Dr. M.G.R. Educational & Research Institute
(Deemed University)
Maduravoyal, Chennai- 600 095.
B.TECH (Computer Science & Engineering)
Admission year 2009 onwards
FULL TIME

Semester No: 3
Theory:

Old Course Code	New Course Code	Course Title	L	T	P	C
BCS201	BCS002	Data Structures & Algorithms	3	1	0	4
BCS203	BCS001	Object Oriented Programming	3	1	0	4
BMA213	BMA008	Discrete Mathematics	3	1	0	4
BCS206	BCS003	Computer Graphics & Multimedia	3	1	0	4
BEC231	BEC003	Electron devices and Circuits	3	1	0	4
BEE231	BEE005	Electrical Engineering	3	1	0	4

Practical:

BCS221	BCSL03	Data Structures Using C++	0	0	3	1
BEC241	BCSL04	Electron Devices & Circuit Lab	0	0	3	1

Subtotal: 26

Semester No: 4
Theory:

Old Course Code	New Course Code	Course Title	L	T	P	C
BCS202	BCS007	Data Base Management Systems	3	1	0	4
BCS204	BCS008	Artificial Intelligence	3	1	0	4
BCS307	BCS009	Operating System	3	0	0	3
BMA203A	BMA014	Mathematics III	3	1	0	4
BEC232	BEC008	Basic Principles of Communication	3	0	0	3
BEC234	BEC002	Digital Electronics	3	0	0	3

Practical:

BCS222	BCSL014	DBMS Lab	0	0	3	1
BEC244	BECL04	Digital Electronics Lab	0	0	3	1
BCS226	BCSL07	Audit Course –I (SOFT SKILLS – I)	0	0	3	0

Subtotal: 23

Semester No: 5
Theory:

Old Course Code	New Course Code	Course Title	L	T	P	C
BCS301		System Software	3	1	0	4
BCS303		Computer Architecture	3	1	0	4
BMA309		Mathematical & Computational Tools using MATLAB	3	0	0	4
BCS305		Advanced Java Programming Techniques	3	0	0	3
BCS309		Software Engineering	3	0	0	3
BEC333		Microprocessor and Applications	3	1	0	4

Practical:

BCS321		Operating Systems Lab	0	0	3	1
BEC341		Microprocessor and peripheral interfacing lab	0	0	3	1
BCS 323		Audit Course II (**SOFT SKILLS – II**)	0	0	3	0

SubTotal: 24

Semester No: 6
Theory:

Old Course Code	New Course Code	Course Title	L	T	P	C
BCS302		Computer Networks	3	0	0	3
BCS304		Principles of Compiler design	3	0	0	3
BCS306		Web Technology	3	0	0	3
BEC304		Fundamentals of Digital Signal Processing	3	1	0	4
BCSE11/BCSE21/ BCSE31/BCSE41/ BCSE51/BCSE61/B CSE71/BCSE81/BC SE91/BCSEA1/BCS EB1/BCSEC1/BCSE D1		Elective I	3	0	0	3

			L	T	P	C
BCSE12/BCSE22/BCSE32/BCSE4/BCSE52/BCSE62/BCSE72/BCSE82/BCSE92/BCSEA2/BCSEB2/BCSEC2/BCSED2		Elective II	3	0	0	3

Practical:

BCS322		Network Programming Lab	0	0	3	1
BCS324		System Software and Compiler Design Lab	0	0	3	1
BCS326		Value added training programme / Three Tier Application Project	0	0	3	1

SubTotal: 22(1)

Semester No: 7
 Theory:

Old Course Code	New Course Code	COURSE TITLE	L	T	P	C
BCS403		. Net Framework	3	0	0	3
BCS405		Object Oriented System Analysis and Design	3	0	0	3
BCS407		Data Mining and Warehousing	3	0	0	3
BCS409		Information storage Management	3	1	0	4
BCSE13/BCSE23/BCSE33/BCSE43/BCSE53/BCSE63/BCSE73/BCSE83/BCSE93/BCSEA3/BCSEB3/BCSEC3/BCSED3		Elective III	3	0	0	3

Old Course Code	New Course Code	COURSE TITLE	L	T	P	C
BCSE14/BCSE24/ BCSE34/BCSE44/ BCSE54/BCSE64/ BCSE74/BCSE84/ BCSE94/BCSEA4/ BCSEB4/BCSEC4/ BCSED4		Elective IV	3	0	0	3

Practical:

BCS421		. Net Lab	0	0	3	1
BCS423		Comprehension / Foreign Language Certification	0	0	0	2
BCS425		Project (Phase – I)	0	0	4	2
BCS427		Software System Development Lab with IBM Rational Rose	0	0	3	1

Subtotal: 25(2)

Semester No: 8
Theory:

Old Course Code	New Course Code	COURSE TITLE	L	T	P	C
BMG431		Entrepreneurship Development	3	0	0	3
BCSE15/BCSE25/BC SE35/BCSE45/BCSE 55/BCSE65/BCSE75/ BCSE85/BCSE95/BC SEA5/BCSEB5/BCS EC5/BCSED5		Elective V Or Special Elective –I	3	0	0	3
BCSE16/BCSE26/ BCSE36/BCSE46/ BCSE56/BCSE66/ BCSE76/BCSE86/ BCSE96//BCSEA 6/BCSEB6/BCSE C6/BCSED6		Elective VI Or Special Elective – II	3	0	0	3

Note: **Any International Value added Professional Certification can also be considered as special elective**

Practical:

BCS422		PROJECT (Phase – II)	0	0	12	6

Subtotal: 15
Total Credits: 135
From Ist year 45 credits
At the end of the course Total credits to earned is 180

B.Tech (CSE) ELECTIVES

I. DATABASE SPECIALISATION

Old Course Code	New Course Code	Course Title	L	T	P	C
BCSE11		DATABASE TUNING	3	0	0	3
BCSE12		ADVANCED KNOWLEDGE MANAGEMENT	3	0	0	3
BCSE13		INFOMETRICS	3	0	0	3
BCSE14		ENTERPRISE APPLICATION INTEGRATION	3	0	0	3
BCSE15		WEB DATA DESIGN & MANAGEMENT	3	0	0	3
BCSE16		ADVANCED DATABASES	3	0	0	3

II. NETWORKING SPECIALISATION

Old Course Code	New Course Code	Course Title	L	T	P	C
BCSE21		HIGH SPEED NETWORKS	3	0	0	3
BCSE22		TCP/IP DESIGN AND IMPLEMENTATION	3	0	0	3
BCSE23		AD-HOC NETWORKS	3	0	0	3
BCSE24		3G-NETWORKING	3	0	0	3
BCSE25		NETWORK SECURITY	3	0	0	3
BCSE26		MOBILE & PREVASIVE COMPUTING	3	0	0	3

III. JAVA AND WEB SPECIALISATION

Old Course Code	New Course Code	Course Title	L	T	P	C
BCSE31		JAVA VIRTUAL MACHINE	3	0	0	3
BCSE32		XML & WEB SERVICES	3	0	0	3
BCSE33		SERVER SIDE PROGRAMMING USING JAVA	3	0	0	3
BCSE34		ADVANCE WEB TECHNOLOGIES	3	0	0	3
BCSE35		NETWORK PROGRAMMING USING JAVA	3	0	0	3
BCSE36		SEMANTICS WEB	3	0	0	3

IV. DOMAIN SPECIALISATIONS

Old Course Code	New Course Code	Course Title	L	T	P	C
BCSE41		J2ME	3	0	0	3
BCSE42		SAP (ERP)	3	0	0	3
BCSE43		ECRM	3	0	0	3
BCSE44		EBUSINESS	3	0	0	3
BCSE45		SERVICE ORIENTED ARCHITECTURE	3	0	0	3
BCSE46		MOBILE APPLICATION DEVELOPMENT	3	0	0	3

V. VLSI & EMBEDDED SPECIALISATION

Old Course Code	New Course Code	Course Title	L	T	P	C
BCSE51		VLSI TECHNOLOGY	3	0	0	3
BCSE52		SYSTEM MODELING USING HARDWARE DESCRIPTION LANGUAGES	3	0	0	3
BCSE53		VLSI DESIGN	3	0	0	3
BCSE54		COMPUTER AIDED DESIGN OF VLSI	3	0	0	3
BCSE55		EMEDDED SYSTEM DESIGN	3	0	0	3
BCSE56		MICRO CONTROLLER ARCHITECTURE AND DESIGN	3	0	0	3

VI. BIOINFORMATICS SPECIALISATION

Old Course Code	New Course Code	Course Title	L	T	P	C
BCSE61		BASIC BIOLOGY	3	0	0	3
BCSE62		BIOLOGICAL DATABASES AND DATA ANALYSIS	3	0	0	3
BCSE63		CELL BIOLOGY AND GENETICS	3	0	0	3
BCSE64		PROGRAMMING IN PERL	3	0	0	3
BCSE65		TOOLS AND TECHNIQUES FOR BIOLOGICAL DATA MINING	3	0	0	3
BCSE66		ADVANCE TECHNIQUES FOR SEQUENCE AND STRUCTURE ANALYSIS	3	0	0	3

VII. DIGITAL IMAGE PROCESSING SPECIALISATION

Old Course Code	New Course Code	Course Title	L	T	P	C
BCSE71		DIGITAL IMAGE PROCESSING	3	0	0	3
BCSE72		PATTERN RECOGNITION	3	0	0	3
BCSE73		MEDICAL IMAGING TECHNIQUES	3	0	0	3
BCSE74		DIGITAL IMAGE PROCESSING ALGORITHMS	3	0	0	3
BCSE75		INTELLIGENT IMAGE DATABASES	3	0	0	3
BCSE76		GEOGRAPHICAL INFORMATION SYSTEM	3	0	0	3

VIII..RESEARCH SPECIALISATION

Old Course Code	New Course Code	Course Title	L	T	P	C
BCSE81		SOFTWARE AGENTS	3	0	0	3
BCSE82		FUZZY SET THORY AND APPLICATIONS	3	0	0	3
BCSE83		PARALLEL ALGORITHMS	3	0	0	3
BCSE84		SPEECH PROCESSING	3	0	0	3
BCSE85		SOFT COMPUTING	3	0	0	3
BCSE86		MACHINE LEARNING	3	0	0	3

IX. SOFTWARE ENGINEERING SPECIALISATION

Old Course Code	New Course Code	Course Title	L	T	P	C
BCSE91		SOFTWARE ARCHITECTURE	3	0	0	3
BCSE92		SOFTWARE DESIGN	3	0	0	3
*BCSE93		SOFTWARE QUALITY AND TESTING	3	0	0	3
BCSE94		SOFTWARE METRICS	3	0	0	3
BCSE95		RISK MANAGEMENT	3	0	0	3
BCSE96		SECURITY PRINCIPLES AND PRACTICES	3	0	0	3

*BCSE93 is the equivalent of BCS401offered as per the previous syllabus

X. OS SPECIALISATION

Old Course Code	New Course Code	Course Title	L	T	P	C
BCSEA1		UNIX INTERNALS	3	0	0	3
BCSEA2		DISTRIBUTED COMPUTING	3	0	0	3
BCSEA3		REAL TIME SYSTEM DESIGN	3	0	0	3
BCSEA4		ADVANCED OPERATING SYSTEM	3	0	0	3
BCSEA5		PARELLEL PROCESSING	3	0	0	3
BCSEA6		FAULT TOLERANCE SYSTEM	3	0	0	3

XI.COMPUTATIONAL THEORY SPECIALISATION

Old Course Code	New Course Code	Course Title	L	T	P	C
BCSEB1		DESIGN OF ALGORITHMS	3	0	0	3
BCSEB2		NUMERICAL & STATISTICAL METHODS	3	0	0	3
BCSEB3		THEORY OF COMPUTATION	3	0	0	3
BCSEB4		ALGORTHIMICGRAPH THEORY	3	0	0	3
BCSEB5		PRINCIPLES OF PROGRAMMING LANGUAGES	3	0	0	3
BCSEB6		NATURAL LANGUAGE PROCESSING	3	0	0	3

XII.HARDWARE SPECIALISATION

Old Course Code	New Course Code	Course Title	L	T	P	C
BCSEC1		HIGH PERFOMANCE MICROPROCESSOR	3	0	0	3
BCSEC2		COMPUTER PERIPHERALS AND INTERFACING	3	0	0	3
BCSEC3		ROBOTICS	3	0	0	3
BCSEC4		MULTI CORE ARCHITECTURE AND PROGRAMMING	3	0	0	3
BCSEC5		SPECIAL ELECTIVE – I	3	0	0	3
BCSEC6		SPECIAL ELECTIVE – II	3	0	0	3

XIII.MIS SPECIALISATION

Old Course Code	New Course Code	Course Title	L	T	P	C
BCSED1		DECISION SUPPORT SYSTEM	3	0	0	3
BCSED2		MANAGEMENT INFORMATION SYSTEMS	3	0	0	3
BCSED3		MAINFRAME COMPUTING	3	0	0	3
BCSED4		E – COMMERCE	3	0	0	3
BCSED5		TOTAL QUALITY MANAGEMENT	3	0	0	3
BCSED6		MAN MACHINE INTERFACE	3	0	0	3

BCS201	DATA STRUCTURES AND ALGORITHMS	3	1	0	4

Unit I   Linear Data Structures   9   3   0
Stacks, Queues & Lists Implementation and Applications, Singly linked list-Doubly linked lists.

Unit II   Nonlinear Data Structures   9   3   0
Trees – Binary Trees – Binary Search Tree – Tree Traversals – AVL Trees

Unit III   Algorithm Analysis   9   3   0
 Sorting and searching –space complexity-time complexity-Big Oh-Binary Searching-analysis-Quick sort-Heap sort-Merge sort-Analysis

Unit IV   Graph algorithms   9   3   0
Graph operations-DFS-BFS-Minimum cost spanning tree-Krushkal's algorithm-Prim's Algorithm

Unit V   Algorithm Design Methods   9   3   0
Greedy method – Shortest path – Divide and Conquer –Matrix multiplication-Dynamic programming-Back tracking –Traveling Sales person problem.

Text Book:

1. E. Horowitz, S. Sahani & Mehta, "*Fundamentals of Data Structures in C++*", Galgotia 2007.

References:

1) Weiss Mark Allen, "*Data Structures and Algorithm Analysis in C*", Pearson Education, 3/e 2004.
2) E.Horowitz, Sahni & Sanguthevar Rajasekaran, "*Fundamentals of Computer Algorithms*", Galgotia Publications, 2004
3) Jean-Paul Tremblay, Paul G. Sorenson, "An Introduction to Data Structures with Applications", Tata McGraw-Hill, 2nd Edition, (2007)
4) Sara Baase & Allen Van Gelder, "*Computer Algorithms*" Galgotia 2000.

BCS203	OBJECT ORIENTED PROGRAMMING	3	1	0	4

Unit I   INTRODUCTION   9   3   0
Programming methodologies-Comparison-Object Oriented concepts-Basics of C++
environment.

Unit II   CLASSES   9   3   0
Definition-Data members-Function members-Access specifiers-Constructors-Default
constructors-Copy constructors-Destructors-Static members-This pointer-Constant members-
Free store operators-Control statements

Unit III INHERITANCE AND POLYMORPHISM   9   3   0
Overloading operators-Functions-Friends-Class derivation-Virtual functions-Abstract base
classes-Multiple inheritance. Microsoft Foundation Class Libraries

Unit IV   TEMPLATES   9   3   0
Class templates-Function templates-Exception handling-Streams.

Unit V JAVA PROGRAMMING   9   3   0
Java environment-Classes-Definition-Fields-Methods-Object creation-Constructors-
Overloading methods-Static members-This keyword-Nested classes-Extending classes-
Inheritance-member accessibility-Overriding methods-Abstract classes-Interfaces.

Text Books:
1. Stanley B.Lippman, "The C++ Primer" Pearson Education, 4th edition 2005.
2. H.M.Deitel and P.E.Deitel, "Java How to Program", Pearson Education, 5th edition 2003.

