)
3. Understand and analyze network services.
4. Understand and analyze application performance
5. Understand and analyze network traffic and protocols
6. Understand network-troubleshooting concepts.
7. Understand network security concepts.
8. Understand network intrusions and how to identify them such as Computer Viruses, Network worms,etc

UNIT-I

INTRODUCTION 9

Attacks - Services - Mechanisms - Conventional Encryption - Classical and Modern Techniques - Encryption Algorithms - Confidentiality.

UNIT-II

PUBLIC KEY ENCRYPTION 9

Principles of Public-Key Cryptosystems-RSA-Elliptic Curve Cryptography-Elliptic Curve Arithmetic- Number Theory Concepts- Divisibility and the Division Algorithm-Prime Numbers- Fermat's and Euler's Theorems

UNIT-III

MESSAGE AUTHENTICATION 9

Hash Functions - Digest Functions - Digital Signatures- ElGamal Digital Signature Scheme- Schnorr Digital Signature Scheme- Digital Signature Standard (DSS) -Authentication protocols

UNIT-IV

NETWORK SECURITY PRACTICE 9

Authentication Applications: Kerberos, X.509 - Electronic Mail Security: Public Key Infrastructure- PGP, S-MIME - IP Security - Web Security: SSL, TLS, SET.

UNIT-V

SYSTEM SECURITY **9**

Intruders – Viruses – Detection of viruses- Virus Countermeasures-Worms – Firewalls: The Need for Firewalls- Firewall Characteristics- Design Principles and Types-Firewall Location and Configurations – Trusted Systems

TOTAL NO OF PERIODS: 45

TEXT BOOK:

1. William Stallings, "Cryptography & Network Security - Principles & Practice", 6thEdition, Pearson Education, 2013.

REFERENCE BOOKS:

1. Behrouz A. Forouzan, "Cryptography & Network Security", Tata McGraw Hill,2011.
2. Bruce Schneier, "Applied Cryptography", 2nd Edition, John Wiley & Sons, 1996.
3. Pfleeger & Pfleeger, "Security in Computing", Pearson Education, 4th Edition.
4. Atul Kahate, "Cryptography & Network Security", Tata McGraw Hill.
5. Steve Burnett & Stephen Paine, "RSA Security's Official Guide to Cryptography", Tata McGraw Hill.

BCS7L1 SOFTWARE TESTING LABORATORY 0 0 3 2

1. Study of various tools Study various tools such as WinRunner, LoadRunner, TestDirector, Rational Rose Suite etc.
2. Perform various types of testing:
    a. Unit Testing
    b. Regression Testing
    c. Integration Testing
    d. Validation Testing
    e. Acceptance Testing
    f. System Testing
3. Prepare test plan and develop test case hierarchy
4. Generate Test cases and Test Documentation in the following case studies
    1. Library System
    2. Course Registration System
    3. Quiz System
    4. Student marks analyzing system
    5. Online ticket reservation system
    6. Stock maintenance

TOTAL NO OF PERIODS: 30

BCS7L2 WEB TECHNOLOGY LAB 0 0 3 2

1. Create a HTML page, which has properly aligned paragraphs with image along with it.
2. Write a program to display list of items in different styles.
3. Create both client side and server side image maps.
4. Create your own style sheets and use them in your web page.,
5. Create a form with various fields and appropriate front and validations using any one of the scripting languages.
6. Write a program to store the form fields in a database, use any appropriate Server Slide Scripting.
7. Create a web page using XML.
8. Write a program to connect a XML web page to any database engine.

TOTAL NO OF PERIODS:30

BSE7L1 CRYPTOGRAPHY AND NETWORK SECURITY LAB 0 0 3 2

LIST OF EXPERIMENTS

- Demonstrate traffic analysis of different network protocols using tool. i.e. Wire-shark
- Demonstrate Sniffing using packet tool i.e. snort.
- Configure your e-mail account against various threats. i.e. spam attack, phishing, spoofing etc.
- Demonstration of SQL-Injection.
- Demonstration of readymade encryption/decryption code
- Demonstrate cross-scripting.
- Draw various Security Topologies.
- Write Ceaser's Cipher algorithm & solve various examples based on Encryption & Decryption.
- Write, test and debug Ceaser cipher algorithm in C/C++/Java/Python/MAT Lab.
- Write algorithm/steps for Shift Cipher & solve various examples on it
- Write algorithm/steps for Hill Cipher and solve examples on it.
- Write algorithm/steps for playfair cipher and solve examples on it
- Write algorithm/steps for one time pad & solve various examples on in.
- Draw diagram of Public Key Infrastructure.

TOTAL NO OF PERIODS: 30

BSE7P1 PROJECT WORK PHASE-I 0 0 63

BSE801 SOFTWARE RELIABILITY 3 0 0 3

OBJECTIVES

- The ability to tackle challenging computing problems using a comprehensive knowledge of computer science, while reflecting a commitment to quality, innovation, critical thinking, and continuous improvement.
- The ability of analyzing and solving complex technical problems from a broad perspective of computer science, including business, societal, and regulatory issues.
- The ability to function as both a leader and collaborative team member within different environments.
- The ability to Communicate effectively to all constituencies and uphold a commitment to professional and ethical conduct.
- The ability be engaged in lifelong learning to maintain currency in an ever-changing field, to innovate, and to attain professional advancement.

OUTCOMES

- Apply knowledge of computing and of mathematics appropriate to computer science and analyze a problem, and identify and define the computing requirements appropriate to its solution.
- Design, implement and evaluate a program to meet desired needs and function effectively on multi-disciplinary teams and lead a technical activity.
- Understand professional, ethical, legal, security and social issues and responsibilities in computing and communicate effectively with a range of audiences.
- Based on a broad education, understand the global, economic, environmental and societal impacts of a computing solution and recognize the need for, and demonstrate an ability to engage in, continuing life-long learning.
- Use current techniques, skills and tools necessary for computing practices.

UNIT I 9

INTRODUCTION TO RELIABILITY ENGINEERING

Reliability - Repairable and Non Repairable systems - Maintainability and Availability - Designing for higher reliability - Redundancy - MTBF - MTTF MDT - MTTR- k out of in systems

UNIT II **9**

SOFTWARE RELIABILITY

Software reliability - Software reliability Vs Hardware reliability - Failures and Faults - Classification of Failures - Counting - System Configuration - Components and Operational Models - Concurrent Systems - Sequential Systems - Standby Redundant systems

UNIT III **9**

SOFTWARE RELIABILITY APPROACHES

Fault Avoidance - Passive Fault detection - Active Fault Detection - Fault Tolerance - Fault Recovery - Fault Treatment

UNIT IV **9**

SOFTWARE RELIABILITY MODELING

Introduction to Software Reliability Modeling - Parameter Determination and Estimation - Model Selection - Markovian Models - Finite and Infinite failure category Models - Comparison of Models - Calendar Time Modeling

UNIT V **9**

SPECIAL TOPICS IN SOFTWARE RELIABILITY

Management Techniques for reliability - Organization and Staffing - Programming Languages and Reliability - Computer Architecture and Reliability - Proving Program correctness & Reliability Design - Reliability Testing - Reliability Economics

TOTAL NO OF PERIODS:45

TEXT BOOKS:

1. *John D. Musa, "Software Reliability", McGraw Hill, 2004.*
2. *Patric D. T.O Connor, "Practical Reliability Engineering", 4th Edition, John Wesley & sons, 2003*

REFERENCE BOOKS:

1. Doron Peled, “Software Reliability Methods”,Springer,2011.
2. Alessandro Birolini, "Reliability Engineering", Springer ,2010.

BSE 8P1 PROJECT WORK AND VIVA-VOCE 0 0 18 6

The objective of project work is to enable the students, to work in convenient groups of not more than four members in a group, on a project involving some design and fabrication work or theoretical and experimental studies related to the respective engineering discipline.

Every project work shall have a Guide who is a member of the faculty of the University. Twelve periods per weeks shall be allotted in the Time Table for this important activity and this time shall be utilized by the student to receive directions from the Guide, on library reading, laboratory work, computer analysis, or field work as assigned by the Guide and also to present periodical seminars of viva to review the progress made in the project.

Each student shall finally produce a comprehensive report covering background information, literature-survey, problem statement, project work details, estimation of cost and conclusions. This final report shall be in typewritten form as specified in the guidelines.

The continuous assessment and semester evaluation may be carried out as specified in the guidelines to be issued time to time.

TOTAL NO OF PERIODS: 90

ELECTIVE I

BCS001 ANALYSIS OF SOFTWARE ARTIFACTS 3 0 0 3

UNIT I

QUALITY MODELS **9**

Introduction-views on quality-cost of quality-quality models-Statistics and measurements-Statistics and measurements-Analysis of given source code using SQALE and Sonar models.

UNIT II

QUALITY FRAMEWORK AND TESTING **9**

Quality framework characteristics – verification- Measuring test adequacy- overview of black box testing techniques-decision tables-combinatorial testing- classification tree method- white box testing- Random and exploratory.