References:
1. Deitel and Deitel, "C++ How to Program" Pearson Education, 4th edition 2000.
2. N.Barkakati, "Object Oriented Programming in C++", Prentice Hall of India Pvt.Ltd, 1997.
3. Ken Arnold and James Gosling, "The Java Programming Language with updated 1.3",
Pearson Education 2000.
4. B.Stroustrup,"The C++ Programming Language", 3rd Edition, Pearson Education, 2004.
5. E.Balagurusamy "Object Oriented Programming with C++"-fourth Edition."Tata Mcgraw
Hill", 2008.

BMA213	DISCRETE MATHEMATICS	3	1	0	4

Unit I   Logic   9 3 0

Statements – Truth tables – Connectives – Normal forms – Predicate calculus – Inference theory for statement calculus and predicate calculus.

Unit II   Combinatorics   9 3 0

Review of Permutations and combinations – Mathematical Induction – Pigeonhole principle – Principle of inclusion and exclusion – Generating functions – Recurrence relations.

Unit III   Groups   9 3 0

Semigroups – Monoids – Groups – Permutation Groups – Cosets – Lagrange's Theorem – Group homomorphism – Kernal – Rings and Fields (Definitions and Examples only).

Unit IV   Lattices   9 3 0

Partial ordering – Posets – Hasse diagram – Lattices – Properties of lattices – Sub lattices – Special lattice – Boolean algebra.

Unit V   Graphs   9 3 0

Introduction to Graphs – Graph terminology – Representation of Graphs – Graph Isomorphism – Connectivity – Euler and Hamilton paths.

Text Book:
1.S.P. Tremblay & R.Manohar, "Discrete Mathematical Structure with Applications to Computer Science", McGraw Hill Co., 1975, 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; 1-5.1 to 1-5.5; 1-6.4 to 1-6.5 For Logic, Sections 3-1.1 to 3-2.3

Reference:
1. Alan Doer and Kenneth Levassenr," Applied Discrete Structures for Computer Science", Galgotia Publications (p) Ltd.(1986).
2. Seymour Lipschutz, & Marc Larslipson,"Discrete Mathematics", McGraw Hill Inc., New Delhi(1992)
3. Kolman, Busby & Ross, "Discrete Mathematical Structures for Computer Science", 2nd Edition, Pearson Education (1987)

BCS205	COMPUTER GRAPHICS AND MULTIMEDIA	3	1	0	4

Unit I Introduction   9   3   0

Overview of graphics system-Video display devices-Raster scan system-Random scan system-Graphics monitor and workstation –Input devices-Hard copied devices-Graphic software-Output primitives-Line drawing algorithms-Loading the frame buffer-Line function-Circle generation-Ellipse generation-curves-Filled area primitives.

Unit II Transformation   9   3   0

Attributes of output primitives-Line attributes-Curve attributes-Color and gray scale levels-Area fill attributes-Character attributes-Bundled attributes-Inquiry functions-Antialaising-Two dimensional transformation-Basic transformation-Matrix representations-Composite transformations-Other transformations-Affine transformation-Raster method for transformation.

Unit 1II Clipping & Windowing   9   3   0

Viewing pipeline-Coordinate reference frame-Window to view port transformation-Two dimensional viewing functions-Clipping operations-Point clipping-Line clipping-Polygon clipping-Curve clipping-Text clipping-Exterior clipping.

Unit 1V Three Dimensional Concept   9   3   0

Three-dimensional display methods-Parallel projection-Perspective projection-Depth cueing-Visible line surface identification-Surface rendering-Exploded and cut away views-Three dimensional and stereoscopic views-Three dimensional graphics package.

Unit V Multimedia System   9   3   0

Introduction- Multimedia applications-Multimedia system architecture-Objects for multimedia systems. Compression and decompression-Types of compression-Binary image compression schemes-JPEG/MPEG

Textbook:
1. Donald Hearn, M.Pauline Baker, "Computer graphics", 3rd edition, Pearson Education,2003.
2. Koegel Buford JFK, Multimedia Systems,5th edition , Pearson Education,2009

Reference:
1. Foley J.D., Van Dam A, Fiener S.K. and Hughes J.F., "Computer Graphics", 2nd edition, Pearson Education, 1996.2.Anirban Mukhopadhyay, Arup Chattopadhyay, "Introduction to Computer Graphics", Vikas Publication House, 2003
2. Zhigang Xiang, Roy Plastock, "Computer Graphics", 2nd Edition, McGraw Hill, 2003

BEC231	ELECTRON DEVICES AND CIRCUITS	3	1	0	4

Unit I   Semiconductor devices   9 3 0

  Semiconductor-Materials-PN-Junctiondiode-BJT-FET-VICharacteristics-Rectifiers-Zenerdiode-Voltage regulators

Unit II Amplifiers   9 3 0

Transistor biasing-self biasing-DC and AC analysis of CE, CB and CC. Amplifiers, Current gain, voltage gain-frequency response-power amplifiers

Unit III Feed Back Amplifiers and Oscillators   9 3 0

Negative feedback-Effect-Types-positive feedback-Berkhausen criteria-Oscillators-RC Phase shift-Wein Bridge-Hartley-Collpit's –analysis

Unit IV Operational Amplifier and Applications   9 3 0

Operational amplifier Ideal characteristics-Applications-Current to voltage, Voltage to current converters, Arithmeticcircuitc-Adder, Subtractor, Multiplier, Differentiator and Integrator. Inverting and Non-inverting amplifiers-Buffer

Unit V Mulivibrators and Timers   9 3 0

555 Timer-Block diagram-Monostable-Bistable and Astable, multivibrator using 555

Text Book:

1. Floyd, "Electronic Device"-Pearson Education–6th edition 2003

2. David A. Bell "Electronic Devices and Circuits", Prentice Hall of India

References:

1. Milman and Halkias "Integrated Electronic", TMH, 1985

2.Boyle stad Nashelsky, "Electronic Devices and Circuit theory", PHI

BEE231	ELECTRICAL ENGINEERING	3	1	0	4

Unit 1 DC CIRCUITS 9 3 0

Introduction - v-i relationships of circuit parameters – Voltage source and current source - Kirchhoff's laws – Network reduction techniques – Mesh and Node analysis – Superposition theorem – Thevenin's theorem – Norton's Theorem – Maximum power transfer theorem.

Unit II AC CIRCUITS 9 3 0

RMS and average values of periodic waves – form factor – phase and phase difference – RL, RC, RLC circuits – Parallel circuits – power and power factor – Introduction to three phase system – solution of balanced three phase circuits – power measurement of 3-phase system.

Unit III DC MACHINES 9 3 0

Construction details of DC machines – principle of operation of DC generator – EMF equation – Characteristics of DC generators – Principle of DC motor –Back EMF – Torque equation – Characteristics shunt, series and compound motors - Losses and efficiency – Starters – Speed control – applications.

Unit IV   TRANSFORMERS 9 3 0

Principle of ideal transformer – constructional details – EMF equation – Equivalent circuit – Voltage regulation – losses and efficiency – OC and SC tests on transformer – Autotransformer – Power supplies - basic principle of SMPS and UPS.

Unit V SYNCHRONOUS MACHINES AND INDUCTION MOTORS   9 3 0

Construction details – principle of alternator – EMF equation – Voltage regulation – EMF method - Starting of synchronous motor – effect of field excitation – V-curves. Induction motor – principle of operation – torque equation – torque-slip characteristics – Starting methods and sped

Text Books:
   1**.** S.K Bhattacharya, "Electrical Machines", Tata Mc Graw Hill Publications.
   2. Sudhakar & Shyammohan "Circuits & Networks Analysis & Synthesis"
  Tata McGraw – Hill, 2001.

Reference Books:
 1. J.A.Edminister, "Theory And Problems On Electric Circuits" Mc Graw Hill
        Publications, 1994.
 2. I.J. Nagrath & D.P. Kothari, "Electrical Machines", TMH Publications.
 3."Hughes Electrical Technology", Revised by I McKenzie Smith, Low price Edition,
 Pearson Education, Seventh edition.

BCS221	DATA STRUCTURE USING C++	0	0	3	1

1. Implementation Of Stack using arrays and pointers
2. Implementation Of Queue using arrays and pointers
3. Implementation of Circular Queue (Using Arrays)
4. Single Linked List
5. Circular Linked List
6. Doubly Linked List
7. Evaluation Of Expressions
8. Binary Tree Implementations And Traversals
9. Binary Search Trees
10. Quick Sort And Heap Sort

BEC241	ELECTRON DEVICES AND CIRCUITS LAB	0	0	3	1

1. PN junction diode-VI characteristics

2. Zener Diode -Regulator

3. Rectifiers-HWR FWR

4. I/P & O/P of characteristics CE

5. RC coupled amplifier frequency response with and without feedback

6. Operational Amplifier-Applications

   Adder

   Subtractor

   Inverting amplifier

   Non-inverting amplifier

   Buffer

   Integrator

7. Wein Bridge Oscillator

8. Astable Multivibrator using 555 timer

BCS202	DATABASE MANAGEMENT SYSTEM	3	1	0	4

Unit 1   Introduction   9   3   0
Definition -Need for a DBMS-Uses of DBMS- Advantages and disadvantages of DBMS
Database and database users- view of data –Architecture-data models-data dictionary –
database languages

Unit II   Relational approach   9   3   0
Relational model-Structure of a relational database-Relational algebra- Tuple relational
calculus-Domain relational calculus-SQL-Embedded SQL-Query languages

Unit III   Relational database design   9   3   0
Relational database design-Integrity constraint-Pitfalls and design –Functional dependency-
Normalization-Entity relationship model-Storage and file structure-Indexing and hashing-
Basic concepts-B^+ tree index file-B tree index file-Static hashing –Dynamic hashing

Unit IV   Object Oriented Relational Database Technology   9   3   0
  Concepts for Object oriented data model – Object oriented database Languages -Persistent
programming language-Object relational Databases.
System Implementation techniques:
Query processing-Transaction processing-Concurrency control-Recovery system

Unit V   Enhanced Data models for advanced applications   9   3   0
Database system architecture- Client server system-centralized systems—parallel systems-
Distributed system-distributed databases.

Textbook:

1. Abraham Silberschatz, Henry F.korth, S.Sudharshan, "Database system concepts" 4th
   Edition, Tata McGraw-Hill, 1997

References:
1. Ramez Elmasri, Shamkant B.Navathe, "Fundamentals of database systems", 3th edition
Pearson Education-2003.
2. Raghu Ramakrishnan, "Database Management Systems", Tata McGraw- Hill Publishing
Company,2003.
3. Hector Garcia-Molina, Jeffrey D.Ullman and Jennier Widom-"Database system
Implementation"- Pearson Education-2000.
4. Peter Rob and Corlos Coronel-" Database System, Design, Implementation and
Management", Thompson Learning Course Technology- 5th edition,2003.

BCS204	ARTIFICIAL INTELLIGENCE	3	1	0	4

Unit I Introduction   9   3   0

Introduction to artificial intelligence-foundations of AI-history of AI-agents and environments-Structure of intelligent agents

Unit II Problem solving   9   3   0

        Problem solving by searching-problem solving agent-example problems-searching for solutions-informed search strategies-Best first search-heuristic functions-memory bounded search iterative improvement algorithms- game playing –introduction-perfect decision in two person games-imperfect decisions-alpha –beta pruning-back tracking

 Unit III   Knowledge Representation   9   3   0

        Knowledge and reasoning-logical agents-the Wumpus problem-logic –prepositional logic-reasoning patterns-prepositional inference-agent based on prepositional logic-first order logic-syntax and semantics-using first order logic-knowledge engineering in first order logic-inference in first order logic-forward chaining-backward chaining-resolution

Unit IV Planning   9   3   0

        Planning-the planning problem-planning with state space search-partial order planning-planning and acting –simple re-planning agent-fully integrated planning and execution

Unit V Reasoning with incomplete and uncertain knowledge 9   3   0

     Uncertain knowledge and reasoning--acting under uncertainty-basic probability notations-the axioms of probability-inference using full joint distribution-Bayes rule-probabilistic reasoning-knowledge in uncertain domain-Bayesian networks-inference in Bayesian networks-making simple decisions-making complex decisions

Textbook:
1. Stuart Russel, Peter Norving,"Artificial Intelligence A modern Approach", Pearson education, 2nd edition 2004.

Reference:

1. Artificial Intelligence, A System Approach(Computer Science) By M . Tim Jones 2008.
2. S.Bhattachaya;F.Smarandache "Artificial Intelligence and Responsive Optimization", 2nd edition, 2003.
3. Gerhard Lakemeyer; Bernhard Nebel," Exploring Artificial Intelligence in the New Millenium" M. Kaufmann, 2003.
4. Ben Coppin," Artificial intelligence illuminated", ones and Bartlett, 2004.

BCS307	OPERATING SYSTEM	3	0	0	3

Unit I Introduction   9   0   0

Mainframe systems – Desktop systems – Multiprocessor systems - Distributed systems – Cluster Systems – Real time systems-Hardware Protection-System Components-Handheld Systems-Operating System Services-System Calls-System Programs-System Structure-Visual Machines-System Design and Implementation.

Unit II Process Management   9   0   0

Process concept-Process Scheduling-Operation on Process-Cooperating Processes-InterProcess Communication-Threads-Overview-Multithreading Models. CPU Scheduling-Basic Concepts-Scheduling Criteria-Scheduling Algorithms-Multiple-Processor Scheduling-Real Time Scheduling-Algorithm Evaluation

Unit III Synchronization and Deadlocks   9   0   0

Process Synchronization-The Critical Section Problem-Synchronization Hardware-Semaphores-Classical Problems Of Synchronization-Deadlocks-System Model-Deadlock Characterization-Methods Of Handling Deadlocks-Deadlock Prevention-Deadlock Avoidance-Deadlock Detection-Recovery form Deadlock.

Unit IV Memory Management: 9   0   0

Background-Swapping-Contiguous Memory Allocation - Virtual Memory – Address Translation – Paging – Segmentation – Segmentation with Paging. - Static Paging Algorithm – Dynamic Paging Algorithm

Unit V   Files and Secondary storage Management: 9   0   0

File Systems – File Concepts – Access Methods – Directory Structure – File System Mounting – File Sharing – Protection – File System Structure – File System Implementation – Recovery – Disk Structure – Disk Scheduling – Disk Management

Text Book:
1. Silberschatz, Galvin, GAGNE "Operating System Concepts" 7th Edition John Wiley & Sons INC, 2006.

References:
1. D.M.Dhamdhere, "Operating Systems:A Concept based Approach", Tata McGraw Hill, 2007
2. Charles Crowley, "Operating Systems: A Design Oriented Approach", Tata McGraw Hill 2000.
3. Andrew S. Tanenbaum, "Modern Operating Systems", Prentice Hall of India, 2008.
4. William Stallings, "Operating Systems",5 th edition Prentice Hall of India, 2004.

BMA203A	MATHEMATICS III	3	1	0	4

UNIT I 930
Partial Differential Equations
Formation-Solutions of standard type of first order equations – Lagrange's equation – Linear partial differential equations of second and higher order with constant co-efficient.

UNIT II 930
Fourier Series
Dirichlet's conditions – General Fourier series – Half range sine and cosine series parseval's identity – Complex form of Fourier series – Harmonic analysis.

UNIT III 930
Fourier Transforms
Statement of Fourier integral theorem – Fourier transform pairs – Fourier sine and Cosine transforms – Properties – Transform of simple functions – Convolution theorem – Parseval's Identity.

UNIT IV 930
Laplace Transforms
Transforms of simple functions – properties – Transforms of derivatives and integrals – Initial and final value theorems – Inverse transforms – Convolution theorem – Periodic functions – Applications – linear ordinary differential equations – Integral Equations.

UNIT V 930
Theory of Sampling and Tests of Hypothesis
Theory of sampling – Types of sampling – Random – Stratified – Systematic – Test of hypothesis – Large sample – Test of significance – proportion – Difference of proportions – single mean – and variances, small sample – Students 't' test – single mean – Difference of means – Paired 't' test – F's test – Difference of variance, exact. Sample – Chi – Square test - Goodness of fit – Independence of attributes.

TEXT BOOKS:
1) P. Kandaswamy, K. Thilakavathy and K. Gunavathy, Engineering Mathematics Vol II & III (4th Revised Edn.) –s. Chand & Co Publishers – (1998).
2) B.S. Grewal, Higher Engineering Mathematics (35th Edn.) – Khanna Publishers Delhi (2000).

REFERNCWE BOOKS:
1) E.Kreyszig: Advanced Engineering Mathematics (8th Edn.) – John Wiley and Sons (Asia) Pvt. Ltd., Singapore (2001)
2) S.Narayanan, T.K. Manikavachagam Pillai, and G. Ramanaiah – Advanced Mathematics for Engineering studies – Vol II & III
3) M.K. Venkatraman, Engineering Mathematics – Volume III – A & B National Publishing company, Chennai (13th Edn.),(1998).

BEC232	BASIC PRINCIPLES OF COMMUNICATION	3	0	0	3

UNIT – I   **9 0 0**

Signals – Type – analog, digital – Spectrum – telecommunication services – Transmission path – Noise in communication system – Internal – External – Noise Figure

UNIT – II   **9 0 0**

Modulation Systems – Basic principles – Amplitude Modulation – Concept – Power & Band Width consideration – frequency modulation - Principle – Power & Band Width consideration – Noise in AM & FM – Phase Modulation

UNIT – III   **9 0 0**

Radio communication – AM Transmitters Receiver – FM Transmitter – Receiver – Performance measurement

UNIT – IV   **9 0 0**

Digital communication Advantages – basic block diagram – sampling Theorem – Quantization – PCM – DPCM – Delta modulation – ADM – Applications.

UNIT – V   **9 0 0**

Error control coding – Relational, types – Linear block Codes – Cyclic codes – memory codes – simple problems.

TEXT BOOKS:
1. Anokh Singh "Principles of Communication", S.Chand & Co. 2002.
2. Sanjay Sharma "Analog communication systems" Karthic & Sons, 2002.
3. Simon Haykins, "Principles of Communication", PHI, 1990.

REFERENCES:

1. B.P. Lathi, "Analog and Digital Communication Systems", PHI, 1992.
2. Taub & Schilling, "Principles of Communication", Tata McGraw Hill Publications, 1990.
3. A.B. Carlson, "Communication Systems", McGraw Hill, 1992.

BEC234	DIGITAL ELECTRONICS	3	0	0	3

Unit I Number systems   9 0 0

Review of binary, octal and hexadecimal number systems – conversions; Binary Arithmetic – signed magnitude form – 1's, 2's   complement representation. Codes: - BCD, | Ex-3|, Grey codes, ASCII Codes, Error detecting codes (Hamming code)

Unit II Boolean Algebra   9 0 0

Boolean algebra – De Morgan's law - Simplifications of Boolean expression – Sum of products and product of sums – Karnaugh Map – Quince McClusky method of simplification (Including Don't care conditions)

Unit III Combinational logic   9 0 0

Logic gates – AND, OR, NOT, NOR, NAND and EX-OR – combinational logic- Arithmetic circuits – Half adder – Full adder, Half Subtractor - Decimal Adder – Excess 3 adder – Code converters – Multiplexer – Demultiplexer- Encoder – decoder – Design of any general combinational logic circuit.

Unit IV Sequential logic design   9 0 0

Building blocks of sequential logic-RS, JK, Master-Slave, D and T flip-flop, Asynchronous and synchronous counters - Binary and BCD counters - Shift registers – Basic models of sequential machines – concept of state diagram – state table – state reduction – Design and implementation of synchronous sequential circuits

Unit V Logic families   9 0 0

Characteristics of RTL, DTL, TTL, families – Schottky, clamped TTL, ECL, IIL – Mos Inverters – complementary Mos inverters

Text Books:

1. MORIS MANO: Digital Logic & Computer Design, Pearson Education, 2nd edition 2001
2. Fundamentals of Logic Design – IVth edition – Charles H.Roth, Jr. – Jaico Publications.

References:

1. FLOYD: Digital Fundamentals, Universal Book Stall, New Delhi.1993
2. ALBERT PAUL, MALVINO AND DONALD P LEACH: Digital principles and Applications. Mc Graw Hill publications, 2003.
3. Ronald J. TOCCI: "Digital Systems Principles and Applications" 6th edition, PHI, 1997.

BCS222	DBMS LAB	0	0	3	1

I Program to learn DDL and DML commands

1. Creating a database, simple queries

2. Use of select statements for queries

       A. AND, OR, NOT operations

       B. Union intersection and join operations

3. Sorting and grouping

4. Nested queries using SQL

5. Built in functions in SQL

6. Update operations using SQL.

7. Use of index, creating views and querying in views

II Program to learn PL/SQL

  a.   To create a cursor and work on that.

  b.   To create PL/SQL code for Exception.

  c.   To create PL/SQL code using control statement.

  d.   To create PL/SQL code using sub programs.

III Visual Basic

Program to develop an application for

  a.   Pay-roll processing

  b.   Student evaluation system.

  c.   Computerized quiz

  d.   Income tax calculation

  e.   Election processing system.

BEC244	DIGITAL ELECTRONICS LAB	0	0	3	1

1. Verification of Truth tables of Logic Gates

2. Characteristics of digital Logic families

3. Implementation of Boolean function

4. Adders / Subtractors

5. Multiplexers / Demultiplexers

6. Encoder / Decoders

7. Implementation of any general combinational logic circuit

8. Study of Flip – Flops

9. Study of Registers

10. Study of Counters

11. Implementation of any general sequential logic circuits

12. A to D Converters

BEC226	Audit Course – I (SOFT SKILLS - I)	0	0	3	1

UNIT	TOPICS COVERED

UNIT I - Self Management

Goal setting
Stress management
Time management

Personal Effectiveness
Personal Productivity
Work Organization
Goal setting
Assertiveness
Stress management
Time Management

UNIT II - Creativity

Creativity
Innovation
Problem solving
Lateral thinking

Creativity
Innovation
Problem solving
Communication
Active listening
Questioning
Lateral Thinking

UNIT III - Communication

Effective Presentation
Active Listening
Questioning & Answering
Body Language
Group Discussion

Verbal communication
Interviewing
Group discussions
Presentation
Written communication
Non-verbal communication
Telephone skills

UNIT IV – Interpersonal / Teamwork

Assertiveness
Cultural Diversity
Negotiation
Customer Orientation
Building and Leading teams

Negotiation
Diversity
Conflict management
Communication
Communication
Feedback skills
Lead teams
Motivate self and others
Build and work in teams

UNIT V – Leadership

Delegation
Influencing
Counseling
Giving Feedback

Lead and manage teams
Plan and organize work
Delegation
Communication
Influence and motivate
Coach and Counsel

BCS301	SYSTEM SOFTWARE	3	1	0	4

Unit I   INTRODUCTION   9   3   0
Basic concepts-Machine structure- Instruction formats – Addressing modes – Typical   Architectures.

Unit II   ASSEMBLERS   9   3   0
Functions – features – Machine dependent – Machine independent, Design options – OnePass – Multipass – Implementation – Examples.

Unit III   LOADERS   and LINKERS   9   3   0

Functions – Features – Relocation – Program Linking – Linking Loader Implementation Automatic library search – Loader option – Linkage editors – Dynamic linking – Bootstrap loaders – Examples.

Unit IV   MACROPROCESSORS   9   3   0

Functions – Macro parameters – Using labels – conditional macro expansion – Recursive Macro expansion – General purpose macro processors – Examples.

Unit V   COMPILERS and UTILITIES   9   3   0

Introduction to Compilers – Different phases of a compiler – Simple One pass Compiler, Code optimization techniques, System software tools, Implementation of editors – Debuggers.

Text Book:
1. L. Beck. "System Software, an Introduction to System Programming", Pearson Education ,3rd Edition 2008

Reference:
1. John R. Levine, "Linkers & Loaders", Morgan Kauffman, 2003.
2 .A.V. Aho, Ravi Sethi ,Monica.s, J.D. Ullman. "Compilers Principles, Techniques and Tools", Addison Wesley ,2nd Edition 2007
3.D.M. Dhamdhere "Systems Programming And Operating Systems", Tata McGraw Hill, 2nd. Revised Edition, 2002
4. Silberschatz, Galvin, Gagne, "Operating System Concepts", 6th ed., Wiley, 2003.
5. Donovan ,"Programming and Operating System,2/e:Operating Systems: A Concept based approach "Tata McGraw Hill Publishing company 2001.

BCS303	COMPUTER ARCHITECTURE	3	1	0	4

Unit 1   INTRODUCTION   9 3 0

Basic structure of Computer Hardware-Von-Neumann Architecture-Functional units-Instruction formats and types-Addressing modes. RISC Vs CISC

Unit II   ARITHMETIC AND LOGIC UNIT   9 3 0

Fixed point arithmetic operation-addition, subtraction, multiplication, division-Floating point arithmetic operation-Design of ALU-Bit-slice processors.

Unit III PROCESSOR UNIT   9 3 0

Data path implementation-Control unit-hardwired control, micro programmed control, nanoprogramming- Concepts of pipelining. Pipeline hazards

Unit IV MEMORY SYSTEM   9 3 0

Memory hierarchy-Internal organization of RAM, ROM, Interleaved memory-Cache and associative memories-Virtual memory. Memory organization and cache_coherence issues

Unit V INPUT/OUTPUT AND PERIPHERALS   9 3 0

Basic concepts-programmed I/O-Interrupts and DMA-I/O processors-input devices-display devices-printers magnetic disk drives-optical drives. SCSI

Text Books:
1.   Hayes," Computer Architecture and Organization",Tata McGraw Hill,2004
2.   Hennessey & Pateterson, "Computer Architecture A Quantitative Approach", Harcourt Asia, Morgan Kaufmann, 3rd Edition 2003

References:
1. Heuring V.P., Jordan H.F., "Computer System Design and Architecture", Addison Wesley,2004.
2. Carl Hamacher V., Zvonko G.Vranesic, Safwat G. Zaky, "Computer organization", Tata McGraw Hill, Fifth Edition.
3.Morris Mano,"Computer System Architecture", PHI- 3rd Edition, 2004

BCS305	ADVANCED JAVA PROGRAMMING TECHNIQUES	3	0	0	3

UNIT I JAVA BASICS REVIEW   9 0 0

Java Streaming - Components and Events Handling - Threading Concepts - Networking Features - Byte Code Interpretation - Media Techniques.

UNIT II ADVANCED NETWORKING AND BEANS   9 0 0

Client-Server computing - Sockets - Content Protocols - Handlers - Developing Distributed Applications - RMI - Remote Objects – Object Serialization - Bean Concepts - Events in Bean Box - Bean customization and persistence.

UNIT III JAVA DATABASE PROGRAMMING   9 0 0

Connecting to Databases - JDBC principles - Databases access - Interacting - Database Search - Accessing Multimedia Databases – Database Support in Web applications.

UNIT IV WEB BASED JAVA   9 0 0

Servlets, EJB.JBuilder, JNI, Struts

UNIT V RELATED JAVA TECHNIQUES   9 0 0

3D Graphics - JAR File Format and Creation - Internationalization - AWT/Swing Programming - Advanced Java Scripting Techniques.

Text books:
1. J2EE, " Complete Reference" , by Herbert Schildt,2007.
2. George Reese,"Java Database best practices" by O'Reilly & Associates, 2003.
3. Jame Jaworski "Java Unleashed", SAMS Tech media Publications, 1999.

References:
1. Chuck Cavaness,"Programming Jakarta Struts",by O'Reilly Media,2004.
2. Campione, Walrath and Huml "The Java Tutorial", Addison Wesley 2001.
3. Duane A .Bailey,"Java Structures", McGraw-Hill publications 2001.
4. Jeff Frentzen and Sobotka, "Java Script", Tata McGraw Hill 1999.

BMA309	MATHEMATICAL and COMPUTATIONAL TOOLS USING MATLAB	3	1	0	4

Unit – I: Introduction to MATLAB® and Its Graphics Capabilities 9

Getting Started - Basic Algebraic Operations and Functions - Plotting Points - Axes - Commands
Labeling a Graph - Plotting a Point in 3-D - M-files - MATLAB Simple Programming - Iterative Loops - If-Else-End Structures - Array Operations - Curve and Surface Plotting - *x-y* Parametric Plot - More Parametric Plots in 2-D - Printing and Saving Work in MATLAB - MATLAB Commands Review

Unit – II: Elementary Functions and Some of Their Uses 9

Function Files - Examples with Affine Functions - Examples with Quadratic Functions - Examples with Polynomial Functions - Examples with Trigonometric Functions - Examples with the Logarithmic Function - Ideal Coaxial Capacitor - The Decibel Scale –Examples with the Exponential Function - Commonly Used Signal Processing Functions - MATLAB Commands Review

Unit – III: Numerical Differentiation, Integration, and Solutions of Ordinary Differential Equations 6

Limits of Indeterminate Forms - Derivative of a Function - Infinite Sums - Numerical Integration
A Better Numerical Differentiator - A Better Numerical Integrator: Simpson's Rule - Numerical Solutions of Ordinary Differential Equations - First-Order Iterator - The Runge-Kutta Method* - MATLAB ODE Solvers - MATLAB Commands Review

Unit – IV: Matrices 12

Setting up Matrices - Creating Matrices in MATLAB - Adding Matrices - Multiplying a Matrix by a Scalar - Multiplying Matrices - Inverse of a Matrix - Solving a System of Linear Equations - Application of Matrix Methods - Reconstructing a Function from Its Fourier Components
Interpolating the Coefficients of an (n – 1)-degree - Polynomial from n Points - Eigenvalues and Eigenvectors* - Finding the Eigenvalues of a Matrix - Finding the Eigenvalues and Eigenvectors Using MATLAB - The Cayley-Hamilton and Other Analytical Techniques* - Cayley-Hamilton Theorem - Solution of Equations of the Form - Solution of Equations of the Form - Pauli Spinors - Special Classes of Matrices* - Unitary Matrices - Unimodular Matrices - MATLAB Commands Review

Unit – V: A Taste of Probability Theory 9

Introduction – Basics - Addition Laws for Probabilities - Conditional Probability - Total Probability and Bayes Theorems - Repeated Trials - Generalization of Bernoulli Trials - The Poisson and the Normal Distributions - The Poisson Distribution – The Normal Distribution

Total=45

Text Book:

1." MATLAB and its Applications in Engineering" by Raj Kumar Bansal , Ashok Kumar Sharma , Manoj Kumar Sharma, Pearson Education 2009 Edition

REFERENCE BOOKS:

1**.** Getting started with MATLAB7- a quick introduction for scientists and engineers,by Rudra Pratap, IIs, Bangalore, Oxford University press, Indian Edition.

2. ELEMENTARY MATHEMATICAL and COMPUTATIONAL TOOLS for ELECTRICAL and COMPUTER ENGINEERS USING MATLAB by Jamal T. Manassah City College of New York
    Boca Raton London New York Washington, D.C. CRC Press

BCS309	SOFTWARE ENGINEERING	3	0	0	3

Unit I   **9 0 0**

Introduction – Computer Based System Engineering – Emergent System Properties – Systems and their environment – System modeling – The system engineering process – System procurement **- Software Process –** Software Process Models – Process iteration – Software specification – Software design and implementation – Software validation – Software evolution – Automated process support **– Project Management –** Management activities - Project planning – Project scheduling – Risk Management.