UNIT III

SOFTWARE ANALYSIS **9**

Introduction to Static analysis- Static analyzer for finding dynamic programming errors-dataflow testing – procedure to apply data flow testing- examples- performance analysis and verification- Security analysis and verification – Software vulnerabilities and exploitation.

UNIT IV

QUASAR METHOD **9**

Applying the Design structure matrix to system decomposition and integration problems- achieving Agility through Architecture visibility-Recovering and verifying architecture through design structure matrices.

UNIT V

QUALITY MANAGEMENT **9**

Project quality management- Essential Testing-Test driven development – guidance for software verification and validation plans-Master test planning.

TEXT BOOKS

1. Edited by Kshirasagar Naik and Priyadarshi Tripathy, “Software testing and Quality Assurance: theory and practice”, John wiley & sons Inc, copyright, 2008.

2. Daniel Galin, “Software Quality Assurance from Theory to Implementation”, Pearson Education Ltd., 2004.

REFERENCES

1. “Quality models to engineering quality requirements” published in journal of object technology, chair of Software engineering, Vol.2, No. 5 Sep. – October 2003.

2. Tyson R. Browning, A review and new directions, “Applying the design structure matrix to system decomposition and integration problems”, IEEE transactions on Engineering management

3. Neeraj sangal and frank waldman in the journal of “Defense software engineering Dependency models to manage software Architecutre”.

BCS002 SOFTWARE QUALITY MANAGEMENT 3 0 0 3

OBJECTIVES:

- To understand how to choose appropriate quality goals and to select, to plan, and to execute quality assurance activities throughout development and evolution to predictably meet quality and schedule goals.
- To study the software quality engineering metrics and models

OUTCOMES:

- employ software metrics and models in software development
- select the best quality assurance plan during development

UNIT I **9**

INTRODUCTION

Concepts of Quality Control, Quality Assurance, Quality Management - Total Quality Management; Cost of Quality; QC tools - 7 QC Tools and Modern Tools; Other related topics - Business Process Re-engineering - Zero Defect, Six Sigma, Quality Function Deployment, Benchmarking, Statistical process control.

UNIT II **9**

SOFTWARE ENGINEERING PRINCIPLES

Software Engineering Principles, Software Project Management, Software Process, Project and Product Metrics, Risk Management.

UNIT III **9**

SOFTWARE QUALITY ASSURANCE MODELS

Software Quality Assurance; Statistical Quality Assurance - Software Reliability, Models for Quality Assurance - ISO-9000 - Series, CMM, SPICE, Malcolm Baldrige Award.

UNIT IV **9**

SOFTWARE PROCESSES & TESTING

Software Process - Definition and implementation; internal Auditing and Assessments; Software testing - Concepts, Tools, Reviews, Inspections & Walkthroughs; P-CMM.

UNIT V **9**

TQM

Total Quality Management - Introduction, Software reuse for TQM, Software testing method for TQM, Defect Prevention and Total Quality Management, Zero Defect Software Development, Clean room Engineering.

TOTAL NO OF PERIODS: 45

TEXT BOOKS

1. Allan Gillies, "Software quality Theory & Management ",Thomson international Press,2011
2.Amitava Mitra, ”Fundamentals of Quality Control and Improvement” ,Wiley, 2008.

REFERENCES:

1.Roger Pressman, "Software Engineering ", 8th edition, McGraw Hill, 2015.

2. Kim H. Pries, Jon M. Quigley, "Total Quality Management for Software", CRC Press, 2005.

BCS003 SOFTWARE PROJECT MANAGEMENT 3 0 0 3

OBJECTIVE:

- To provide students with a clear understanding of the unique risks, issues, and critical success factors associated with technology projects.
- To introduce students to the role and function of project management.

OUTCOMES:

- It Enables the students understand what is a product, project and process is.
- It enables students understand the lifecycle for a software project.
- It enables students understand how the quality of a software product is calculated.

UNIT I1 **9**

INTRODUCTION TO SPM

Exposure to Software Project Management: Software development as a project, Stakeholders in software project, Software product, process, resources, quality, and cost, Objectives, issues, and problems relating to software projects.

UNIT II

PLANNING **9**

Overview of Project Planning: Steps in project planning; Defining scope and objectives; work breakdown structure; Deliverables and other products

UNIT III **9**

EFFORT AND COST ESTIMATION

Software Effort Estimation: Problem in software estimation; Effort estimation techniques COCOMO model.

Risk Analysis and Management: Nature and categories of risk in software development; risk Identification; Risk assessment; Risk mitigation, monitoring, and management;

UNIT IV **9**

SOFTWARE DEVELOPMENT MODELS

Selection of Appropriate Project Approach: Rapid application development; Waterfall model; V-process model; Spiral model; Prototyping,; Incremental delivery.

UNIT V **9**

SOFTWARE QUALITY ASSURANCE

Software Quality Assurance : Planning for quality; Product versus process quality management; Procedural and quantitative approaches; Defect analysis and prevention; Statistical process control; Pareto analysis; Causal analysis; Quality standards; ISO 9000; Capability Maturity Model; Quality audit.

TOTAL NO OF PERIODS: 45

TEXT BOOKS :

1. Bob Hughes and Mike Cotterell," Software Project Management", Tata McGraw-Hill Edition,2010
2. Joel Henry ,"Software Project Management" , Pearson Education,2009.
3. Pankaj Jalote ,"Software Project Management in practice" , Pearson Education.2005

REFERENCES:

1. S. A. Kelkar ,"Software Project Management" , ,PHI,2012.

ELECTIVE II

BCS004 PARALLEL COMPUTING 3 0 0 3

Objectives:

This course is an introduction to parallel computing and aims at teaching basic models of parallel machines and tools to program them. It is an introduction to parallel programming, how to parallelize programs.

Outcomes:

- Be able to reason about ways to parallelize a problem.
- Be able to evaluate a parallel platform for a given problem.
- Become familiar with programming with MPI and Vector processor.

UNIT-I **9**

PARALLEL COMPUTING MODELS & PROGRAM

The state of computing. Multiprocessors & Multi computers, Multi vector & SIMD Computers, PRAM&VLSI Models, Architectural Development Tracks, Conditions of Paralleling Programming, Partitioning & Scheduling, Programming flow mechanism. System interconnect Architecture.

UNIT-II **9**

PARALLEL COMPUTER PERFORMANCE & HARDWARE TECHNOLOGIES

Performance Metrics & Measures, Parallel Processing Application, Speedup performance laws, Scalability analysis & approaches. Processors & memory hierarchy. Advanced processortechnology. Superscalar & Vector processes, Memory hierarchy technologies. Virtual Memory Technology.

UNIT-III **9**

BUS, CACHE, MEMORY & PIPELINING TECHNIQUES

Backup bus system, Cache memory organization. Shared memory organization, Sequence & Weak consistency models. Linear pipeline processes - nonlinear pipeline processes. Instruction pipeline design, arithmetic pipeline design, Superscalar & Super pipeline design.

UNIT-IV **9**

MULTIPROCESSORS & MULTI COMPUTERS

Multiprocessor system interconnects. Cache coherence & synchronous mechanisms, Three generation of multi computers. Message-passing mechanism. Principles of multithreading, Fine-grained multi' computers, Calable& Multithreaded architecture, Dataflows Hybrid architecture.

UNIT-V **9**

SOFTWARE FOR PARALLEL PROGRAMMING

Parallel programming models, parallel layers & compilers, dependency analysis of data arrays, code optimization & scheduling, Loop parallelization & pipelining, Multiprocessor mix design goals.

TOTAL NO OF PERIODS: 45

TEXTBOOK:

1. Kai Hwang, "Advanced Computer Architecture, Parallel Scalability Programmability"- Tata McGraw Hill, 112123.

BCS005 REAL TIME SYSTEMS 3 0 0 3

OBJECTIVES:

- Introduction of the real-time systems.
- Computing required for the real-time operating systems.
- Required for the real-time database and communication.

OUTCOMES:

- To present the mathematical model of the system.
- To develop real-time algorithm for task scheduling.
- To understand the working of real-time operating systems and real-time database.
- To work on design and development of protocols related to real-time communication.

UNIT-I **9**

INTRODUCTION

Issues in real-time system. Task classes. Architecture issues. Operating system, Operating system issues. Performance measure for real time systems, Estimating program Runtimes. Classical uniprocessor scheduling algorithm. Uniprocessor scheduling of IRIS tasks. Task assignment, Mode changes. Fault Tolerance scheduling.

UNIT-II

9

PROGRAMMING LANGUAGES AND TOOLS

Introduction desirable language characteristics, Data typing. Control structure, Facilitation hierarchical decomposition. Packages, Exception handling, Overloading and generics. Multitasking, Low-level Programming, Task scheduling, timing specification, Programming environments, Run-time support.

UNIT-III **9**

REAL-TIME DATABASE AND COMMUNICATION

Basic definitions. Real time vs. general purpose database. Main memory databases. Transaction priorities. Transaction aborts. Concurrency control issues, Disk scheduling algorithms. Two-phase approach to improve predictability, Maintaining serialization consistency. Database for real-time systems, Communication network topologies. Communication Protocols.