Unit II   **9 0 0**

Software Requirements – Functional and non-functional requirements – User requirements – System requirements – The software requirements document – **Requirements engineering Processes –** Feasibility studies – Requirements elicitation and analysis – Requirements validation – Requirements management – **System Models –** Context models – Behavioral models – Data models – Object Models – CASE Workbenches **– Software Prototyping** – Prototyping in the software process – Rapid prototyping technique – User Interface Prototyping **– Formal specification –** Formal specification in the software process – Interface specification – Behavioral specification

 Unit III   **9 0 0**

 Architectural Design – System structuring – Control models – Modular decomposition – domain Specific architectures **– Distributed systems architectures –** Multiprocessor architectures – Client-Server Architectures – Distributed object architectures – CORBA **– Object-Oriented Design –** Objects and object classes – Design Evolution – **Real-time Software design –** System design, Real-time executives –Monitoring and control systems – Data acquisition systems **– Design with reuse –** Component-based development – Application families – Design patterns – **User Interface Design** – Principles – User Interaction – Information Presentation – User Support – Interface Evaluation

Unit-IV   **9 0 0**

Dependability – Critical systems – Availability and Reliability – Safety – Security **– Critical System Specification** – Software Reliability Specification – Safety Specification – Security Specification – **Critical System Development –** Fault Minimization – Fault Tolerance – Fault Tolerant Architectures – Safe System Design

Unit V   **9 0 0**

Verification and Validation – Planning – Software inspections – Automated static analysis – Clean room Software Development – **Software Testing –** Defect Testing – Integration Testing – Object Oriented Testing – Testing Work benches – **Critical Systems validation –** Formal methods and Critical Systems - Reliability validations – Safety Assurance – Security Assessments

TEXT BOOK:

1.   Sommerville I., "Software Engineering", 8th edition, Addison Wesley, 2006.

REFERENCES:

1.   Fairley, "Software Engineering Concepts", McGraw-Hill, 1985.
2.   Roger S. Pressman, 'Software Engineering: A Practitioner Approach', 6th edition, McGraw-Hill, 2005
3.   David Gustafson, "Software Engineering", Schaum's outlines, Tata McGraw-Hill, 2003.
4.   Douglas Bell, Software Engineering for Students, 4/E, Addison-Wesley 2005.

5.   Schaum S outline of theory and Problems of Software Engineering- 2002

BEC333	MICROPROCESSOR AND APPLICATIONS	3	1	0	4

Unit 1   9 3 0

Internal Architecture of 8085 microprocessor – Instruction set – Addressing Modes – 8085 interrupts – Timing diagram – Debugging Techniques – Assembly level's programming

Unit II   9 3 0

(8251) USART – Programmable Interval Timer (8253/8254) programmable Peripheral interface (8255) – CRT controller (8275 / 6845) – Floppy disk Controller (8272)

Unit III   9 3 0

Programmable DMA controller (8257)- Programmable Interrupt controller (8259)-Keyboard display Interface (8279) – ADC / DAC interfacing.

Unit IV   9 3 0

8086 Architecture and pin configuration – Minimum mode and maximum mode configuration - Addressing modes – Basic Instruction – 8086 Interrupts – assembly level's Programming – Introduction to 80186, 80286, 80386 and Pentium processor

Unit V   9 3 0

Typical Application of 8085 – Stepper Motor controls – Traffic light controls – waveform generation – Analog interfacing and industrial control – Microcomputer based system with seven segment displays and key switches

Text Books:

1. Ramesh S.Gaonkar, Microprocessor Architecture Programming and Applications with 8085. Fourth edition, Penram International publishing 2000.(Units I,II,III & V)
2. Douglas V. Hall, Microprocessor and Interfacing, programming and Hardware, Tata McGraw Hill, Second Edition 1999.(Unit III)

References:

1. Yu_Cheng Liu Glenn A. Gibson, Microcomputer systems the 8086 / 8088 family, Prentice Hall 2001.
2. Kenneth J.Ayala the 8086 Microprocessor, Programming and Interfacing the PC, Penram International Publishing, 1995.
3. A.K.RAY&K.M.BHUCHANDI, Advanced Microprocessor and Peripherals, Architecture, Programming & Interfacing, -TMH, 2000

BCS321	OPERATING SYSTEMS LABORATORY	0	0	3	1

1. Basic UNIX Commands

2. Shell Programming (such as database accessing)

   Shell program 1

   Shell program 2

   Shell program 3

   Shell program 4

   Shell program 5

3. Process Management-Fork-Exec

4. Implementation of some Scheduling Algorithms

5. Message Queues, Pipe and FIFO's

6. Signals

7. Shared Memory and Semaphores

8. Implementation of Best Fit & Worst Fit file allocation Strategies

9. Implement the solution of Dining Philosopher's Problem

10. File Systems

BEC341	MICROPROCESSOR AND PERIPHERAL INTERFACING LAB	0	0	3	1

8085/8086 Microprocessor: -

1. Assembly language Programming for single byte, multibyte, addition and subtraction, multiplication and division
2. Searching and sorting
3. Square and square root
4. Block Movement of Data

Interfacing: -

5. Wave form generation using 8255 PPI
6. Traffic light controller
7. Stepper Motor Controller
8. Keyboard Interfacing
9. Matrix display

PERIHERALS LAB

1. 7-segment LED Display Routine.
2. Printer Interface.
3. Serial data transfer using COM port.
4. Data Acquisition System.
5. Floppy Disk Drive, Hard Disk Drive Mechanism

BCS323	Audit Course – II (SOFT SKILLS - II)	0	0	3	0

UNIT	TOPICS COVERED
UNIT I **Verbal Reasoning**	Range of tests, including missing Words, Word links & Word swaps Sentence sequences, Text comprehension Verbal Logical Reasoning
UNIT II **Quantitative Analysis / Data Interpretation**	Short cuts and techniques both in theory and problem solving processes Practice varied range of problems with different levels of difficulty Interpretation of graphs, charts and tables
UNIT III **Technology Orientation**	Dot NET J2EE Open Source Software Testing Unified Process
UNIT IV **Introduction to Domains**	Telecommunication Banking Human Resource Management Retail etc.,
UNIT V **MAKING WINNING IMPRESSIONS - Interview Preparation**	Choose the right job Write winning resume Perform in Group Discussions Groom in a professional manner Display positive body language Attend interviews confidently Create Positive Impressions

BCS302	COMPUTER NETWORKS	3	0	0	3

Unit I Introduction   **9 0 0**

The uses of computer networks - Network hardware - Network software - Reference model
Example of networks- Network standardization.
The physical layer: The theoretical basis for data communication - Guided Transmission
media - Wireless transmission - Mobile telephone - Communication satellite.

Unit II Data Link Layer: **9 0 0**

 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.

Unit III Network layer   **9 0 0**

Network layer design issues - Routing algorithms - Congestion control algorithms -
Internetworking- Network layer in Internet.

Unit IV Transport layer   **9 0 0**

        Transport layer design issues - Transport protocols - Simple transport protocol -
Internet transport protocols UDP, TCP.

Unit V Application layer   **9 0 0**

        Domain name system - Electronic mail - World Wide Web - Multimedia -
Cryptography, Digital signature- Communication Security.

TEXT BOOK:

1.   Andrew S. Tanenbaum, "Computer networks ", PHI, 4th edition 2003.

REFERENCES:

1.   William Stallings," Data and computer communications", PHI, 2001
2.   Douglas E. comer," Internetworking with TCP/IP-Volume-I", PHI, 5th edition 2006
3.   Godbole, "Data communication and networking", TMH, 2004.
4.   Forouzan B. A., "Data Communications and networking", TMH, 2003.

BCS304	**PRINCIPLES OF COMPILER DESIGN**	3	0	0	3

Unit I   **9**
Phases of a Compiler-Computer Language Representation—Compiler Construction Tools—Token Specification

Unit II   **9**
Recognition Machine - Error Recovery –A Typical Lexical Analyzer Generator- top down parsing-Principles.

 Unit III   **9**
Top-down Parsing- Implementation - Bottom-up Parsing - LR Parsers - Implementation - Error Recovery - Parser Generator

Unit IV   **9**
Intermediate Languages - Declarations - Flow Control Statements - Procedure Calls - Symbol Table

UnitV   **9**
Introduction to Code Optimization - Code Generation - Issues in design of Code Generator - Run Time Storage Management - Approaches to
Compiler Development

TEXT BOOK

1. Alfred V.Aho Ravi Sethi, Jefferey D.Ullman,Monica S Lam "Compiler Principles, Techniques and Tools",2nd edition,Pearson Education 2007.

 REFERENCE BOOK:

1. Chattopadhyay Santanu, "Compiler Design" ,PHI 2007.
2. Allen Holub I., "Compiler Design in C", PHI, 2007.
3. V Raghavan , "Principles of compiler", Tata Mc Graw Hill, 2009
4. Kenneth C Louden, Compiler Construction Principles & Practice,Thompson learning 2003.

BCS306	WEB TECHNOLOGY	3	0	0	3

UNIT I INTRODUCTION TO HTML   9 0 0

Introduction to HTML, web publishing - Process of web publishing, Implementation, Phases of website development, HTML'S Role in the web, Issues facing HTML documents, Documents types, HTML Elements.

Links & Addressing: Links, Basics, URL Concepts, Links in HTML, Anchor attributes, Images & anchors, Image maps, <links> & <META> tags, HTML & images.

Presentation & Layouts: Layout with tables, Frames, Layers, HTML & other media types - HTML & binary objects, <MARQUEE> tag, Audio support in browser, Video support, Style sheet basics, Style sheet properties, Positions with style sheet, CSS2.

Programming & HMTL: HTML forms basics, <FORM> element, Form controls, Server side programmed, Counter gateway interface, Cold fusion,

UNIT II Site Delivery & XML   9 0 0

Delivering the website, Virtual hosting, Running a local web server Working of web server, Relationship any HTML, SGML & XML, Basic XML, Ways to use XML, Rewriting HTML as XML, Future of XML

UNIT III   9 0 0

Java script/VB Script, Active server pages, Purpose of scripts, Scripts in an HMTL document, Script events & HTML, Client side programming & HTML, JSP

UNIT IV   9 0 0

Web Server (Tomcat) and Servlet

UNIT V   9 0 0

A small website application which has to retrieve the data from a database and displays it

TEXT BOOK:

1. THOMAS A.POWELL, The Complete Reference HTML, 4th Edition - Tata McGraw Hill, 2004.

REFERENCE BOOKS:

1. Ramesh Bangis, " Web Technology" firewall media publications, 2006.
2. Bruce W. Perry, "Java Servlet & JSP cookbook" , O'Reilly Media, Inc., 2004.
3. Exix Ladd, Jim O'Donell, "Platinum Edition using XHTML, XML &   Java 2", 2000.
4. David Flanagan, "Java Script", O'Reilly Media, 5th edition,2006.Marty Hall, Larry Brown, Yaakov Chaikin, "Core Servlets & Java Server", Printice Hall Ptr,2008.

BEC304	FUNDAMENTALS OF DIGITAL SIGNAL PROCESSING	3	1	0	4

Unit I SIGNALS & SYSTEMS   9 3 0

Signal classifications – Signal Representation – Classification of Discrete time signals – Typical Discrete time signals – operation on signals – Discrete time system – Classification of Discrete time systems – solution of difference Equations.

Unit II Z TRANSFORM & REALISATIONS   9 3 0

Z Transform – Properties – System function – Inverse Z Transform – Realisation of Digital filters – Direct Form-I, Direct Form-II, Transposed, parallel, cascade, Lattice- Ladder structure.

Unit 1II DFT & FFT   9 3 0

Discrete Fourier Transform (DFT) – Definition – Properties – Convolution of sequences – Linear convolution - circular convolution.
Introduction to Radix – 2FET – Properties – DIT (FFT) – DIF (FFT) – Algorithms of Radix – 2FFT – Computing Inverse DFT by doing a direct DFT

Unit IV DESIGN OF DIGITAL FILTER   9 3 0

Review of design techniques for analog low pass filters –Frequency transformation – Properties of IIR filter design – Characteristics of FIR filters with linear phase - Fourier series Method – frequency sampling Method – Design of FIR filters using windows.

Unit V EFFECTS OF FINITE REGISTER LENGTH   9 3 0

Fixed Point & Binary floating Point Number Representation – Quantization Effects due to truncation &Rounding – finite word length effect in digital filters.

TEXT BOOK:

1. Sanjit K.Mitra 'Digital Signal Processing', A computer Based Approach, Tata McGraw Hill, New Delhi, 1998.
2. Johnny R.Johnson, Introduction to 'Digital Signal Processing' Minth Printing, September 2001.

REFERENCE:

1. John G.Proakis and Dimitris G.Manolakis, "Digital Signal Processing, Algorithms and Applications", PHI of India Ltd, New Delhi 3rd Edition 2000.

BCS322	**NETWORK PROGRAMMING LAB**	0	0	3	1

1. Write a socket program for Echo/Ping/Talk commands.
2. Create a Socket (TCP) between two computers and enable file transfer between them.
3. Write a program to implement remote command execution (two m/c's can be used).
4. Create a socket (UDP).
5. Write a port simulating ARP/RARP.
6. Create a socket for HTTP for web page upload and download.
7. Write a program for file transfer in Client-Server architecture using following methods
      a) Using RS232C
      b) Using TCP/IP
8. Write a program to implement RMI (Remote Method Invocation)
9. Perform a case study about different routing algorithms to select the network path with its optimum and economical during data transfer
      a) Shortest path routing
      b) Flooding
      c) Broadcast /Multicast routing.

BCS324	SYSTEM SOFTWARE AND COMPILER DESIGN LAB	0	0	3	1

SYSTEM SOFTWARE:

1. Symbol Tables
2. Assemblers
3. Loaders
4. Linkers
5. Macroprocessors

COMPILER DESIGN:

1. Write a program for constructing NFA from a regular expression
2. Write a program for constructing DFA from a regular expression
3. Write a program for constructing top down parsing table.
4. Write a program to implement Shift-reduce parsing algorithm.
5. Write a program to implement Operator-Precedence parsing algorithm.
6. Write a program for constructing LR-Parsing table..
7. Write a program to generate a code for a given intermediate code.

Software Required: C/C++

BCS326	Value added Training Programme / Three Tier Application Project	0	0	3	1

During the 6th semester vacation holidays student has to do an application project either for the department or for other departments or for the industry. Application project using Advanced Java-Three tier application project

Or

Student can attend Value- added training programme conducted by the department to get the Credit for the course.

List of International Value added Professional Certification

I. NETWORKING (CISCO)
1. CCNP
2. CCNA

II. Operating System

1. NETWORK+
2. NOVEL
3. MICROSOFT WINDOWS XP
4. MICROSOFT WINDOWS 2003
5. SUN SOLARIS
6. LINUX

III. SOFTWARE DEVELOPMENT
1. MCSD
2. MCSA
3. SUN JAVA 2

IV. DATA BASE ADMINISTRATION
1. ORACLE DBA
2. ORACLE DBO

V. SOFTWARE QUALITY ASSURANCE AND TESTING

   CASQ
1. CAST
2. CABA
3. CSBA
4. CSPE
5. CQSPE
6. CSQA
7. CSTE
8. CMSQ
9. CMST
10. CSPM

BCS403	.NET FRAMEWORK	3	1	0	4

UNIT I   9   3   0
.NET platform, .NET Frame work, Common Language Runtime, Namespace, assemblies, .NET memory management Introduction to C#.net, Introduction to VB.NET

UNIT II C#.NET   9   3   0
Introduction to c#, Understanding C# in .NET, Overview of c#, literals, Variables, Data Types. Operators, Expressions, Branching and Looping Operations- Methods, Arrays Strings. Structures and Enumerations – Classes and Objects- inheritance and Polymorphism, Multiple Inheritance. Operator Overloading, Events, Console I/O Operations and Exception**.

UNIT III VB.NET   9   3   0
Introduction, Windows application, Web application, Building Blocks, programming Fundamentals, Creation of Windows Forms, SDI Vs MDI, Crating run time Windows Controls. File handling, Interaction with other Applications. Creating and using reports. Debugging and Packaging.

UNIT IV   ADO.NET   9   3   0
ADO.NET, Connected Objects, Disconnected Objects, Data Form Wizard, Data Bound Form, Various Connection Methodologies for Database, Querying database, usage of Data Adapter class. Working with data off-line, Data view object, strongly typed Dataset Objects. Working with XML data, Building Windows based and web based application. .Net data providers

UNIT V ASP.NET& Web services   9   3   0
Creation of web services, web service with ASP.NET, ASP.NET applications with databases, cookies and session handling.

Text Book:
1. **.net Framework Essentials** by Thuan Thai, Hoang Q. Lam O'reilly publication 2003 3rd edition.
2. **Programming in C#** by E. Balagurusamy 2nd edition Tata McGraw-Hill fifth reprint 2008.
3. **Starting Out with Visual Basic 2008** by , Kip Irvine 4th edition 2008 Addison Wesley publication.
4. **Professional ASP.NET Web Services** by Andreas Eide, Chris Miller, Bill Sempf, Srinivasa Sivakumar, Mike Batongbacal, Matthew Reynolds, Mike Clark , Brian Loesgen , Robert Eisenberg, Brandon Bohling, Russ Basiura , Don Lee Addison Wesley 4 edition 2008
5. **Programming Microsoft ADO.NET** by David Sceppa Microsoft press 2006

References :
1. Web reference http://www.microsoft.com/learning/en/us/default.aspx
2. web reference http://msdn.microsoft.com/en-us/vstudio/default.aspx

BCS405	Object Oriented System Analysis and Design	3	0	0	3

UNIT I   9 0 0

Object Orientation – System Development – Review of Objects- Inheritance – Object Relationship-Dynamic Binding –OOSD Life Cycle - Process – Analysis – Design – Prototyping – implementation – Testing – Overview of methodologies.

UNIT II   9 0 0

OMT – Booch Methodology – Jacobson methodology – patterns – unified approach - UML –Use case – Class diagrams –Dynamic modeling.

UNIT - III   9 0 0

Use case model – Creation of Classes – Noun Phrase Approach – Responsibilities – Collaborators – Object Relationships – super Sub classes – Aggregation

UNIT – IV   9 0 0

OO Design Axioms – Class Visibility – refining Attributes – Methods – Access layer – OODBMS – Table – Class Mapping view layer

UNIT – V   9 0 0

Quality Assurance testing – inheritance & testing – test plan – usability testing –User satisfaction - testing**.**

TEXTBOOK:

1. Ali Bahrami,"object oriented system development ", McGraw Hill international, 1999

REFERENCE:

1. Grady Booch, "Object oriented Analysis & design" , Addison -Wesley Longman, 1994.

2. Rambaugh j , blaha M premeriani, W., Eddy F and Loresen W., "object oriented Modeling & design", PHI ,1997

3. OOAD with application 3rd edition by Grady booch, Robert.A, Maksimchuk, MichaelW.Engel and Bobbi J. Young 2007.

4. Advanced OOAD By Joey F.George-2003.

5. Object Oriented System Analysis and Design Denesh Batra, Joseph S. Valacich and Jehhery A. Hoffer 2nd edition 2006.

BCS407	DATA MINING AND WAREHOUSING	3	0	0	3

Unit I - Introduction

Introduction - Client server computing model-Data warehouse-Parallel systems-Cluster Systems-Distributed DBMS-Client server RDBMS solutions.

Unit II - Data Warehousing

Components-Building a Data Warehouse-mapping Data Warehouse to a Multiprocessor-Architecture-DBMS Schemas for Design Support-Data Extraction-Cleaning and Transferring tools- Meta data.

Unit III - Business tools

Reporting and Query tools and Application-OLAP-Patterns and Models-Statistics- Artificial Intelligence.

Unit IV - Data Mining

Introduction-Decision Trees- Neural Networks – Nearest Neighbor and clustering – Genetic Algorithm – Rule induction – Selecting and using the right technique.

Unit V - Data visualization and overall perspective

Tools-Applications-Data visualization Techniques– Case Study

Text Book:

1. Alex Berson-Stephen. J.Smith, "Data warehousing-Data Mining & OLAP", TMH 2006
2. Margaret H Dunham." Data Mining – Introduction and advanced topics", Pearson Education 2005.

Reference Books:

1. Jiawei Han and Micheline Kamber , "Data mining concepts and techniques", Morgan Kaufmann Publishers,2005.
2. Arun K Pujari, "Data Mining Techniques", Universities Press (India) Ltd., 2002.
3. Sam Anahory, Dennis Murry," Data Warehousing in the real world", Pearson Eductation 2003.

BCS409	INFORMATION STORAGE MANAGEMENT	3	1	0	4

UNIT –I   9 3 0 0

• Review the amount of information being created and understand the value of information to a business • Identify Data Center infrastructure elements and their requirements • RAID , SCSI , NAS and SAN.

UNIT– II   9 3 0 0

Understand role of ILM strategy • List physical and logical components of host, connectivity, and storage • Detail the disk drive architecture and performance • Describe the concept of RAID and different RAID levels (RAID 0, 1, 3, 5, 0+1/1+0, and 6) • Define Intelligent Storage System (ISS) and its components • Implementation of ISS as high-end and midrange storage arrays.

UNIT – III   9 3 0 0

• Describe the implementation of DAS and overview of SCSI • Define and detail the architecture, components, and topologies of FC-SAN, NAS, and IP-SAN • Understand the object based storage system CAS and its application as long-term archiving solution • Describe block-level and file-level storage virtualization technologies and processes • Overview of emerging technologies such as cloud storage and virtual provisioning

UNIT– IV   9 3 0 0

• Understand the concept of information availability and its measurement • Describe the causes and consequences of downtime • Define RTO, and RPO • Identify single points of failure in a storage infrastructure and solutions for its mitigation • Describe the backup/recovery purposes and considerations • Discuss architecture and different backup/Recovery topologies • Describe local replication technologies and their operation • Describe remote replication technologies and their operation.

UNIT – V   9 3 0 0

• Define information security • List the critical security attributes for information systems • Define storage security domains • List and analyze the common threats in each domain • Identify key parameters and components to monitor in a storage infrastructure • List key management activities and examples • Define storage management standards and initiative.

Total No of Hours: 60

TEXT BOOK:
1**.** EMC Corporation, Information Storage and Management, WileyIndia, 9-Hours788126521470.

Reference Books:
1. Robert Spalding, "Storage Networks: The Complete Reference", Tata McGraw Hill , Osborne, 2003.

Marc Farley, "Building Storage Networks", Tata McGraw Hill ,Osborne, 2001.

S.NO	Name of the Experiment
C# .NET	

1.	Implementation of Operator Overloading
	    a. Complex Number
	    b. Matrix
	    c. Time(+.-)

2.	Implementation of Multiple Inheritance a. Employee b. Area of an Object
3.	Implementing Multithreading
VB .NET	
4	Designing a Calculator
5	Implement File Handling(Read,Delete,Modify)
6	Implement Exception Handling a. Voter problem b. Student Status
7	Event Handling – Mouse Click,Button click
ASP .NET	
8	Super Market
9	Hotell Management System
ADO. NET	
10	Student Attendance Calculation
11	Hospital management System
WEB SERVICE	
12	Income tax calculation

BCS423	COMPREHENSION/ FOREIGN LANGUAGE CERTIFICATION	0	0	0	2

The objective of comprehension is to provide opportunity for the student to apply the knowledge acquired during the academic program to real – life problems which he/she may have to face in future as an engineer.

Three periods per week shall be allotted in the time table for the activity and this time shall be utilized by the students to receive guidance from the members of faculty on solving real – life problems, practice solving these problems and on group discussions, seminar presentation, library reading as assigned by the faculty member in-charge.

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

Or

Student has to attend Foreign Language Foundation course conducted by their respective consulate approved training centers. With the course completion certificate they can claim the credit for the subject.

BCS425	PROJECT (Phase-I)	0	0	9	3

1. Title Identification
2. Title Confirmation
3. Problem Scenario and Definition
4. Feasibility Study and Requirement Specification
5. Solution Approach
6. Architectural Design / Data Flow Design
7. Solution Design and Workflow

BCS427	Software System Development Lab with IBM Rational Rose	0	0	3	1

LIST OF EXPERIMENTS

Develop the following software using software Engineering methodology:

1. Online Railway reservation system
2. Simulator software for parallel processing operation
3. Payroll processing application
4. Inventory system
5. Simulator software for compiler operation
6. Automating the Banking process
7. Software for game
8. Library management system
9. Text editor
10. Create a dictionary
11. Telephone directory
12. Create an E- Book of your choice.

SOFTWARE REQUIRED:

Languages: C/C++/JDK 1.3, JSDK, WEB BROWSER & UML
Any Front End Tools (Like VB, VC++, Developer 2000)
Any Back End Tools (Like Oracle, MS-Access, SQL)

BMG431	ENTREPRENEURSHIP DEVELOPMENT	3	0	0	3

UNIT – I

Entrepreneur – Traits and types, Creating and starting the venture – Sources of new ideas, Methods of generating ideas, Product planning and development process and establishing evaluation criteria.

UNIT – II

Business plan – Marketing plan - Marketing research for the new venture, Marketing mix, steps in preparing marketing plan. Financial plan – Proforma of income statements, Cash flow, Balance sheet, Break even Analysis, Application of funds. Organizational plan-legal forms of Business, Tax attributes, Role of Board of Directors, Advisors, Designing the organization. Risk assessment, Sources of finance-equity, Financial Institutions and Commercial banks.

UNIT – III

Record keeping-Meaning, Methods, Types, Hiring-concept, Procedure for hiring, Motivation – Entrepreneurial theories of motivation, Leadership - Styles of leadership.

UNIT – IV

Financial control - Managing cash flow, managing inventory, fixed assets, Managing cost and profits, Taxes. Entrepreneurial skills – Marketing skills, Strategic planning, Time Management skills, Negotiation skills.

UNIT – V

Other routes for success - Joint venture – Meaning, Types, Advantages Acquisition – Meaning, Importance advantages merger - Advantages, Disadvantages franchising – Advantages of franchising entrepreneur's point of view, Types going public – Raising funds from the market.

Text Book:

1.   Hirsch, Entrepreneurship, Tata McGraw-Hill, New Delhi, 2001.

References:

1.   Kuratko, Entrepreneurship, 6th edition, Thomas learning, 2005.

2.   Prasana Chandra, Projects-planning, analysis, selection, implementation and reviews, Tata McGraw-Hill Publishing Company Limited, 1996.

3.   P.C.Jain (ED) Hand Book for entrepreneurs, EDII, Oxford University Press, New Delhi, 1999.

4.   Staff College for Technical Education, Manila and Centre for Research and Industrial Staff Performance, Bhopal, Entrepreneurship Development, Tata McGraw-Hill Publishing Company Limited, 1998.

5.   P.Saravanavel, Entrepreneurial Development, Ess Pee Kay Publishing house, Chennai.

6.   S.S.Khanka, Entrepreneurial Development, S.Chand and Company Limited, New Delhi.

BCS422	PROJECT (Phase-II)	0	0	12	6

1. Detailed Design and Implementation
2. Test Plan
3. Partial Demo
4. Packaged Demo
5. Documentation verification

BCSE11	DATABASE TUNING	3	0	0	3

UNIT I: FUNDAMENTALS OF TUNING   8
Review of Relational Databases – Relational Algebra - Locking and Concurrency Control – Correctness Consideration – Lock Tuning – Logging and the Recovery Subsystem – Principles of Recovery – Tuning the Recovery Subsystem – Operating Systems Considerations – Hardware Tuning.

UNIT II: INDEX TUNING   8
Types of Queries – Data Structures – B tree – B+ Tree - Hash Structures – Bit Map Indexes – Clustering Indexes – Non Clustering Indexes – Composite Indexes – Hot Tables – Comparison of Indexing and Hashing Techniques.

UNIT III: QUERY OPTIMIZATION   10
Techniques - Tuning Relational Systems – Normalization – Tuning De-normalization – Clustering Two Tables – Aggregate Maintenance – Record Layout – Query Tuning – Triggers – Client Server Mechanisms – Objects, Application Tools and Performance – Tuning the Application Interface – Bulk Loading Data – Accessing Multiple Databases.

UNIT IV: TROUBLESHOOTING   10
Query Plan Explainers – Performance Monitors – Event Monitors – Finding "Suspicious" Queries – Analyzing a Query's Access Plan – Profiling a Query Execution – DBMS Subsystems.

UNIT V:CASE   STUDIES   9
Transaction Chopping – Time Series Databases – Understanding Access Plans – Configuration Parameters: Oracle; SQL Server; DB2UDB – Distributed Database – Implementation.

TOTAL = 45

TEXT BOOKS:

1. Dennis Shasha and Philippe Bonnet "Database Tuning, Principles, Experiments, and Troubleshooting Techniques", Elsevier Reprint 2005.
2. Thomas Connoly and Carlolyn Begg, "Database Systems, A Practical Approach to Design, Implementation and Management", Third Edition, Pearson Education 2003.
3. M.Tamer Ozsu, Patrick Valduriez and S.Sridhar "Principles of Distributed Database Systems", Pearson Education 2007.

BCSE12	ADVANCED KNOWLEDGE MANAGEMENT	3	0	0	3

UNIT I: INTRODUCTION   9

The value of Knowledge – Knowledge Engineering Basics – Knowledge Economy – The Task and Organizational Content – Knowledge Management – Knowledge Management Ontology.

UNIT II: KNOWLEDGE MODELS   9

Knowledge Model Components – Template Knowledge Models –Reflective Knowledge Models– Knowledge Model Construction – Types of Knowledge Models.

UNIT III: TECHNIQUES OF KNOWLEDGE MANAGEMENT   8

Knowledge Elicitation Techniques – Modeling Communication Aspects – Knowledge Management and Organizational Learning.

UNIT IV: KNOWLEDGE SYSTEM IMPLEMENTATION   11

Case Studies – Designing Knowledge Systems – Knowledge Codification – Testing and Deployment – Knowledge Transfer and Knowledge Sharing – Knowledge System Implementation.

UNIT V: ADVANCED KM   8

Advanced Knowledge Modeling – Value Networks – Business Models for Knowledge Economy – UML Notations – Project Management.

TOTAL = 45

TEXT BOOKS:

1. Guus Schreiber, Hans Akkermans, Anjo Anjewierden, Robert de Hoog, Nigel Shadbolt, Walter Van de Velde and Bob Wielinga, "Knowledge Engineering and Management", Universities Press, 2001.
2. Elias M.Awad & Hassan M. Ghaziri, "Knowledge Management", Pearson Education, 2003.
3. C.W. Holsapple, "Handbooks on Knowledge Management", International Handbooks on Information Systems, Vol 1 and 2, 2003.
4. http://www.epistemics.co.uk
5. http://depts.washington.edu/pettt/papers/WIN_poster_text.pdf

BCSE13	INFOMETRICS	3	0	0	3

UNIT I: IT ORGANIZATION   9

Metrics that matter - Interpreting the metrics – Collecting the data – Managing the data – Obstacles to acquiring IT metrics information – Old data versus new graphical analysis – Core of software planning – Measuring the core metrics (Product, Quality, Process, Productivity, Time, Effort) – Estimating and controlling with the core metrics – Work output measurements.

UNIT II: MEASUREMENT PROGRAM APPROACHES   9

EDS Brazil metrics program – Measurement program implementation approaches – Bench marking – Data definition framework for defining software measurements.

UNIT III: SOFTWARE METRICS   9

Functional points as part of measurement program – Estimation of software reliability – Establishing central support for software sizing activities – Using metrics to manage projects – Tracking software progress – Effectively utilizing software metrics.

UNIT IV: SOFTWARE ESTIMATION   9

Problems with measurements – Avoiding obstacles and common pitfalls – Unreported and unpaid overtime – Using software metrics for effective estimating – Estimating software development projects – Enhanced estimation on time within budget – Metrics in outsourcing – Lifigaton – The product of non practicing function point metrics – Applying statistical process central to software – Metrics in E-Commerce.

UNIT V: KNOWLEDGE MANAGEMENT   9

Quality information and knowledge – Why quality information and knowledge – Define information quality – Create organizational knowledge – Manage knowledge as assets – Create customized solution – Network knowledge infrastructure.

TOTAL = 45

TEXT BOOKS:

1. Stephen H. Kan, " Metrics and Models In Software Quality Engineering", First Edition, Pearson Education, 2003.
2. N. Fenton, S. L. Pfleeger, "Software Metrics: A Rigorous and Practical Approach", Thomson Learning, 1997.
3. IT Measurement – A Practical Advice from the Experts", International Function Point Users Group, Pearson Education, Asia.

BCSE14	ENTERPRISE APPLICATION INTEGRATION	3	0	0	3

UNIT I: INTRODUCTION 9

Business Imperative for Enterprise Integration – Business agility – ROI of Enterprise Integration – Challenges – Business drivers – Defining Requirements – Enterprise Integration strategy.