UNIT-IV **9**
FAULT-TOLERANCE TECHNIQUES

Introduction, Failure causes, Fault types, Fault detection, Fault and Error containment. Redundancy, Data diversity, Reversal checks, Malicious or Byzantine failures, Integrated failure handling.

UNIT-V **9**

RELIABILITY AND CLOCK SYNCHRONIZATION

Introduction Obtaining parameter values, Reliability models for hardware redundancy. Software error models, Taking time into account Clock synchronization, Non fault-tolerant synchronization algorithms, Impact of faults, Fault tolerant synchronization in hardware. Synchronization in hardware.

TOTAL NO OF PERIODS: 45

TEXTBOOK

1. C.M. Krishna, Kang G. Shin, “Real-Time Systems”, McGraw Hill, 2010.

BCS006 DISTRIBUTED OPERATING SYSTEM 3 0 0 3

OBJECTIVES:

- To provide hardware and software issues in modern distributed systems.
- To get knowledge in distributed architecture, naming, synchronization, consistency and replication, fault tolerance, security, and distributed file systems.
- To analyze the current popular distributed systems such as peer-to-peer (P2P) systems will also be analyzed.

OUTCOMES:

- The student will gain enough understanding of distributed operating systems, be able to explain the principles underlying the functioning of distributed systems as well as how these principles are applied in distributed systems and what the problems and challenges are.
- The student will understand and estimate the impact of different design choices, system features on distributed systems.

UNIT- I **9**

Modes of communication, System Process, Interrupt Handling, Handling Systems calls, Protection of resources &Resources Management Micro-Kernel Operating System.

UNIT- II **9**

Review of Network Operating System and Distributed Operating System, Issue in the design of Distributed Operating System, Overview of Computer Networks. Inter process communication, Linux, IPC Mechanism, Remote Procedure calls, RPC exception handling, Security issues, RPC in Heterogeneous Environment (case study Linux RPC)

UNIT -III **9**

Clock Synchronization, Logical clocks, Physical clocks, clock synchronization algorithms, Mutual Exclusion, Election Algorithms, Dead locks in Distributed Systems. Thrashing, Heterogeneous DSM, Resource Management (Load Balancing approach, Load Sharing approach), Process Management: process Migration, Thread.

UNIT- IV **9**

Overview of shared memory, consistency model, Page based Distributed Shared Memory, Shared –variable Distributed Memory, Object -based Distributed Memory.

UNIT- V **9**

File models, File access, File sharing, file-caching, File Replication, fault Tolerance, Network File System, (Case study, 8NFS on Linux Directory Services, Security in Distributed File system).

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1.M. Beck et al," Linux Kernel Programming",3rd edition, 2002.
2.B.W. Kernighan and R Pide, "The Unix Programming Environment ",Prentice Hall of India-2000.

REFERENCES:

1. Silberschatz,P.B.Garvin,Gagne," Operating System Concepts", 2009.

BCS007 EMBEDDED SYSTEM 3 0 0 3

OBJECTIVES:

- To study the software designing used in embedded systems.
- To study the object oriented analysis and design for real time systems.
- To study the development activities of real time system using UML.

OUTCOMES:

- Apply Object Structure and Behavior analysis in real time design
- Apply the concept of architectural design in practical applications
- Apply objects and classes concepts in real time applications

UNIT- I 9

REVIEW OF EMBEDDED HARD WARE

Gates - Timing Diagram - Memory - Microprocessor - Buses - Direct Memory Access - Interrupts - Built ins on the Microprocessor - Convention Used on Schematic - Schematic - Interrupts Microprocessor Architecture - Interrupt Basics - Shared Data Problem - Interrupt Latency.

UNIT- II 9

MICROCHIP PIC MICRO CONTROLLER

Introduction - CPU Architecture - Registers - Instruction Sets - Addressing Modes - Loop Timing - Timers - Interrupts Timing - I/O Exception - I2 C Bus Operation - Serial EEPROM - Analog to Digital Converter - UART - Baud Rate - Data Handling - Initialization - Special features - Serial Programming - Parallel Slave Port.

UNIT-III 9

EMBEDDED MICROCOMPUTER SYSTEM

Motorola MC68H11 Family Architecture - Registers - Addressing Modes Programs - Interfacing Methods - Parallel I/O Interface - Parallel Port Interface - Memory Interfacing - High Speed I/O Interfacing - Interrupts- Interrupt Service Routine - Features of Interrupts - Interrupt Vector -

Priority - Timing Generation & Measurement - Input capture - Output Compare - Frequency measurement - Serial I/O Devices - RS 232, RS485 - Analog Interfacing - Applications.

UNIT- IV **9**

SOFTWARE DEVELOPMENT

Round Robin - Round Robin with Interrupts - Function - Queue Scheduling Architecture & Algorithms - Introduction to - Assemblers, Compliers, Cross Compliers, Integrated Development environment(IDE) - Object Oriented Interfacing - Recursion - Debugging Strategies - Simulators .

UNIT V **9**

REAL TIME OPERATING SYSTEM

Task & Task States - Tasks & Data - Semaphores & Shared Data - Operating System Services - Message Queues - Timer Functions - Event Memory Management - Interrupt Routines & RTOS Environment - Basic design Using RTOS.

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1. David E. Simon, "An Embedded Software Primer", Pearson Education, 2004
2. Jonartthan W. Valvano, "Embedded Micro Computer System:Real Time Interfacing", Thomson Learning, 2001.

REFERENCES:

1.Laplante,Ovaska,"Real-Time Systems Design and Analysis: Tools for the Practitioner", 4th Edition,Wiley,2013.

2.Bruce Schneier, Niels Ferguson, "Practical Cryptography", Wiley Dream tech India Pvt. Ltd., 2003.

BCS008 MIDDLEWARE TECHNOLOGIES 3 0 0 3

OBJECTIVES:

- The course provides details about the modern component platforms.
- Based on practical examples, details about modern middleware technologies will be analyzed.
- Students get the chance to gain in-depth knowledge about their favorite middleware platform.

OUTCOMES:

- Thoroughly, individually, describe the most important aspects when using middleware technologies
- Be able to, in group, develop a component-based application based on middleware technology.
- Be able to individually judge existing or new middleware frameworks in comparison to historical and today's solutions
- Individually, in detail describe differences and similarities in different middleware platforms.

UNIT I **9**

CLIENT / SERVER CONCEPTS

Client – Server – File Server, Database server, Group server, Object server, Web server .Middleware – General middleware – Service specific middleware. Client / Server Building blocks – RPC – Messaging – Peer – to- Peer.

UNIT II **9**

EJB ARCHITECTURE

EJB – EJB Architecture – Overview of EJB software architecture – View of EJB – Conversation – Building and Deploying EJBs – Roles in EJB.

UNIT III **9**

EJB APPLICATIONS

EJB Session Beans – EJB entity beans – EJB clients – EJB Deployment – Building an application with EJB.

UNIT IV **9**

CORBA

CORBA – Distributed Systems – Purpose - Exploring CORBA alternatives – Architecture overview – CORBA and networking model – CORBA object model – IDL – ORB - Building an application with CORBA.

UNIT V **9**

COM

COM – Data types – Interfaces – Proxy and Stub – Marshalling – Implementing Server / Client – Interface Pointers – Object Creation, Invocation , Destruction – Comparison COM and CORBA – Introduction to .NET – Overview of .NET architecture – Marshalling - Remoting.

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1. Robert Orfali, Dan Harkey and Jeri Edwards, “The Essential Client/Server Survival Guide”, Galgotia Publications Pvt. Ltd., 2002.
2. Tom Valesky,”Enterprise Java Beans”, Pearson Education, 2002.

REFERENCES:

1.Jesse Liberty, “Programming C#”, 2nd Edition, O’Reilly Press, 2002.

2. Mowbray,”Inside CORBA”, Pearson Education, 2002.

3.Jason Pritchard,”COM and CORBA side by side”, Addison Wesley, 2000.

4.Jeremy Rosenberger,” Teach yourself CORBA in 14 days”, Techmedia, 2000.

ELECTIVE III

BCS009 PATTERN RECOGNITION 3 0 0 3

OBJECTIVES:

Students can understand about Pattern reorganization, perceptron algorithms and supervised, unsupervised learning.

OUTCOMES:

- Know how to test for assumptions for an analysis and what to do when those assumptions are not correct.
- Know how to collect data for a particular situation.
- Know about Bayesian approach.

UNIT-I **9**

PATTERN CLASSIFIER

Overview of pattern recognition- Discriminant functions-Supervised teaming - Parametric estimation - Maximum likelihood estimation - Bayesian parameter estimation- perceptron algorithm-LNSE algorithm -Problems with Bayes approach-Pattern classification by distance functions -Minimum distance pattern classifier.