UNIT II: ENTERPRISE INTEGRATION ARCHITECHTURE 9

Overview – Business case – Components of EIA – Organizational Structure – Architectural Governance - Understanding Integration Technology – Current Integration Architecture – Technical Integration Architecture specification.

UNIT III: SERVICE AND INFORMATION INTEGRATION ARCHITECTURE 9

Service Oriented Architecture – Benefits – Defining Services – Event driven service design – specification – Understanding Metadata – Metadata Architecture – standards – Information Integration Patterns – Architecture Specification.

UNIT IV: PROCESS AND APPLICATION INTEGRATION ARCHITECTURE 9

Process to Business – Process Integration Technology – Process Standards – Architecture Specification - Choosing Technology - Application Integration Technology – Implementation Specification – Composite Application – Composite integration specification.

UNIT V: CASE STUDY 9

TOTAL = 45

TEXT BOOKS:

1. David S.Linthicum, "Enterprise Application Integration",Addison – Wesley Information Technology Services, 2006.
2. Martin Fowler Patterns of Enterprise Application Architecture (Addison-Wesley Signature Series) 2002

BCSE15	WEB DATA DESIGN AND MANAGEMENN	3	0	0	3

UNIT I: SITE ORGANIZATION AND NAVIGATION   9
User centered design – Web medium – Web design process – Evaluating process – Site types and architectures – Navigation theory – Basic navigation practices – Search – Site maps.

UNIT II: ELEMENTS OF PAGE DESIGN   9
Browser compatible design issues - Pages and Layout – Templates – Text – Color – Images – Graphics and Multimedia - GUI Widgets and Forms – Web Design patterns

UNIT III: SCRIPTING LANGUAGES   10
Client side scripting: XHTML – DHTML– JavaScript– XML Server side scripting: Perl – PHP – ASP/JSP Designing a Simple web application

UNIT IV: PRE-PRODUCTION MANAGEMENT   8
Principles of Project Management – Web Project Method – Project Road Map – Project Clarification – Solution Definition – Project Specification – Content – Writing and Managing content.

UNIT V: PRODUCTION, MAINTENANCE AND EVALUATION   9
Design and Construction – Testing, Launch and Handover – Maintenance – Review and Evaluation – Case Study.

TOTAL = 45

TEXT BOOKS:

1. Themas A. Powell, "The Complete Reference – Web Design", Tata McGraw Hill, Third Edition, 2003.
2. Ashley Friedlein, "Web Project Management", Morgan Kaufmann Publishers, 2001.
3. H. M. Deitel, P. J. Deitel, A. B. Goldberg, "Internet and World Wide Web – How to Program", Third Edition, Pearson Education 2004.
4. Joel Sklar, "Principles of Web Design", Thomson Learning, 2001.
5. **Van Duyne, Landay, and Hong** "The Design of Sites: Patterns for creating winning web sites", 2nd Edition, Prentice Hall, 2006.
6. Lynch, Horton and Rosenfeld, "Web Style Guide: Basic Design Principles for Creating Web Sites", 2nd Edition, Yale University Press, 2002.

BCSE16	ADVANCED DATABASES	3	0	0	3

UNIT I   **9 0 0**
Introduction:
Review of Relational Databases – Database Tuning – Advanced Transaction Processing.

UNIT II   **9 0 0**
Distributed Databases:
Introduction – Architecture- Design – Query Processing – Transaction Management – Concurrency Control – Recovery – Parallel Databases.

UNIT III   **9 0 0**
Object Oriented Databases:
Introduction - Basis OO Concepts – Modeling and Design for Object Oriented Databases – Persistence – Transaction, Concurrency, Recovery and Versioning.

UNIT IV   **9 0 0**
Special Purpose Databases:
Temporal Databases – Active Databases – Spatial and Multimedia Databases – Deductive Databases – Mobile Databases.

UNIT V   **9 0 0**
Current Trends :
Data Warehousing – OLAP – Data Mining Techniques – Databases and the World Wide Web – Decision Support System.

TOTAL = 45

Text Books :
1.M. Timer, Ozsu and Patrick Valduriez, "Principles of Distributed Database System", PHI, 1999. (I,II,III,V unit)
2.Abdullah Uz Transelet-al, "Temporal databases"-Theory design and   implementation", Benjamin/Cummings publishing co,1993.(IV Unit)

Reference Books :
 1. Jennifer Wisdom & Stefano Ceri (Edited), "Active Database Systems – Triggers & Rules for Advanced Database Processing", Morgan Kaufmann Publishers Inc., 1996.
2. Setrag Khos Shafian, "Object Oriented Databases", John Wiley & Sons IC., 1993.
3. Setrag Khos shafian,Brad Baker," Multimedia And Imaging databases",Morgan Kaufmann,1996.

BCSE21	HIGH SPEED NETWORKS	3	0	0	3

Unit-1. High Speed Networks   **9**
Frame Relay Networks – Asynchronous transfer mode – ATM Protocol Architecture, ATM logical Connection – ATM Cell – ATM Service Categories –AAL. High Speed LAN's: Fast Ethernet – Gigabit Ethernet– Fibre Channel –Wireless LAN's: applications, requirements – Architecture of 802.11.

Unit-2. Congestion And Traffic Management   **8**
Queuing Analysis – Queuing Models – Single Server Queues – Effects of Congestion – Congestion Control – Traffic Management – Congestion Control in Packet Switching Networks – Frame Relay Congestion Control.

Unit-3. TCP And ATM Congestion Control   **12**
TCP Flow control – TCP Congestion Control – Retransmission – Timer Management – Exponential RTO backoff – KARN's Algorithm – Window management – Performance of TCP over ATM. Traffic and Congestion control in ATM – Requirements – Attributes – Traffic Management Frame work, Traffic
Control – ABR traffic Management – ABR rate control, RM cell formats – ABR Capacity allocations – GFR traffic management.

Unit-4. Integrated And Differentiated Services   **8**
Integrated Services Architecture – Approach, Components, Services- Queuing Discipline – FQ – PS – BRFQ – GPS – WFQ – Random Early Detection – Differentiated Services.

Unit-5. Protocols For QoS Support   **8**
RSVP – Goals & Characteristics, Data Flow, RSVP operations – Protocol Mechanisms – Multiprotocol Label Switching – Operations, Label Stacking – Protocol details – RTP – Protocol Architecture – Data Transfer Protocol– RTCP.

                                                TOTAL = 45

Text books:
1. William Stallings, "High speed networks and internet", Second Edition, Pearson Education, 2002.

References:

1. Warland, Pravin Varaiya, "High performance communication networks", Second Edition , Jean Harcourt Asia Pvt. Ltd., , 2001.

2. Irvan Pepelnjk, Jim Guichard, Jeff Apcar, "MPLS and VPN architecture", Cisco Press, Volume 1 and 2, 2003.

BCSE22	TCP/IP DESIGN AND IMPLEMENTATION	3	0	0	3

UNIT I   **9 0 0**

        Inter networking issues-routing-internet addressing-address resolution protocol (ARP)-reverse address resolution protocol (RARP)-packet format-routing.

UNIT II   **90 0**

        Fragmentation and reassembly-error processing-IP V6-UDP-basic concepts-TCP data structures**.**

UNIT III   **9 0 0**

        Finite state machine implementation-output processing-timer management-flow control-urgent data processing.

UNIT IV   **9 0 0**

        Core gateway system-autonomous systems and considerations-interior gateway protocols, transparent gateways, DNS.

UNIT V   **9 0 0**

        Sockets-RPC mechanisms-Telnet-Mail systems.

                                                                     TOTAL = 45

TEXT BOOK:

1. COMER D.E. AND STEVENS D.L. INTERNETWORKING WITH TCP/IP VOL I II III 2nd edition Prentice hall of India 1997.

REFERENCE BOOKS:

1. COMER D.E. AND STEVENS D.L. INTERNETWORKING WITH TCP/IP VOL III Prentice hall of India 1997
2. STEVENS W.R "TCP/IP ILLUSTRATED VOL I ,II AND III ,Addision Wesley 1999
3. COMER D.E."INTERNETWORKING WITH TCP/IP "VOL I 3rd edition Prentice hall   of India, 1997.

BCSE23	AD-HOC NETWORKS	3	0	0	3

Unit-1. Introduction   9
Model of Operation – Commercial Application – Technical and Market factors affecting Ad Hoc Networking.

Unit-2. Routing Protocols   9
Overview of routing methods – Proactive – Reactive and hybrid routing protocol – Uni-Cast routing protocol (AODV, DSR, DSDV) – Multi-Cast routing protocol (ODMRP) – Multi clustering– Power Issues – ABR.

Unit-3. Transport Layer And Security Issues   9
TCP over Ad Hoc – Recent Issues – Recent Trends – Advanced Topics – Current Trends – Security.

Unit-4. Sensor Networks – Introduction   9
Unique constraints and challenges – Advantages of Sensor networks –Sensor network Applications – Collaborative processing – Key Definitions of sensor networks – A tracking Scenario – problem formulation – Inference of states – Tracking Multiple Objects – Sensor models – Performance comparison and metrics.

Unit-5. Networking Sensors And Infrastructure Establishment   9
Key Assumptions – Medium Access Control – General Issues –Geographic– Energy Aware Routing – Attribute Base Routing. Topology Control – Clustering – Time Synchronization – Localization and
localization services - algorithms

TOTAL = 45

TEXT BOOK:
1. C.K.Toh, "Ad Hoc Mobile Wireless Systems", Prentice Hall, PTR, 2002.

References:
1. Charles E.Perkins, "Ad Hoc Networking", Addison – Wesley, 2001.
2. Feng Zhao, Leonidas Guibas, "Wireless Sensor Networks – An
Information processing Approach", Elseivier 2004.

BCSE24	3G NETWORKING	3	0	0	3

Unit-1   8

Wireless communication , History of wireless communication, mobile communication fundamentals, Basic Network Architecture, roaming, handover, GSM ,UMT, CDMA2000.

Unit-2.   12

First generation architecture, MTSO configuration, call setup, handoff, frequency reuse, channel band plan , 2G – GSM ,TDMA , CDMA architecture , traffic scenario , location update ,

Unit-3   12

Mobile oriented voice call , digital voice channel, control channel , MAHO , Forward CDMA , Reverse CDMA , iDEN , CDPD. UMTS , migration path , services , air interface , WCDMA .

Unit-4   7

Basics , 3GPP network architecture , CDMA 2000 architecture ,Uplink and down link - spreading , scrambling and modulation , UTRAN architecture , functional role of RNC , protocol.

Unit-5   8

Voice over IP , basics ,H-323 , architecture , reuse, SIP , SDP , MEGACO protocol , 3G system RF design , methodology , propagation , RF guide lines.

                                                         Total   45

Text Book

1.3G wireless Network , Clint Smith , Daniel Collins , McGraw Hill , 2006
2.Third Generation Information Network , Sanjiv Nanda , Kluwer Academic Publisher, 2006.

BCSE25	NETWORK SECURITY	3	0	0	3

UNIT I SYMMETRIC CIPHERS 9

Overview - Classical Encryption Techniques – Block Ciphers and the Data Encryption Standard – Introduction to Finite Fields – Advanced Encryption Standard – More on Symmetric Ciphers – Confidentiality using Symmetric Encryption.

UNIT II PUBLIC-KEY ENCRYPTION AND HASH FUNCTIONS 9

Introduction to Number Theory – Public-Key Cryptography and RSA – Key Management - Diffie-Hellman Key Exchange – Elliptic Curve Cryptography – Message Authentication and Hash Functions – Hash and MAC Algorithms – Digital Signatures and Authentication Protocols.

UNIT III NETWORK SECURITY PRACTICE 9

Authentication Applications – Kerberos – X.509 Authentication Service – Electronic mail Security – Pretty Good Privacy – S/MIME – IP Security – Web Security.

UNIT IV SYSTEM SECURITY 9

Intruders – Intrusion Detection – Password Management – Malicious Software – Viruses and Related Threats - Viruses Countermeasures – Distributed Denial of Service Attacks - Firewalls – Firewall Design Principles – Trusted Systems.

UNIT V WIRELESS SECURITY 9

Introduction to Wireless LAN Security Standards – Technology Comparisons - Wireless LAN Security Factors – Issues in Wireless Security.

Total = 45

REFERENCES

1. William Stallings, "Cryptography And Network Security – Principles and Practices", Pearson Education, Fourth Edition, 2006.
2. Atul Kahate, "Cryptography and Network Security", Tata McGraw Hill, 2003.
3. Bruce Schneier, "Applied Cryptography", John Wiley & Sons Inc, 2001.
4. Stewart S. Miller, "Wi-Fi Security", McGraw-Hill 2003.
5. Charles B. Pfleeger, Shari Lawrence Pfleeger, "Security in Computing", Fourth Edition, Pearson Education, 2007.

BCSE26	MOBILE AND PERVASIVE COMPUTING	3	0	0	3

UNIT I   9
Wireless networks- emerging technologies- Blue tooth, WiFi, WiMAX, 3G ,WATM.-Mobile IP protocols -WAP push architecture-Wml scripts and applications.

UNIT II   8
Mobile computing environment—functions-architecture-design considerations ,content architecture -CC/PP exchange protocol ,context manager. Data management in WAECoda file system- caching schemes- Mobility QOS. Security in mobile computing.

UNIT III   8
Handoff in wireless mobile networks-reference model-handoff schemes. Location management in cellular networks - Mobility models- location and tracking management schemes- time, movement ,profile and distance based update strategies. ALI technologies

UNIT IV   10
Pervasive Computing- Principles, Characteristics- interaction transparency, context aware, automated experience capture. Architecture for pervasive computing- Pervasive devices-embedded controls.- smart sensors and actuators -Context communication and access services

UNIT V   10
Open protocols- Service discovery technologies- SDP, Jini, SLP, UpnP protocols–data synchronization- SyncML framework - Context aware mobile services -Context aware sensor networks, addressing and communications. Context aware security.

TOTAL = 45

REFERENCES

1. Ivan Stojmenovic , Handbook of Wireless Networks and Mobile Computing, John Wiley & sons Inc, Canada, 2002.
2. Asoke K Taukder,Roopa R Yavagal,Mobile Computing, Tata McGraw Hill Pub Co. , New Delhi, 2005.
3. Seng Loke, Context-Aware Computing Pervasive Systems, Auerbach Pub., New York, 2007.
4. Uwe Hansmann etl , Pervasive Computing, Springer, New York,2001.

BCSE31	JAVA VIRTUAL MACHINE	3	0	0	3

UNIT I   JAVA PROGRAMMING LANGUAGE   9

Types, value, variables, conversions – Names and packages, classes, fields, method, static initializes, constructors, interfaces, nesting – Arrays – Exception – Execution – Threads.

UNIT II JAVA VIRTUAL MACHINE (JVM) STRUCTURE   9

Data types – Runtime data base areas and frames – Objects – Floating point arithmetic – Exceptions – Instruction set summary – Class libraries.

UNIT III   CLASS FILE FORMAT   9

Class and interfaces names, descriptors – Constant pool – Fields, methods, attributes – Constraints – Verification.

UNTI IV RUNTIME ISSUES   9

Runtime constant pool – Virtual machine start up – Creation, loading, linking, initialization – Binding - Instruction set – Threads and locks.

UNTI V COMPILING FOR JVM   9

Constants, local variables, control constructs – Arithmetic – Runtime constant pool – Arguments, method, class instances – Arrays - Compiling switches – Exceptions – Synchronization.

TOTAL = 45

Text Book

1. Tim Lindholm and Frank Yellin, "The Java Virtual Machine Specification", Second Edition, Addison Wesley, 1999.

References

1. Ken Arnold and James Gosling, 'The Java Programming Language", Addison Wesley, 1998.

2. Alferd V.Aho, Ravi Sethi, Jeffery D. Ullman, "Compilers – Principles, Techniques and Tools", Addison Wesley, 1998.

3. Joshua Engel, "Programming for the Java Virtual Machine", Addison Wesley, 1999.

BCSE32	XML AND WEB SERVICES	3	0	0	3

UNIT I   **9**
INTRODUCTION
Role Of XML - XML and The Web - XML Language Basics - SOAP - Web Services - Revolutions Of XML - Service Oriented Architecture (SOA).

UNIT II   **9**
XML TECHNOLOGY
XML - Name Spaces - Structuring With Schemas and DTD - Presentation Techniques - Transformation - XML Infrastructure.

UNIT III   9
SOAP
Overview Of SOAP - HTTP - XML-RPC - SOAP: Protocol - Message Structure - Intermediaries - Actors - Design Patterns And Faults - SOAP With Attachments.

UNIT IV   **9**
WEB SERVICES
Overview - Architecture - Key Technologies - UDDI - WSDL - ebXML - SOAP And Web Services In E-Com - Overview Of .NET And J2EE.

UNIT V   **9**
XML SECURITY
Security Overview - Canonicalization - XML Security Framework - XML Encryption - XML Digital Signature - XKMS Structure - Guidelines For Signing XML Documents - XML In Practice.

Total No. Of Periods: 45

TEXT BOOKS:
1. Frank. P. Coyle, XML, Web Services And The Data Revolution, Pearson Education, 2002.

REFERENCES:
1. Ramesh Nagappan , Robert Skoczylas and Rima Patel Sriganesh, " Developing Java Web Services", Wiley Publishing Inc., 2004.
2. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services", Pearson Education, 2004.
3. McGovern, et al., "Java Web Services Architecture", Morgan Kaufmann Publishers,2005.

BCSE33	SERVERSIDE PROGRAMMING USING JAVA	3	0	0	3

UNIT-I: 9

XML: Document type definition, , Document Object model, Presenting XML, Using XML Processors: DOM and SAX

UNIT-II: 9

Introduction to Java Beans, Advantages of Java Beans, BDK ,Introspection, Using Bound properties, Bean Info Interface, Constrained properties, Persistence, Customizes, Java Beans API, Introduction to EJB's

UNIT-III: 9

Web Servers and Servlets: Tomcat web server, Introduction to Servelets: Lifecycle of a Serverlet, JSDK, The Servelet API, The javax.servelet Package, Reading Servelet parameters, Reading Initialization parameters. The javax.servelet HTTP package, Handling Http Request & Responses, Using Cookies-Session Tracking, Security Issues,

UNIT-VI: 9

Introduction to JSP: The Problem with Servelet. The Anatomy of a JSP Page, JSP Processing. JSP Application Design with MVC Setting Up and JSP Environment: Installing the Development Kit, Tomcat Server & Testing Tomcat
JSP: Generating Dynamic Content, Using Scripting Elements Implicit JSP Objects, Conditional Processing – Displaying Values Using an Expression to Set an Attribute, Declaring Variables and Methods Error Handling and Debugging Sharing Data Between JSP pages, Requests, and Users Passing Control and Date between Pages – Sharing Session and Application Data – Memory Usage Considerations

UNIT - V: 9

Database Access : using JDBC, Studying Javax.sql.* package,Accessing a Database from a JSP Page, Application – Specific Database Actions,Deploying JAVA Beans in a JSP Page, Introduction to struts framework..

Total   45

TEXT BOOKS:
1. Web Programming, building internet applications, Chris Bates 2nd edition,
WILEY Dreamtech (UNIT s 1,2 ,3)
2. The complete Reference Fifth Edition by Patrick Naughton and Herbert Schildt. TMH (Chapters: 25) (UNIT 4)
3. Java Server Pages –Hans Bergsten, SPD O'Reilly (UNITs 5,6,7,8)
REFERENCE BOOKS:
1. Programming world wide web-Sebesta,Pearson
2. Internet and World Wide Web – How to program by Dietel and Nieto PHI/Pearson
3.An Introduction to web Design and Programming –Wang-Thomson
4. Web Applications Technologies Concepts-Knuckles,John Wiley
5. Programming world wide web-Sebesta,Pearson
6. Beginning Web Programming-Jon Duckett WROX.
7. Java Server Pages, Pekowsky, Pearson.

BCSE34	ADVANCED WEB TECHNOLOGIES	3	0	0	3

UNIT – I   **9**
INTRODUCTION
Introduction – Network concepts – Web concepts – Internet addresses - Retrieving Data
with URL – HTML – DHTML: Cascading Style Sheets - Scripting Languages: Javascript
– Vbscript.

UNIT – II   **9**
COMMON GATEWAY INTERFACE
Common Gateway Interface: Programming CGI Scripts – HTML Forms – Custom Database
Query Scripts – Server Side Includes – Server security issues – XML.

UNIT – III   **9**
JAVA PROGRAMMING
Java fundamentals: Classes – Inheritance – Packages – Interfaces – Exceptions Handling –
Multi threading - Applets

UNIT – IV   **9**
 SERVER SIDE PROGRAMMING
Server side Programming – Active server pages – Java server pages – Java Servlets:Servlet
container – Exceptions – Sessions and Session Tracking – Using Servlet context –Dynamic
Content Generation – Servlet Chaining and Communications.

UNIT – V   **9**
 APPLICATIONS
Simple applications – Internet Commerce – Database connectivity – Online databases –EDI
Applications in Business – Plug-ins – Firewalls

Total No. of Periods: 45

REFERENCE BOOKS:
1. Deitel, Deitel and Neito, "INTERNET and WORLD WIDE WEB – How to
program", Pearson education asia, 2001
2. D.Norton and H. Schildt, "Java 2: The complete Reference", TMH, 2000.
3. Elliotte Rusty Herold , "Java Network Programming", O'Reilly Publications, 3rd
Edition, 2004.
4. Eric Ladd and Jim O'Donnell, et al, "USING HTML 4, XML, and JAVA1.2", PHI
publications, 2003.
5. Jeffy Dwight, Michael Erwin and Robert Nikes "USING CGI", PHI Publications,
1997

BCSE35	NETWORK PROGRAMMING USING JAVA	3	0	0	3

UNIT - I 9

Networks-The Layers of a Network ,IP, TCP, and UDP ,The Internet,The Client/Server Model,Internet Standards,URIs,HTML, SGML, and XML,HTTP,MIME ,Media Types,Server-Side Programs,Output Streams,Input Streams,Filter Streams,Readers and Writers,Running Threads,ReturningInformation from a Thread,Synchronization,Deadlock,Thread Scheduling,Thread Pools

UNIT –II 9

The InetAddress Class,Inet4Address and Inet6Address,The NetworkInterface Class,Some Useful Programs,The URL Class,The URLEncoder and URLDecoder Classes,The URI Class,Proxies,Communicating with Server-Side Programs Through GET,Accessing Password-Protected Sites

UNIT – III 9

Socket Basics,Investigating Protocols with Telnet,The Socket Class,Socket Exceptions,Socket Addresses,Examples,The ServerSocket Class,Some Useful Servers, Secure Sockets,Secure Communications,Creating Secure Client Sockets,Methods of the SSLSocket Class,Creating Secure Server Sockets,Methods of the SSLServerSocket Class,An Example Client,An Example Server, Buffers,Channels,Readiness Selection

UNIT –IV 9

The UDP Protocol , The DatagramPacket Class , The DatagramSocket Class , Some Useful Applications , DatagramChannel , What Is a Multicast Socket? , Working with Multicast Sockets , Two Simple Examples , URLConnections , Opening URLConnections , Reading Data from a Server , Reading the Header , Configuring the Connection , Configuring the Client Request HTTP Header ,Writing Data to a Server , Content Handlers , The Object Methods , Security Considerations for URLConnections , Guessing MIME Content Types , HttpURLConnection , Caches , JarURLConnection

UNIT - V 9

What Is a Protocol Handler?, The URLStreamHandler Class, Writing a Protocol Handler , More Protocol Handler Examples and Techniques , The URLStreamHandlerFactory Interface , What Is a Content Handler? The ContentHandler Class , The ContentHandlerFactory Interface, A Content Handler for the FITS Image Format , Remote Method Invocation,Implementation, Loading Classes at Runtime The java.rmi Package, The java.rmi.registry Pckage,The java.rmi.server Package , What Is the JavaMail API? , Sending Email , Receiving Mail, Password Athentication , Addresses , The URLName Class , The Message Class , The Part Interface , Multipart Messages and File Attachments , MIME Messages , Folders

Total = 45

Text Books

1. Java Network Programming, Third Edition, by Elliotte Rusty Harold ,2005 OREILLY Publication.

REFERENCES:

1. Java Network Programming by Merlin and Conard Hughes,Michael Shoffner and Maria Winslow , PHI
2. Advanced Java Networking by Prashant Sridharan,PHI
3. Java Networking and Communications by Todd Courtois PHI
4. Java Networking and AWT API Super Brian Maro Biible by Nataraj Nagartham ,Arvind Srinivasam,Waite group.

BCSE36	SEMANTICS WEB	3	0	0	3

UNIT I   INTRODUCTION   9

Components – Types – Ontological Commitments – Ontological Categories –
Philosophical Background - Knowledge Representation Ontologies – Top Level
Ontologies – Linguistic Ontologies – Domain Ontologies – Semantic Web – Need -
Foundation   –Layers–Architecture

UNIT II LANGUAGES FOR SEMANTIC WEB AND ONTOLOGIES   10

Web Documents in XML – RDF - Schema – Web Resource Description using RDF- RDF
Properties – Topic Maps and RDF – Overview – Syntax Structure – Semantics –
Pragmatics - Traditional Ontology Languages – LOOM- OKBC – OCML - Flogic
Ontology Markup Languages – SHOE – OIL - DAML + OIL- OWL

UNIT III ONTOLOGY LEARNING FOR SEMANTIC WEB   10

Taxonomy for Ontology Learning – Layered Approach – Phases of Ontology Learning –
Importing and Processing Ontologies and Documents – Ontology Learning Algorithms
Evaluation

UNIT IV ONTOLOGY MANAGEMENT AND TOOLS   9

Overview – need for management – development process – target ontology – ontology
mapping – skills management system – ontological class – constraints – issues
Evolution – Development of Tools and Tool Suites – Ontology Merge Tools – Ontology
Based   Annotation   Tools

UNIT V APPLICATIONS   7

Web Services – Semantic Web Services - Case Study for specific domain – Security
Issues– current   trends

TOTAL PERIODS : 45

TEXT BOOKS :
 1. Asuncion Gomez-Perez, Oscar Corcho, Mariano Fernandez-Lopez, ""Ontological
    Engineering: with examples from the areas of Knowledge Management, e-
Commerce and the Semantic Web" Springer, 2004.
2. Grigoris Antoniou, Frank van Harmelen, "A Semantic Web Primer (Cooperative
Information Systems)", The MIT Press, 2004
REFERENCES:
   1. Ale xander Maedche, "Ontology Learning for the Semantic Web", Springer; 1
      edition,2002
   2. John Davies, Dieter Fensel, Frank Van Harmelen, "Towards the Semantic Web
      Ontology – Driven Knowledge Management", John Wiley & Sons Ltd., 2003.

BCSE41	J2ME	3	0	0	3

UNIT – I   9

Introduction to Java Environment – Types – J2ME – Java Virtual Machine – Wireless Devices – Wireless Technology – Radio Data Networks – Microwave and Mobile Radio Networks – Messaging – Personal Data Assistants

UNIT – II   9

J2ME Architecture – Run-Time Environment – MIDlet Programming – Multiple MIDlets – Java Language and Software Development Kits – Wireless Toolkit – Best Practices and Patterns – J2ME User Interfaces

UNIT – III   9

High Level Display – Low Level Display – Record Management System – Data, Databases – Databases Schema – Indexing – JDBC Driver – Packages – Database Connection – Transaction Processing

UNIT – IV   9

JDBC and Embedded SQL – Tables – Inserting Data – Selecting Data – Metadata – Updating and Deleting Data – Calculating and Grouping Data – Viewing Data - Personal Information Manager

UNIT – V   9

J2ME Networking – Connection – HTTP – Communication Management – Session Management – Web Services – Basics – Multi-Tier, Client Tier and Web Tier Architecture – WSDL – SOAP

Total = 45

BOOKS FOR REFERENCE:

1. James Keogh, **"The Complete Reference – J2ME"**, Tata McGraw Hill, ISBN – 0-07-053415-2
2. Jonathan Knudsen and Sing Li, **"Beginning J2ME – Novice To Professional",** APRESS
3. Kim Toply, **"J2ME in a Nutshell",** O'Relly

BCSE42	SAP(ERP)	3	0	0	3

UNIT – I   INTRODUCTION   9

Enterprise Resource Planning (ERP) – Evolution, concepts, Integration and advantages, Architecture of various ERP products like SAP, J.D. Edwards, Peoplesoft Etc. Overview of modules in SAP (Functional and Technical).

UNIT – II   CLIENT/SERVER IN R/3 ARCHITECTURE   9

Basics in Client/Server in R/3 Applications & Systems administration, R/3 System Features, Definition of Client & Server etc.,

UNIT – III   TYPES OF SERVERS   9

Types of Servers in SAP (Presentation, Application, Database, Message Server, Gateway Server)

UNIT – IV   WORK PROCESS   9

Definition of Work Process and overview of different types of work processes and Work processes architecture, Work & responsibilities of Basis Administrator

UNIT – V   PROCEDURES ON INSTALLATION   9

Procedures on installation of SAP BASIS and Technical Overview of ABAP/4 etc.

Total = 45

Reference Books:

1. Enterprise Resource Planning by ALEXIS LEON, TMH
2. SAP R/3 System Administration by LIANE WILL by BPB
3. SAMS Teach Yourself ABAP/4 in 21 days by KEN GREENWOOD
4. ERP – Demystified by ALEXIS LEON, TMH
5. SAP R/3 – SAP Architecutre, Basis ABAP Programming with MM and SD Modules by DREAMTECH SOFTWARE TEAM

BCSE43	ECRM	3	0	0	3

UNIT I - Introduction   9

Definition -CRM as a business strategy -Elements of CRM - CRM Processes and systems-Entrance, applications and success of CRM

UNIT II - Strategy and Organization of CRM   9

Customer-supplier relationships - History - Description of customer-supplier relationships - Dynamic in relationships - Communities -*Case study*: The relation between a logistics service provider and its new client

UNIT III-   CRM as an integral business strategy   9

Nature of the CRM strategy - Context of the CRM strategy - Results of a successful CRM strategy *Case study*: Orange Line

UNIT IV - CRM Systems and their Implementation   9

Overview of CRM systems - call centre - Internet and the website - Data warehouse and datamart - Campaign management systems - Content management system - Suppliers of CRM systems *Case study*: Canada Post delivers on its CRM strategy

UNIT IV – ECRM   9
Meaning and definition- features of ECRM- Framework and Architecture- Building ECRM- Tools to maintain ECRM- Elements, types and process of Data mining- Applications of Data Mining- Advantages of ECRM

                                                                                    Total = 45

Text Book

1. Customer Relationship Management – Ed Peelen , Pearson Education
2. E-Commerce – Pujawalia Mann, Niddhi MJP Publishers

Reference Book

1. Data Mining Techniques in CRM- Konstantinos Tsiptsis, Antonios Chorianopoulos Wiley InterScience

BCSE44	**E-BUSINESS**	3	0	0	3

UNIT I - Foundation concepts   9

Foundations of information systems (IS) in business : System concepts – components of an IS – IS resources – fundamental roles of IS applications in business – e-business in business – trends in IS – types of IS – managerial challenges of information technology. Competing with information technology (IT) Fundamentals of strategic advantage – strategic uses of IT – the value chain and strategic IT – using IT for strategic advantages – basics of doing business on the Internet

UNIT II – E-Business categories   9

B-B, B-C, C-C and other categories- Affiliation- Price bidding case study priceline.com Advertising- Subscription case study encyclopedia Britannica

UNIT III E-Business domain   9

Customer relationship management (CRM) – Enterprise resource planning (ERP) and Supply chain management (SCM)- ES-Test- E-Procurement

UNIT IV Technical aspects of E-Business   9

XML-Database solution- Resources for building an E-Business website from scratch- Payment services- Online Security: Symmetric and Asymmetric encryption-public key cryptography-SSL and SET

UNIT V Management challenges   9

Ethical responsibility of a business- Information Technology Act 2000 in India. Enterprise and global management of IT: Managing the IS function – failures in IT management – the international dimension in IT management – Cultural, political and geoeconomic challenges Global business/IT strategies and applications – global IT platforms

Total = 45

TEXT BOOKS
1. O'Brien,J.(2004). Management Information Systems ; Managing information technology in the business enterprise, New Delhi: Tata McGraw-Hill.
2. Stair, R.M. & Reynolds, G.W.(2001). Principles of Information Systems, %5e Singapore: Thomson Learning.
3. Electronic Commerce: A managerial perspective, Prentice Hall, 2004, E.Turban,D.King,J.Lee and D.Viehland

REFERENCE BOOKS
1.Joseph,P.T.(2005). E-Commerce: An Indian perspective(2e), New Delhi : Prentice-Hall of India
2. Canzer, B(2005). E-Business and Commerce: Strategic thinking and practice (Indian adaptation), New Delhi: Biztantra (Originally published by Houghton Mifflin Co., USA)
3. Eisenmann, T.R.(2002). Internet business models : texts and cases, New York: McGraw-Hill Irwin.
4.Rayport, J.F. & Jaworski, B.J.(2002). Introduction to e-commerce, New York: McGraw-Hill Irwin.