UNIT-II **9**

UNSUPERVISED CLASSIFICATION

Clustering for unsupervised learning arid classification -clustering concept-C- means algorithm - Hierarchical clustering procedures-Graph theoretic approach to pattern clustering-validity of clustering solutions.

UNIT-III **9**

STRUCTURAL PATTERN RECOGNITION

Elements of formal grammars -string generation as pattern description-recognition of syntactic description - Parsing-Stochastic grammars and applications - Graph based structural representation,

UNIT-IV **9**

FEATURE EXTRACTION AND SELECTION

Entropy minimization - Karhunen - Loeve transformation -feature selection through functions approximation-Binary feature selection.

UNIT-V **9**

RECENT ADVANCES

Neural network structures for pattern recognition - Neural network based pattern associators-Unsupervised learning in neural pattern recognition -self organizing networks-Fuzzy logic-Fuzzy pattern classifiers -Pattern classification using Genetic Algorithms.

TOTAL NO OF PERIODS: 45

TEXTBOOKS:

1. Robert J. Schalkoff, Pattern Recognition: Statistical, Structural and Neural Approaches, John Wiley & Sons Inc.. New York, 2001.

2. Tou and Gonzales, “Pattern recognition principles”, Wesley Publication Company, London, 2004

3. Morton Naider and Eric Smith P., “Pattern Recognition Engineering”, John Wiley & Sons, New York, 2003.

BCS010 FUZZY AND GENETIC ALGORITHM 3 0 0 3

OBJECTIVES:

Students can understand about Fuzzy logic, Fuzzy set and defuzzification methods.

OUTCOMES:

- Learn the unified and exact mathematical basis as well as the general
- Principles of various soft computing techniques.
- Provide detailed theoretical and practical aspects of intelligent
- Modeling, optimization and control of non-linear systems.
- Prepare the students for developing intelligent systems through case

UNIT-I 9

INTRODUCTION

Uncertainty and Imprecision-Statistics and Random process - Uncertainty in information - Fuzzy sets and Membership - Chance versus ambiguity, classical Sets and Fuzzy Sets : Classical Sets - Fuzzy sets - Sets as points in hypercube, Classical Relations and Fuzzy Relations Cartesian product -Crisp Relations - Fuzzy Relations - Tolerance and Equivalence Relations - Value Assignments.

UNIT-I I 9

MEMBERSHIP FUNCTIONS

Membership Functions: Features of Membership function - Standard forms and boundaries - Fuzzification^ Membership value assignments.'Fuzzy to Crisp conversions: Lambda cuts for fuzzy sets - Lambda cuts for fuzzy relations- Defuzzification Methods.

UNIT-III **9**

PRINCIPLES OF FUZZY LOGIC

Fuzzy Arithmetic, Numbers, Vectors and the Extension Principle: Extension Principle- Fuzzy numbers - Internal analysis in arithmetic - Approximate methods of extension. Classical logic and fuzzy logic: Classical predicate logic - Fuzzy logic - Approximate reasoning - Fuzzy Tautologies - Other forms of the implication & composition operation.

UNIT-IV **9**

RULE BASED SYSTEMS

Fuzzy Rule Based Systems: Natural language - Linguistic hedges - Rule based systems - Graphical techniques of inference, Fuzzy Nonlinear Simulation: Fuzzy Relational Equations - Partitioning - Nonlinear Simulation using fuzzy rule based systems - FAMs. Fuzzy decision making.

UNIT-V **9**

FUZZY CLASSIFICATION

Fuzzy Classification: Classification by equivalence relations- Cluster analysis - Cluster validity - Classification metric - Hardening the fuzzy - Partition, Fuzzy Pattern Recognition : Feature analysis-Partitions of the feature space- Single sample identification - Image processing syntactic recognition.

TOTAL NO OF PERIODS: 45

TEXTBOOK:

1. Timothy J.Ross, “Fuzzy Logic with Engineering Applications”, McGraw Hill International Edition 2000.

BCS011 NATURAL LANGUAGE PROCESSING 3 0 0 3

OBJECTIVES:

This course is designed to introduce some of the problems and solutions of NLP, and their relation to linguistics and statistics.

OUTCOMES:

- Show sensitivity to linguistic phenomena and an ability to model them with formal grammars.
- Understand and carry out proper experimental methodology for training and evaluating empirical NLP systems.
- Be able to manipulate probabilities, construct statistical models over strings and trees, and estimate parameters using supervised and unsupervised training methods.
- Be able to design, implement, and analyze NLP algorithms.

UNIT-I **9**

INTRODUCTION

Introduction - The issues arid difficulties in natural language processing -Linguistics and computational linguistics - Language under- standing and generation - Understanding of spoken, written and textual information.

UNIT-II **9**

PARSING AND GRAMMAR

Syntactic Parsing - English grammar - Structure of the sentence - words and organization of the lexicon - Context free and context sensitive grammar -Transformational grammar-The role of syntax analysis in semantics ATN's - Definite clause grammar and WASP parsers.

UNIT-III **9**

INTERPRETATION

Semantic interpretation - The conceptual dependency model for semantic representation - Semantic network - Frames and scripts - Semantics in the lexicon.

UNIT-IV **9**

SEMANTIC NETWORK

Discourses interpretation - The interconnections between pragmatics -Pragmatics in discourse analysis-Speech acts plan-based Theory of speech acts - Semantic network - Frame and scripts - Semantics in the lexicon.

UNIT-V **9**

CASE STUDY

Generation - Strategies for generation - Planning English referring expressions -KING, a Natural language generation systems.
Typical systems - ELIZA - Baseball - GLJS - PARRY - LADDER - SOPGIE & POET current trends in NLP.

TOTAL NO OF PERIODS: 45

TEXTBOOK

1. James Alien Benjamin Cummings, "Natural language understanding", 2nd Edition 1995. Benjamin/Cummins Publishing Company Inc.

REFERENCE BOOKS

1. Windgrad, "Language as a Cognitive Process; Syntax", Addison Wesley Publication
2. F Popov, "Talking with Computer in Natural Language", Springer-Verlag, 1986.

BCS012 SPEECH TECHNOLOGY 3 0 0 3

OBJECTIVES:

- To provide knowledge in fundamentals of speech processing
- To get knowledge in speech models.

OUTCOMES:

- The student will gain enough understanding of speech models
- The student will understand and estimate the impact of different digital speech recognition models

UNIT- I 9

FUNDAMENTALS OF SPEECH PROCESSING

Introduction to Speech processing - applications - Fundamentals of speech processing - Analysis tools - z - Fourier - DFT transforms - FIR - IIR filters - sampling.

UNIT -II 9

SPEECH MODELS

Digital models - Vocal tract analog and digital models - Time Domain models - Useful Performance measures - zero - crossings - voiced - unvoiced - pitch periods - correlation Functions - smoothing.

UNIT -III 9

DIGITAL REPRESENTATION AND ANALYSIS

Digital representations of speech waveform - Encoding of speech using delta modulation - PCM - differential PCM - other systems - Short-time Fourier analysis - Short term analysis Effects - filter banks - pitch detection - vocoders.

UNIT IV **9**

HOMOMORPHIC SPEECH PROCESSING AND LINEAR PREDICTIVE CODING

Homomorphic speech processing - Cepstrum - pitch detection - formant estimation - vocoders - Linear predictive coding of speech - LPC methods and parameters - relations between speech parameters.

UNIT -V **9**

DIGITAL SPEECH PROCESSING AND RECOGNITION

Digital speech processing for man - machine communication by voice - Speech and speaker recognition - voice response systems.

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1. L. R. Rabiner & R. W. Schafer, "Digital Processing of Speech Signals", Prentice Hall, 2008.

2.Amy Neustein,"Advances in Speech Recognition"Springer,2010.

3.Claudio,Klucio,"Speech Recognition",Wiley 2008

REFERENCES:

1.Wai C. Chu,,"Speech Coding Algorithms: Foundation and Evolution of Standardized Coders", John Wiley & Sons,2003.

2.Javier Ramírez, Juan Manuel Górriz," Recent Advances in Robust Speech Recognition Technology", ,2011.

BCS 013 SOFT COMPUTING 3 0 0 3

OBJECTIVES:

- To learn the key aspects of Soft computing.
- To know about the components and building block hypothesis of Genetic algorithm.
- To understand the features of neural network and its applications.
- To study the fuzzy logic components.
- To gain insight onto Neuro Fuzzy modeling and control.
- To gain knowledge in machine learning through Support vector machines.

OUTCOMES:

- Implement machine learning through neural networks.
- Gain Knowledge to develop Genetic Algorithm and Support vector machine based machine learning system
- Write Genetic Algorithm to solve the optimization problem
- Understand fuzzy concepts and develop a Fuzzy expert system to derive decisions.
- Able to Model Neuro Fuzzy system for data clustering and classification.

UNIT-I

INTRODUCTION TO SOFT COMPUTING 9

Evolution of Computing - Soft Computing Constituents – From Conventional AI to Computational Intelligence - Machine Learning Basics

UNIT-II

GENETIC ALGORITHMS **9**

Introduction, Building block hypothesis, working principle, Basic operators and Terminologies like individual, gene, encoding, fitness function and reproduction, Genetic modeling: Significance of Genetic operators, Inheritance operator, cross over, inversion & deletion, mutation operator, Bitwise operator, GA optimization problems, JSPP (Job Shop Scheduling Problem), TSP (Travelling Salesman Problem),Differences & similarities between GA & other traditional methods, Applications of GA.

UNIT-III

NEURAL NETWORKS **9**

Machine Learning using Neural Network, Adaptive Networks – Feed Forward Networks – Supervised Learning Neural Networks – Radial Basis Function Networks - Reinforcement Learning – Unsupervised Learning Neural Networks – Adaptive Resonance Architectures – Advances in Neural Networks.

UNIT-IV

FUZZY LOGIC **9**

Fuzzy Sets – Operations on Fuzzy Sets – Fuzzy Relations – Membership Functions-Fuzzy Rules and Fuzzy Reasoning – Fuzzy Inference Systems – Fuzzy Expert Systems – Fuzzy Decision Making.

UNIT-V

NEURO-FUZZY MODELING **9**

Adaptive Neuro-Fuzzy Inference Systems – Coactive Neuro-Fuzzy Modeling – Classification and Regression Trees – Data Clustering Algorithms – Rule base Structure Identification – Neuro-Fuzzy Control – Case Studies.

TOTAL NO OF PERIODS: 45

TEXTBOOKS

1. Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, “Neuro-Fuzzy and Soft Computing”, Prentice-Hall of India, 2003

2. Kwang H.Lee, “First course on Fuzzy Theory and Applications”, Springer–Verlag BerlinHeidelberg, 2005.

3. James A. Freeman and David M. Skapura, “Neural Networks Algorithms, Applications, and Programming Techniques”, Pearson Education., 2003.

4. David E. Goldberg, “Genetic Algorithms in Search, Optimization and Machine Learning”, Addison Wesley, 2007.

REFERENCES

1. Mitsuo Gen and Runwei Cheng,”Genetic Algorithms and Engineering Optimization”, Wiley Publishers 2000.

2. S.N.Sivanandam, S.N.Deepa, “Introduction to Genetic Algorithms”, Springer, 2007.

3. ROSS TIMOTHY J, Fuzzy Logic with Engineering Applications, Wiley India Pvt Ltd, New Delhi, 2010.

ELECTIVE IV

BCS014 TCP/IP PRINCIPLES AND ARCHITECTURE 3 0 0 3

OBJECTIVES:

- To provide a solid foundation for understanding the communication process of the Internet
- Provide exposure to fundamental concepts of computer networking in the context of the TCP/IP model and protocols.

OUTCOMES:

- understand the functionality of reference model thoroughly.
- Have a good understanding of various protocols in different layers and how they are Working
- Get an exposure to various next generation protocols in internetworking.

UNIT- I **9**

INTRODUCTION

Protocols and standards - OSI model - TCP/ IP protocol suite - addressing -Version - Underlying technologies.

UNIT -II **9**

IP ADDRESSES, ROUTING, ARP AND RARP

Classful addressing - other issues - Subnetting - Supernetting - classless addressing - routing methods - delivery - table and modules - CIDR - ARP package - RARP.

UNIT-III **9**

IP, ICMP, TGMP AND UDP

Datagram - fragmentation - options - checksum - IP package - ICMP - messages, formats - error reporting - query - checksum - ICMP package - IGMP - messages, operation - encapsulation - IGMP package - UDP - datagram - checksum - operation - uses - UDP package.

UNIT- IV **9**

TCP, UNICAST AND MULTICAST ROUTING PROTOCOLS

Services - flow, congestion and error control - TCP package and operation - state transition diagram - unicast routing protocols - RIP - OSPF - BGP - multicast routing - trees - protocols - MOSPF - CBT - PIM.

UNIT- V **9**

APPLICATION LAYER, SOCKETS

Client server model - concurrency - processes - sockets - byte ordering - socket system calls - TCP and UDP client-server programs - BOOTP -DHCP - DNS - name space, resolution - types of records - concept - mode of operation - Rlogin.

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1.Behrouz A. Forouzan, "TCP/IP Protocol Suite", 4th edition, McGraw Hill, 2013.

2.Douglas E. Comer, "Internetworking with TCP/IP: principles, protocols and architecture" (Volume1), 6th Edition, PHI Learning, 2013.

REFERENCES:

1. Douglas E. Comer, David L. Stevens, "Internetworking with TCP/IP, design, implementation and internals Volume 2, 3rd Edition, PHI Learning, 2009.

2. Ed Tittel, Laura Chappell, "TCP/IP", 1st Edition, Cengage Learning, 2008.

3. Dr. Sidnie Feit, TCP/IP, architecture, protocols and implementation with IPv6 and IP Security, Tata McGraw-Hill, 2008.

BCS015 PERFORMANCE EVALUATION IN COMPUTER SYSTEMS 3 0 0 3

OBJECTIVES:

- To understand the mathematical foundations needed for performance evaluation of computer Systems
- To understand the metrics used for performance evaluation
- To understand the analytical modeling of computer systems
- To enable the students to develop new queuing analysis for both simple and complex systems
- To appreciate the use of smart scheduling and introduce the students to analytical techniques for evaluating scheduling policies.

OUTCOMES:

- Analyze a given problem for possibilities of parallel computations
- Select algorithms and hardware for the solution of high performance projects
- Program computers with shared and distributed memory architectures
- Use appropriate programming languages efficiently for scientific computations
- Run parallel programs on different hardware architectures and software environments

UNIT-I

OVERVIEW OF PERFORMANCE EVALUATION 9

Need for Performance Evaluation in Computer Systems – Overview of Performance Evaluation Methods – Introduction to Queuing – Probability Review – Generating Random Variables for Simulation – Sample Paths, Convergence and Averages – Little's Law and other Operational Laws – Modification for Closed Systems.

UNIT-II

MARKOV CHAINS AND SIMPLE QUEUES 9

Discrete-Time Markov Chains – Ergodicity Theory – Real World Examples – Google, Aloha – Transition to Continuous-Time Markov Chain – M/M/1 and PASTA.

UNIT-III

MULTI-SERVER AND MULTI-QUEUE SYSTEMS 9

Server Farms: M/M/k and M/M/k/k – Capacity Provisioning for Server Farms – Time Reversibility and Burke's Theorem – Networks of Queues and Jackson Product Form – Classed and Closed Networks of Queues.

UNIT-IV

REAL-WORLD WORKLOADS 9

Case Study of Real-world Workloads – Phase-Type Distributions and Matrix-Analytic Methods – Networks with Time-Sharing Servers – M/G/1 Queue and the Inspection Paradox – Task Assignment Policies for Server Farms.

UNIT-V

SMART SCHEDULING IN THE M/G/1 9

Performance Metrics – Scheduling Non-Preemptive and Preemptive Non-Size-Based Policies - . Scheduling Non-Preemptive and Preemptive Size-Based Policies – Scheduling - SRPT and Fairness.

TOTAL NO OF PERIODS: 45

REFERENCES:

1. Mor Harchol - Balter, "Performance Modeling and Design of Computer Systems – Queueing Theory in Action", Cambridge University Press, 2013.
2. Lieven Eeckhout, "Computer Architecture Performance Evaluation Methods", Morgan and Claypool Publishers, 2010.

REFERENCES:

1. Paul J. Fortier and Howard E. Michel, "Computer Systems Performance Evaluation and Prediction", Elsevier, 2003.
2. David J. Lilja, "Measuring Computer Performance: A Practitioner's Guide", Cambridge University Press, 2000.

BCS016 ADVANCED COMPUTER NETWORKS 3 0 0 3

OBJECTIVES:

The objective of Advanced Computer Networks is to cover theoretical topics in the areas of advanced networking technologies, distributed computing.

OUTCOMES:

- Various Network models
- Network and its Speed like fast Ethernet and gigabit Ethernet.
- Knowledge about various routing methods.
- Domain name systems and Distributed domain name systems.
- Protecting our system from external Vulnerabilities.

UNIT-I

NETWORK ARCHITECTURE 9

Review of Basic Network Architectures: OSI reference model, TCP/IP reference model, ATM reference model; Applications(WWW, Audio/Video Streaming, Video conference, Networked Games, Client/Server); Traffic Characterization (CBR, VBR); Switching Paradigms; Multiplexing; Error Control; Flow Control, FTH, DTH, PON, ISDN, DSL, CATV, SONET, Optical Networks.

UNIT-II

NETWORK TECHNOLOGIES 9

Local Area Network Technologies: Fast Ethernet, Gigabit Ethernet, IEEE 802.11 WLAN, Bluetooth, Connecting LANs, VLANS.

UNIT-III

ROUTING AND ITS TYPES **9**

Internetworking: Inter domain Routing, BGP, IPv6, Multicast Routing Protocols, Multi Protocol Label Switching, Virtual Private Networks, High speed transport protocols, Quality of Service Mechanisms, Improving QoS in Internet, DiffServ and IntServ Architectures, RSVP

UNIT-IV

DOMAIN NAME SYSTEMS **9**

Distributed Systems: Naming, DNS, DDNS, Paradigms for Communication in Internet, Caching, Issues of Scaling in Internet and Distributed Systems, Caching Techniques for Web, Protocols to Support Streaming Media, Multimedia Transport Protocols, Content Delivery Networks, Overlay and P2P Networks.

UNIT-V

ATTACKS AND SECURITY IN NETWORK **9**

Applications and Other Networking Technologies: RTP, RTSP, SIP, VoIP, Security Systems, SSH, PGP, TLS, IPSEC, DDoS Attack, Mitigation in Internet, Security in MPLS; Introduction to Cellular, Satellite and Ad hoc Networks.

TOTAL NO OF PERIODS: 45

REFERENCES:

1. Behrouz A. Forouzan, Data Communications and Networking, Fourth Ed., Tata McGraw Hill, 2006.

2. Larry L. Peterson and Bruce S. Davie, Computer Networks: A Systems Approach, Fourth Ed., Morgan Kaufmann, 2007.

3. Markus Hoffmann and Leland R. Beaumont, Content Networking: Architecture, Protocols, and Practice, Morgan Kauffman, 2005.

BCS017 MOBILE COMMUNICATION 3 0 0 3

OBJECTIVES:

This course is designed to all student understand about medium access control (MAC), Wireless LAN, Bluetooth.

OUTCOMES:

- Understand structure of computer communication systems and processes in the computer networks.
- DLL and MAC layer protocols for reliable and noisy channels.
- TCP & UDP protocols.
- Radio signal propagation and properties of wireless communication systems.

UNIT – I

INTRODUCTION **9**

Medium access control – Telecommunication systems – Broadcast systems-SDMA-TDMA-FDMA-TCP/IP-UDP.

UNIT-II **9**

STANDARDS

Wireless LAN: Features-Security standards –Protocol Stack- IEEE 802.11: Standards-Architecture-Frame format-Features –HIPERLAN: Architecture-Standards – Bluetooth and Its Application.

UNIT-III **9**

ADHOC NETWORKS

Characteristics-Performance issues- Routing in mobile hosts-Applications of Ad hoc wireless networks-Issues in Ad hoc networks: Medium Access Scheme-Security-Energy management-Deployment Considerations.

UNIT-IV **9**

NETWORK ISSUES

Mobile IP - DHCP - Mobile transport layer - Indirect TCP - Snooping TCP -Mobile TCP - Transmission time-out freezing - Selective retransmission -Transaction oriented TCP.

UNIT-V **9**

APPLICATION ISSUES

Wireless application protocol - Dynamic DNS - File systems - Synchronization protocol - Context- aware applications - Security - Analysis of existing wireless network.

TOTAL NO OF PERIODS: 45

TEXTBOOK

1. J. Schiller, "Mobile Communications", 2nd Edition, Pearson Education, 2005.

REFERENCES

1. http://www. bluetooth.com

2. William C. Y. Lee, "Mobile Communications Design Fundamentals", John Wiley, 1993.

BCS018 HIGH SPEED NETWORKS 3 0 0 3

OBJECTIVES:

This course gives an overview of High speed computer networks and TCP/IP protocols. It also discusses the security and network management aspects.

OUTCOMES:

- To learn High speed networks, Traffic and congestion management.
- To understand resource allocation and service management approaches.
- To study wireless network operations and functions.
- To learn network management and its protocols.

UNIT-I

HIGH SPEED NETWORKS 9

Introduction-frame relay networks –ATM protocol architecture-ATM logical connection –ATM cells-ATM service categories -AAL- high speed LANS: the emergence of high speed LANS-Ethernets-fiber channel-wireless LANS

UNIT-II

CONGESTION CONTROL 9

Congestion control in data networks and internets-link level flow and error control TCP Traffic - congestion control in ATM networks- Interior routing protocols.

UNIT-III

QOS AND SWITCHING 9

Integrated service architecture-queuing discipline -random early detection differentiated services protocol for QOS support- RSVP- Multiportal Label switching - Real time transport protocol- IP v6.

UNIT-IV

WIRELESS LAN 9

Local broad band and Ad hoc networks. Introduction to wireless LANS-IEEE 802.11 WLAN-WATM-HIPERLAN-Ad hoc networking and WPAN.

UNIT-V

NETWORK MANAGEMENT AND APPLICATION 9

Network management- choosing a configuration method-MIB-SNMP-XMLCORBA-COPS-VPNS-mobile IP-voice over IP

TOTAL NO OF PERIODS: 45

TEXTBOOKS:

1. Williams Stallings, ”High Speed networks And Internet Performance And Quality Of Service”, Pearson Second Edition, 2002.

2. Kaven Pahlavan And Prashant Krishnamoorthy, “Principles Of Wireless Network”, Prentice Hall Of India, 2010

3. Adrian Farrel,” The Internet And Its Protocols”, Elsevier Publications, 2011.

REFERNCES:

1. Behrouz A. Forouzan, “Data Communication And Computer Networking”, 4 th edition , 2011.
2. Larry L. Peterson and Bruce S.Davie, ”Computer Networks”, Third edition, Elsevier Publications, 2003.

BCS020 **E COMMERCE** **3 0 0 3**

OBJECTIVES:

- Understand the nature of e-Commerce;
- Recognize the business impact and potential of e-Commerce;
- Explain the technologies required to make e-Commerce viable;
- Discuss the current drivers and inhibitors facing the business world in adopting and using Ecommerce.
- Explain the economic consequences of e-Commerce;
- Discuss the trends in e-Commerce and the use of the Internet.

OUTCOMES:

- Create and refine website and application designs based on industry's usability standards.
- Assess the suitability of various design principles for websites and applications;
- Apply the skills necessary for large-scale project development on the Web;
- Apply the technologies required to design and prototype Web-based information systems.

UNIT-I **9**

ELECTRONIC COMMERCE

Electronic Commerce, Electronic Data Interchange (EDI), E-Commerce Types – PC and networking: Networking, Communication media – Computer Communication Systems: ISO model, Electronic mail, X.400 Message Handling System, E-mail security, Light weight directory access protocol – Internet: Introduction, Communication protocols, Issues of concern.

UNIT-II **9**

ELECTRONIC DATA INTERCHANGE

EDI: Introduction, Cost and Benefits, Components of EDI System, Implementation Issues – UN/EDIFACT Standard: Introduction, An EDIFACT Message, Interchange Structure, Message Directories - EDI Over Internet, Commerce Over Extranets, Identification and Tracking Tools

UNIT-III **9**

BUSINESS PROCESS REENGINEERING

Business process reengineering – Approach to BPR, BPR methodology – Change management: Change management in the Government, Implementation plan.

CONCERNS FOR E-COMMERCE GROWTH

Legal issues, Risks: Paper document versus electronic document, Technology for authenticating an electronic document, Laws for e-commerce, EDI interchange agreement.

UNIT-IV **9**

CYBER SECURITY: Cyber Attacks, Hacking, Firewalls, IDS, Secure Sockets Layer, Symmetric and asymmetric crypto systems, Guidelines for Cryptography Policy, Developing a Security Policy.

CYBER CRIMES: Cyber crimes and the Information Technology Act, 2000, Cyber forensics

UNIT-V **9**

CASE STUDIES

E-Commerce: Case Studies: ITC's e-Choupal - E-Governance: Case Studies: Indian customs EDI System, Indian Railways, Government of Andhra Pradesh – eSeva.

COMPUTER EMERGENCY RESPONSE TEAM (CERT): Introduction, CERT-In, CERT-In Activities

TOTAL NO OF PERIODS: 45

REFERENCE BOOKS:

1. Kamlesh K Bajaj, Debjani Nag, "E-Commerce – The Cutting Edge of Business", Tata McGraw Hill, Second Edition, 2006
2. David Whitley, "E-Commerce: Strategy, Technologies and applications", McGraw Hill, 2000.
3. Ravi Kalakota and Andrew B. Whinston, "Frontiers of Electronic commerce", Pearson Education, 2005.
4. Pete Loshin, Paul A. Murphy, "Electronic Commerce", Jaico Publisher.

BCS021 OBJECT ORIENTED DATABASE DESIGN 3 0 0 3

OBJECTIVES:

The objective of the course is to provide postgraduate students with a sound technical exposure to the concepts, principles, methods, and best practices in software architecture.

OUTCOMES:

- Design and motivate software architecture for large scale software systems.
- Recognize major software architectural styles, design patterns, and frameworks.
- Describe a software architecture using various documentation approaches
- Use well-understood paradigms for designing new systems.

UNIT-I **9**

INTRODUCTION TO DATABASE

Database management systems - The concepts of the database- levels of representation, using a DBMS. Relational systems - toward the relational model, The relational model, using a relational system, Advantages & limitations of relational systems. A new generation of systems - A new computing context, New Applications.

UNIT-II **9**

DATABASE MODELING

Fundamental Aspects - The role of the data model general principles, Data manipulation languages, some important models - ER, SDM, IFO, RM/T, Daplex, Type systems - Concept of type. Data abstraction. Polymorphism, sub typing Integrating models & type system-Abstract types and modeling, concepts of inheritance, classes & relations, views & desired data constants & transaction.

UNIT-III **9**

PROGRAMMING LANGUAGES

Extended relational models and system - different approaches, model with structured values, Deductive models and logic programming, models with object identity. Extensible systems. Database programming language - Two approaches Integration into an existing languages. Persistent programming languages.

UNIT-IV **9**

OBJECT ORIENTED DATABASE

Object Oriented systems - Principles & technology databases. The system - origins & objective Data model, Data manipulation, interface generator, the programming environment. Implementation of the 02 system.

UNIT-V **9**

CLUSTERING AND INDEXING

Object manager architecture - Introduction, Problems encountered, Addressing mechanisms, Virtual memory, two address levels, distributed architecture, Data management - Data representation, Large sets & long strings, Representing inheritance. Indexing, clustering, transactions & versions.

TOTAL NO OF PERIODS: 45

TEXTBOOK

1. Claude Delobel, Christopher Ucluse, Philippe Richard, “Databases: From relational to object-oriented systems”

REFERENCE BOOK

1. Laura Schlesinger, "How Could You Do That: The Abdication of Character, Courage, and Conscience", Harper Collins, New York, 1996.

2. Stephen Carter, “Integrity”, Basic Books, New York, 1996.

3. Tom Rusk, “ The Power of Ethical Persuasion: From Conflict to Partnership at Work and in Private Life”, Viking. New York, 1993

BCS022 COMPONENT BASED SYSTEM DESIGN 3 0 0 3

UNIT I **9**

BASIC CONCEPTS

Software Components - Component models and Component Services-myths in Component Based Technology - Risk Factors - Success Factors, Component Based Software Development.

UNIT- II **9**

COMPONENTS, ARCHITECTURE AND PROCESS

Component Architecture, Component Frameworks, Component Development, Component distribution and acquisition, Component assembly, markets and components.

UNIT-III **9**

DESIGN OF SOFTWARE COMPONENT

Software Components and the UML Component Infrastructures - Business Components - Components and Connectors - Designing Models of Modularity & Integration

UNIT IV **9**

MANAGEMENT OF COMPONENT BASED SOFTWARE SYSTEMS

Measurement and Metrics for Software Components - Selecting the right Components - Software Component Project Management - Trouble with Testing Components - Configuration Management and Component Libraries - Evolution Maintenance of Management of Component based Systems.

UNIT -V

COMPONENT TECHNOLOGIES

Overview of the Following Component Models: CORBA, COM+, Enterprise Java Beans, Software Agents.

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1. Clemens Szyperski, "Component Software - Beyond object oriented programming", Pearson Education, 2nd edition, 2004.

2. GeorgeT.Heinemen, William T. Councill, "Component Based Software Engineering",2001.

REFERENCES:

1. Thomas J..Mowbray, William A.Ruh, "Inside CORBA Distributed Object Standards and Applications", Addison - Wesley, 2001.

2.Dale Rojerson, "Inside COM", Microsoft Press, 2001.

3.Andreas Vogel, Keith Duddy "Java Programming with CORBA" John Wiley & Sons,3rd edition,2001.

BCS023 PHP PROGRAMMING 3 0 0 3

OBJECTIVES:

- It gives all students exposure to basics of PHP
- It gives knowledge on session tracking and graphics using PHP

OUTCOMES:

- Recognize the difference between HTML, XHTML, MySQL & PHP.
- Differentiate between PHP Web & HTML Controls
- Understand different Web controls
- Understand connecting Web pages with DB.

UNIT -I **9**

PHP INTRODUCTION: PHP Basics - Evolution of PHP - Introduction to PHP Programming Variables, Operators, and Constants: Introduction to Variables – Operators – Type Juggling - Type Casting - Variable Variables - function for Determining and Setting Variable- Types - Constants. Control Structures: Conditional Expressions- Arrays: Introduction to Arrays- Initializing Arrays - Working with Arrays. Functions: Introduction to Functions - Passing Arguments to Functions - Returning Values from Functions - Understanding the Scope of a Variable within a Function, Variable Functions and Variable Argument Functions

UNIT- II **9**

UNDERSTANDING CLASSES: Classes – Constructors - Extending a class. Form Parsing in PHP: Parsing HTML Posted Values in PHP - Form Validation- Printing the Confirmation Page - Printing Hidden Fields - Putting Theory into Practice. Handling Files: Working with Files - Putting Theory into Practice.

UNIT III **9**

HANDLING DATA STORAGE: An Introduction to Database Concepts - Database Management System - Relational Database Management System - Database Normalization - PHP Support to various Databases - Web Database Architecture - MySQL Database Programming.Using PHP with SQL Databases: Working with MySQL - Using Multiple Databases Simultaneously - Important PHP-MySQL Functions - Error handling in MySQL – Error Types in PHP - Creating Customized Error Handlers.

UNIT- IV **9**

SESSION TRACKING: An Overview of Sessions - Tracking Sessions.Input Validators in PHP: Validation Basics - Performing Validations in an HTML Web Page - Performing Validations in PHP - Functions for Validating User Input - Validating Email Addresses .Cookies: What Is a Cookie? Implementing Cookies in PHP - Are Cookies Harmful?

UNIT -V **9**

GRAPHICS IN PHP: Graphics on the web - Creating Images in PHP. Understanding CVS: CVS an Overview – The CVS Repository – Environment Variables in CVS - CVS Command Options. PEAR: Introduction to PEAR – Coding Standards in PEAR – PEAR and CVS – Contributing Codes to PEAR – Requirements to Make Changes in PEAR – Help in PEAR.

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1. Matt Doyle," Beginning PHP 5.3",Wiley,2011.

2.Ashish Wilfred,Meeta Gupta and Kartik Bhatnagar with NIIT, "PHP Professional Projects", Prentice Hall of India, 2002.

REFERENCES:

1. Kevin Tatroe, Peter MacIntyre, Rasmus Lerdorf ,"Programming PHP",O'Rielley,2013.

2.Rasmus Lerdorf and Kevin Tatroe, "Programming in PHP", O'Reilly and Associates, 2002.

BCS024 ADVANCED WEB DESIGN 3 0 0 3

OBJECTIVES:

•To build web applications using ASP and client side script technologies use with Microsoft's IIS.

•To build XML applications with DTD and style sheets that span multiple domains ranging from finance to vector graphics to genealogy for use with legacy browsers.

OUTCOMES:

•Create richly interactive environments natively within browsers.

•Build web application frameworks which facilitate rapid application development.

•Integrate web applications easily into other server-side web procedures, such as email and searching.

UNIT - I

FUNDAMENTALS 9

Introduction to the Web-Web enabling Technologies-Web Service Protocol-web Design Concepts- Examining Good and Bad Web Design-Page Design Resources.

UNIT – II

SIMPLE DESIGN ISSUES 9

Page Design-HTML-Web Page Style Considerations-Page composition-Type Faces-Tag Parameters-Color and Graphics for web Pages-WYSIWYG web Page Editor-Dream Weaver.

UNIT - III

ADVANCE DESIGN ISSUES **9**

Advanced Page Design-Tables and Frames-Preparing Graphics and animations Forms-Cascading Sheets-User interface Design-Page grid-Page Templates-Usability Testing.

UNIT - IV

SCRIPTING IN DESIGN **9**

Typography and Graphic Design for the Web-Creating Transparent GIP- Lean Graphics-Image Maps-Palette Map-web Programming-Web Site Garage-W3C HTML Validation Services-Net Mechanic-DHTML-XML.

UNIT -V

TOOLS AND APPLICATIONS **9**

Online Applications-Developing an Online Shopping application-Database Design Issues-Connecting Database with tools such as Java, ASP, Cold fusion-Designing Portals and Vortals.

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1. Deitel and Deitel, “Internet and World Wide Web-How to Program”, 3rd Edition, Pearson Education, 2005.

REFERENCES:

1.N.P.Gopalan & J.Akilandeswari, “Web Technology: A Developer’s Perspective”, PHI Learning,2008

2.Jeff Frantzen and Sobotka, “Java Script”, Tata McGraw Hill, 2002.

3.Justin Hunter,William Crawford, ”Java Servlet Programming”, O’Reilly Publications, 2nd Edition, 2001.

BCS 025 ADVANCED DATABASES 3 0 0 3

OBJECTIVE:

- The objective of this course is to expose the students to the implementation techniques of database system.
- This course explains techniques for query processing and optimization with transaction and concurrency control techniques

OUTCOMES:

•It enables the students to understand the concept of relational databases and relational operations.

•It enables the students to understand the concept of Object Oriented Databases and its Operations.

•It enables the students to understand the concept of Parallel and Distributed Databases.

•It enables the students to understand the concept of Transaction Processing.

UNIT -I

RELATIONAL DATABASES 9

Integrity Constraints revisited, Extended ER diagram, Relational Algebra & Calculus, Functional, Multi valued and Join Dependency, Normal Forms, Rules about functional dependencies**.**

UNIT -II

QUERY PROCESSING AND OPTIMIZATION 9

Valuation of Relational Operations, Transformation of Relational Expressions, Indexing and Query Optimization, Limitations of Relational Data Model, Null Values and Partial Information.

UNIT- III

OBJECTED ORIENTED AND OBJECT RELATIONAL DATABASES 9

Modeling Complex Data Semantics, Specialization, Generalization, Aggregation and Association, Objects, Object Identity, Equality and Object Reference, Architecture of Object Oriented and Object Relational Databases.

UNIT- IV

PARALLEL AND DISTRIBUTED DATABASES 9

Distributed Data Storage – Fragmentation & Replication, Location and Fragment Transparency Distributed Query Processing and Optimization, Distributed Transaction Modeling and concurrency Control, Distributed Deadlock, Commit Protocols, Design of Parallel Databases, and Parallel Query Evaluation.

UNIT V

ADVANCED TRANSACTION PROCESSING 12

Nested and Multilevel Transactions, Compensating Transactions and Saga, Long Duration Transactions, Weak Levels of Consistency, Transaction Work Flows, Transaction Processing Monitors. Multimedia databases, Databases on the Web and Semi–Structured Data Case Study: Oracle10g, Oracle 11i.

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1.Dietrich, and Urban, "An Advanced Course in Database Systems", Pearson, 2008.

2.Elmarsi, Navathe, Somayajuu, Gupta, "Fundamentals of Database Systems", 4th Edition, Pearson Education, 2007.

3.Garcia, Ullman, Widom, "Database Systems, The complete book", Pearson Education, 2007.

REFERENCES:

1.Date, Kannan, Swaminathan, —"An Introduction to Database Systems", 8th Edition Pearson Education, 2007.

2.Singh S.K., "Database System Concepts, design and application", Pearson Education, 2006.

3.Silberschatz, Korth, Sudarshan, "Database System Concepts", Tata Mcgraw Hill, 6th Edition, 2006.

BCS026 HUMAN COMPUTER INTERACTION 3 0 0 3

OBJECTIVE:

The main objective of this course student must able to understand about

- The human components functions.
- The Computer components functions. .
- The Interaction between the human and computer components.
- Paradigms
- Interaction design basics
- HCI in the software process
- Design rules
- Implementation supports
- Evaluation techniques

OUTCOMES:

- Explain the human components functions regarding interaction with computer
- Explain Computer components functions regarding interaction with human
- Demonstrate Understanding of Interaction between the human and computer components.
- Use Paradigms
- Implement Interaction design basics
- Use HCI in the software process
- Apply Design rules
- Produce Implementation supports
- Use Evaluation techniques

UNIT I FOUNDATIONS OF HCI 9

The Human: I/O channels – Memory – Reasoning and problem solving; The computer: Devices – Memory – processing and networks; Interaction: Models – frameworks – Ergonomics – styles – elements – interactivity- Paradigms.

UNIT II DESIGN & SOFTWARE PROCESS 9

Interactive Design basics – process – scenarios – navigation – screen design – Iteration and prototyping. HCI in software process – software life cycle – usability engineering – Prototyping in practice – design rationale. Design rules – principles, standards, guidelines, rules. Evaluation Techniques – Universal Design.

UNIT III MODELS AND THEORIES

Cognitive models –Socio-Organizational issues and stake holder requirements –Communication and collaboration models-Hypertext, Multimedia and WWW.

UNIT IV MOBILE HCI 9

Mobile Ecosystem: Platforms, Application frameworks- Types of Mobile Applications: Widgets, Applications, Games- Mobile Information Architecture, Mobile 2.0, Mobile Design: Elements of Mobile Design, Tools.

UNIT V WEB INTERFACE DESIGN 9

Designing Web Interfaces – Drag & Drop, Direct Selection, Contextual Tools, Overlays, Inlays and Virtual Pages, Process Flow. Case Studies.

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1. Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, "Human Computer Interaction", 3rd Edition, Pearson Education, 2004.
2. Brian Fling, "Mobile Design and Development", First Edition , O'Reilly Media Inc., 2009
Bill Scott and Theresa Neil, "Designing Web Interfaces", First Edition, O'Reilly, 2009
3. Human Computer Interaction in the Millennium by Carroll, 2000

BBA014 ENTREPRENEURSHIP DEVELOPMENT 3 0 0 3

OBJECTIVES:

The course objectives are to enable students to understand Entrepreneurship Motivation and to know about types of Industries.

OUTCOMES:

- Demonstrate the ability to provide a self-analysis in the context of an entrepreneurial career
- Demonstrate the ability to find an attractive market that can be reached economically.

UNIT-I 9

INTRODUCTION TO ENTRPRENEUR

Meaning and concept of Entrepreneur - Characteristics of entrepreneur -entrepreneur and intrapreneur - Types of Entrepreneurs - Entrepreneurship factor affecting Entrepreneurial growth - Entrepreneurship motivation -Entrepreneurial competence.

UNIT-II 9

EDP Phases

Entrepreneurial Environment - role of family and society EDP - need -objectives -course contents-phases of EDP

UNIT-III 9

PROJECT MANAGEMENT

Project Management: Project identification - project selection - formulation -project evaluation - implementation- Social Cost - Benefit analysis.

UNIT-IV **9**

INDUSTRIES AND ITS TYPES

Small scale industries - definition - characteristics - objectives - scope -growth - strategies is SSIs - sickness of SSIs - Financial support to SSIs-Financial institutions TIIC , SIDCO , Export potential. DIG, SIPCOT, SISI, TIDCO rehabilitation of sick units Governments policies for SSIs and facilities provided to the SSIs

UNIT-V **9**

Sources of Finance

Financial Analysis - source of finance -capital -types of capital - capitalization and capital structure - financial feasibility - Marketing Management -Mobilization of HR - importance Human Resource in SSIs.

TOTAL NO OF PERIODS: 45

REFERENCES:

1. Khanka S. S, "Entrepreneur Development"

2. Saravanavel P, "Entrepreneur", Esspeak K. Publishing house, Chennai, 1997

3. Hisrich, "Entrepreneurship", Tata McGraw Hill, New Delhi 2001

4. Prasna Chandra, "Project Planning, Analysis selection implementation and Reviews", Tata McGraw Hill, 1996

BBA024 ENGINEERING ECONOMICS AND FINANCIAL ACCOUNTING 3 0 0 3

OBJECTIVES:

The course objectives are to enable students to understand general purpose financial statements, appreciate their limitations, and be aware of the forces that influence their content**.**

OUTCOMES:

- Recognize, read and use any of the common management accounting reports.
- Prepare, or provide the necessary information for the preparation of budgets.
- Cost current or proposed products, and know the contentious issues that will need to be addressed.

UNIT-I 9

Introduction

Introduction - economic theories and scope - demand and supply analysis -determinants of demand - law of demand - elasticity of demand - demand forecasting - demand sensitivity - price, income, gross, advertisement-law of supply - elasticity of supply - cost concepts - types - cost curves - short run and long run - break even analysis - pricing concepts - types, price 'determinations. .

UNIT-II 9

Integration and Types

Concepts - firm, industry, market, market power, market conduct, market performance. Market structure-types- perfect, monopoly, monopolistic and oligopoly competition. Manufacturing practices- diversification, vertical and horizontal integration, merger.

UNIT-III 9

Sources of Income

National income : concepts and - measurement - GNP, NNP - methods of measuring National income-inflation and deflation, unemployment.

Money-and Banking: Value-of money - banking - commercial bank and its functions, central bank and its function.New Economic environment economic systems, economic liberalization, privatization and globalization.

UN1T-IV **9**

SOURCES OF FINANCE

Introduction, Scope, Objectives, Basic financial concepts - time value of money and method of appraising project profitability - rate of return - pay back period-present value, NPV comparison-cost-benefit analysis. Source of finance - internal and external - long term and short term - securities, debentures/bonds, shares, financial institutions.

UNIT-V **9**

FINANCIAL STATEMENTS

Accounting system - financial statements - types - ledger, cash flow statement, profit and loss account, balance sheet. Ratios/Financial analysis - liquidity, leverage activity, profitability, trends analysis.

TOTAL NO OF PERIODS: 45

REFERENCE BOOKS:

1. Maheswari S. N "Management Accounting and Financial Accounting", S. Chand & Co. 2003,

2. D.N.Dwivedi, "Managerial Economics", Vikas Publishing House

3. R.R.Barthwal, "Industrial Economics", Wiley Eastern Ltd.,2005

4. G.S. Gupta, "Managerial Economics",8th edition, Tata McGraw-Hill Ltd.,2002

5. M. Y.Khan & P.K.Jain, "Basic Financial Management", Tata Mc Graw Hill Ltd, 2010.