BCSE45	SERVICE ORIENTED ARCHITECTURE	3	0	0	3

UNIT I - Introduction   9

  Open Standards-Structure of SOA Applications- Web & Binary Exchange Services-Business Implications- Presentation Services- SOA Runtime products- Services: Loose coupling-Service Registry-Service level agreements- Message exchange patterns- QOS

UNIT II – XML   9

Intro to XML-XML as used in SOA-Structure of an XML document-Namespaces-XML Schema-Data type reuse- Instance document-Aspects of XPath- SOA standards: WSDL, SOAP, UDDI

UNIT III – BPEL   9

Use of WSDL, BPEL File structure-Scopes-Message Exchanges-Variables and XPath-Partner links-Correlation sets – fault handling-compensation and termination handling-concurrency

UNIT IV – SCA   9

SCA Domain-Bindings & Enterprise service bus-policies and support for conversations-components- composites- higher and lower composites- composite inclusion- constraining type.

UNIT V – SDO   9

Data graph-object definition- SDO annotations-Data Access services- SDO code details.

Total = 45

Text Book :

SOA for the Business Developer: Concepts, BPEL, and SCA (Business Developers series) – Ben Margolis

Reference Books

1. Service Oriented Modelling (SOA) Service Analysis, Design and Architecture – Michael Bell
2. SOA Principles of Service Design – Thomas Erl
3. SOA Design Patterns – Thomas Erl Prentice Hall Services

BCSE46	MOBILE APPLICATION DEVELOPMENT	3	0	0	3

UNIT I - Introduction 9

Introduction to Mac, XCode, Objective C- Mobile Devices Profiles - Mobile Software - Options for development

UNIT II - Introduction to Software As A Service 9

Service□Oriented Computing Examples- Google Maps- Amazon Web Services

UNIT III User Interface (UI) Development for Mobile Apps 9

UI elements views-User Interface Frameworks - Gesture□based interfaces

UNIT IV - Google Andriod Platform 9

The Eclipse Simulator - Google Application Architecture - Event□based programming

UNIT V - Apple iPhone Platform 9

UIKit for Interfaces - Event Handling and Graphics Services - Layer Animation

Total = 45

Textbooks:

1. Hello Android Introducing Development, Ed Burnett.
2. http://www.amazon.com/exec/obidos/ASIN/1934356174/advancedjavapr00
3. Handouts and web documents will serve as foundational readings.

BCSE 51	VLSI TECHNOLOGY	3	0	0	3

Unit – I :   9
VLSI Design flow

Design hierarchy concepts of regularity, modularity & locality VLSI Design styles – CMOS fabrication Technology- Introduction, Fabrication Process flow- basic steps, CMOS n-well process, Advanced CMOS fabrication technologies, layout design rules- introduction-Full – custom Mask Layout design –CMOS Layout design rules – CMOS inverter Layout design – Layout of CMOS NAND & NOR gates – Complex CMOS Logic gates

Unit – II: 9
Parasitic extraction & performance estimation from physical structure

Introduction – Reality with inter connection –MOSFET capacitances-interconnect capacitance estimation – interconnect resistance estimation

Unit – III: 9
Clock signals & system timing

On chip clock generation & distribution using ring & pierce crystal oscillator – non – overlapping clock signals and gate level implementation – H-tree clock distribution N/W – clock skew reduction – Zero – Skew clock routing N/W- Clock distribution N/W for DEC alpha Op chips

Unit – IV: 9
Testability of Integrated systems-VLSI for Fuzzy logic systems

Design constraints – Testing – The rule of ten – terminology – Failures in CMOS – Combinational Logic Testing – Practical Ad-Hoc DFT guidelines –Scan design techniques-Integrated implementations of FLC, Digital implementation of FLC's, Analog implementation of FLC's, Mixed digital /analog implementations of Fuzzy systems, CAD automation for FLC DESIGN, NN implementing fuzzy systems.

Unit – V: 9
Arithmetic for Digital systems
Introduction – notation systems – Principles of generation & propagation – 1 bit full adder – Enhancement Techniques for Adders – multi operand –Adders – Multiplication – Addition and Multiplication in Galois Fields GF(2n)

                                        Total = 45

Text Books:

1. Cheng., SZE., "VLSI Technology"., Prentice Hall of India,
2. Douglas A. Pucknell and Kamran Eshraghian, "Basic VLSI Design Systems and circuits", Prentice Hall of India Pvt Ltd., 1993.
3. Horspool., Gorman., "The Asic Handbook"Tata Mc Graw Hill Publications., 1999
4. Randall .L.Geiger and P.E.Allen, VLSI Design Techniques for Analog and Digital Circuits, McGraw Hill International Company, 1990

BCSE 52	SYSTEM MODELING USING HARDWARE DESCRIPTION LANGUAGES	3	1	0	3

Unit I   **9**

VHDL & VERILOG Introduction and abridgment   Date flow decryption – Structural-connected Blow

Unit II   **9**

Behaviour Description using Standard library – operators in VHDL Vector and scalar operations – Delay model – sequentional statement – signal and process

Unit – III   **9**

Implementation of combinational and sequential circuit using VHDL package

Unit – IV   **9**

Verilog and - Design function using Verilog –Levels of synthesizing Verilog Designing N!W using Verilog – Simple design – wires – wire assignments – Design

Unit – V   **9**

Test Benches –Response capture – RTL Verilog – If statement – Synthesis latches
Case Study
Design of universal asynchronous Receivers – Implementation of NAND – Latch. 16 bit counting, D type Edge triggered flip flop clock for counter –Fibonacci number generator- programmer using hand notation spice modeling of circuit

                    Total = 45

Text Books

1. Mohammed Ismail., "Analog VLSI Integrated Circuits", Prentice Hall of India.,1998
2. Ashenden., "The Designers Guide to VHDL" Tata McGraw Hill Publications.,2nd edition
3. Grey, Hurst Luwis, Mayer., "Analysis and Design of Analog Integrated Circuits" John Willey and Sons

BCSE53	VLSI DESIGN	3	0	0	3

Unit – I: MOS Technology and Circuits: 9

Mos Technology and VLSI, Process parameters and considerations for BJT, MOS and CMOS, Electrical properties of MOS circuits and Device modeling-MOS Circuit Design Process - MOS Layers, Stick diagram Layout diagram Propagation delays, Examples of combinational logic design, Sealing of MOS circuits, Capacitance Calculations

Unit – II: Digital Circuits and Systems 9

Programmable Logic Array (PLA) and Finite State Machines, Design of ALUs, Memories and Registers.

Unit – III: Analog VLSI and High Speed VLSI 9

Introduction to Analog VLSI, Realisation of Neural Networks and Switched capacitor filters, sub-micron technology and GaAs VLSI technology.

Unit – IV: Hardware Description Languages 9

VHDL background and basic concepts, Structural specifications of hardware design organisation and parameterisation.

Unit – V: VLSI Design 9

VLSI applied to communication circuits, Filter design, VLSI for RF circuits, VLSIarchitectures for reduced critical path & low power design

Total : 45

References:

1. Wayne Wolf, Modern VLSI Design, 2nd Edition, Prentice Hall, 1998.
2. Douglas A. Pucknell and Kamran Eshraghian, Basic VLSI Design Systems and circuits, Prentice Hall of India Pvt Ltd., 1993.
3.Randall .L.Geiger and P.E.Allen, VLSI Design Techniques for Analog and Digital Circuits, McGraw Hill International Company, 1990.
4.Amar Mukherjee, Introduction to NMOS and CMOS VLSI System Design, Prentice Hall, 1983.

BCSE54	COMPUTER AIDED DESIGN OF VLSI CIRCUITS	3	0	0	3

UNIT – I   **9**

VLSI Methodologies – VLSI Physical Design Automation – Design and Fabrication of VLSI Devices – Fabrication process and its impact on Physical Design.

UNIT – II   **9**

VLSI Design Automation Tools - Data structures and Basic Algorithms – Algorithms Graph Theory and computtional complexity – Tractable and Intractable problems

UNIT – III   **9**

General purpose methods for combinational optimization – Partitioning – Floor planning and pin assignment – placement – Routing

UNIT – IV   **9**

Simulation – Logic synthesis – Verification – High-level synthesis – compaction.

UNIT – V   **9**

Physical Design Automation of FPGAs, MCMS – VHDL – Verilog - Implementation of simple circuits using VHDL and Verilog packaging

Case Study;Floor planning billion-gate design. Test vector generation design for testing fan et coverage

                                                                      Total = 45

Text Books :

1. N.A. Sherwani, "Algorithms for VLSI Physical Design Automation". 1999.
2. S.H.Gerez, "Algorithms for VLSI Design Automation",1998.

BCSE 55	EMBEDDED SYSTEM DESIGN	3	0	0	3

Unit I   9

(a)   Introduction, motivation. Soc development, etc. design methodologies (hw/sw co-design**T**)
(b)   Specification: - imperative languages- programming lang. (c, c++), hardware description (VHDL, system c), - synchronous languages – esterel, signal, LUSTRE,**T**

Unit II   9

Computational models (design representations)- data-flow based- data flow process networks, khan process networks, etc.)- control flow based-FSM, Petri nets, state charts, etc.- control/data-flow design representations.

Unit III   9

(a) System partitioning (estimation, partitioning methods, etc.);   (b) Allocation, assignment and scheduling- static scheduling,- dynamic scheduling.

Unit IV   9

(a) Interface synthesis.   (b) Testability.

Unit V   9

Low-power design.

Total = 45

Text book:

1. W.wolf,"computers as components: principles of embedded computing systems design", Morgan Kaufman publisher, 2001, ISBN 1-55860-541-x (case), ISBN 1-55860-693-9 (paper)

BCSE56	MICROCONTROLLER ARCHITECTURE DESIGN PROGRAMMING	3	0	0	3

UNIT-I   **9**

(a) basic concepts- a black box introduction to microprocessors, block diagrams and system organization of typical microcomputers and embedded systems.Computer programs at the machine language level, RISC vs. CISC microprocessor architectures, Harvard and von Neumann architectures, varieties of memory- ROM, RAM, EPROM, EEPROM, FLASH, NVRAM, clocks and timers, system bus concepts(address bus, data bus, control bus)

(b) an overview of the architecture of 8051 f microcontrollers

(c) Basics of assembly language programming- bits, bytes and machine codes, manipulating registers (loading, incrementing contents, storing contents of some register in memory), jumping to and continuing execution at some specific address, writing assembling and debugging simple assembly language programs, driving a simple LED display.

Unit-II   **9**

Structured programming in assembler- Loops and counters, delay loops, structured code-modules, subroutines and stack operations, logical instructions (AND, OR, XOR, bit shifting). Doing arithmetic in assemble – arithmetic instructions and the ALU, simple integer arithmetic, higher precision integer arithmetic, an overview of floating point arithmetic techniques, an overview of techniques for calculating trigonometric and logarithmic functions.

Unit-III   **9**

Fundamentals of interfacing- Input/output ports (i/o) ports (serial i/o ports, parallel i/o ports), analog to digital (a/d) and digital to analog (D/A) conversion, programmable timers, interrupt handling, serial I/O, synchronous vs. asynchronous serial I/O, asynchronous transmission format, synchronous transmission format (SDLC), RS-232, terminal interfacing, modem interfacing, bit banging.

Unit-IV   **9**

Working with an embedded stack: Porting issues, systems requirements, integrating with other tools. Working with an operating system, memory management,Testing

Unit-V   **9**

Further practical interfacing skills & software development tools- driving high current and high voltage devices, " pin expansion" techniques for data acquisition and control, working with the 12C bus, working with the SPI bus, working with the CAN bus. Assemblers, compilers, interpreters, C as a programming language for microcomputer systems.

                                        Total = 45

Text book:

1. Steve heath embedded System Design, Newnes, ISSBN 0-7506-3237-2, 1997.

References:

1. David E. Simon, An embedded software primer, Addison Wesley, ISBN 0- 201-61569-X, 1999.

2 Michabel barr, Programming Embedded Systems in C and C++, O'Reilly, ISSBN 1-56592-354-5, 1999.

3. Stuart, R. Ball, Debugging embedded microprocessor systems, Newnes, ISSBN 0-7506-9990-6, 1998.

4. Nikitas Alexandridis, design of microprocessor- based systems, prentice hall, ISSBN 981-4009-48-2, 1997.

BCSE61	BASIC BIOLOGY	3	0	`0	3

Unit – I   **8**

Bacteria: Structure of bacterial cell; bacterial types; transformation, transfection, transduction and conjugation; nutrition; phylogeny

Unit – II   **6**

Viruses: Biology of viruses; bacteriophages, plant and animal viruses; replication of viral genome; HIV

Unit – III   **8**

Protists: protozoans, algae, slime and water molds   Fungal World: Feeding, reproduction, diversity and relationships

Unit – IV   **10**

Plant Diversity: Broad classification and inter-relationships of non-vascular and vascular plants; tissue organization; reproductive patterns; transport mechanisms, growth, photosynthesis, hormones.

Unit – V   13

Animal Life: Major animal phyla, characteristics and interrelationships; tissues,   organs and   organ   systems;   principles   of   nutrition,   digestion,   thermoregulation, Osmoregulation and excretion, muscle contraction, neural reflexes, circulation, respiration and endocrines.

Total = 45

Text Books::

1. The Science of Life by R. A. Wallace, G. P. Sanders & R. J. Ferl, Harper Collins Publishers, Biology, 1991.
2. Big-time biology by Beardsley Tim, Scientific American, 1994.
3. Biogenesis: Theories of life's origin by Lahav, N., New York. Oxford University Press, 1999.

BCSE62	Biological Databases and Data Analysis	3	0	`0	3

Unit – I   **9**

Nature of biological data - Introduction to Bioinformatics - Overview of available Bioinformatics
resources on the web NCBI/EBI/EXPASY etc- Biological Databases: Nucleic acid sequence databases
GenBank/EMBL/DDBJ - Biological Databases: Protein sequence databases - PIR-PSD,
SwissProt, UniProtKB Database search engines Entrez SRS

Unit – II   **9**

Overview/concepts in sequence analysis - Pairwise sequence alignment algorithms - Needleman & Wunsch -Smith & waterman -Scoring matrices for Nucleic acids & proteins:MDM ,BLOSUM, CSW
Database Similarity Searches:BLAST, FASTA

Unit – III   **9**

Multiple sequence alignment :PRAS,CLUSTALW - Biological databases: Genome & genetic Disorders,Genome databases: Human, model organisms, microbes & viral ,OMIM- Biological databases: structural databases-PDB, NDB,CCSD - Derived databases: Prosite, BLOCKS, Pfam/Prodom, Exporting GI list, Batch retrieval

Unit – IV   **9**

Exploring the integrated database system at EBI server and searching the EMBL Nucleotide database using the SRS search engine- Exploring & querying SWISSPROT & UniProtKB - Exploring and querying the PIR database - Pair-wise global alignments of protein and DNA sequences usingNeedleman-Wunsch algorithm & interpretation of results to deduce homology between the sequences, use of scoring matrices - Pair-wise local alignments of protein and DNA sequences using Smith-Waterman algorithm and interpretation of results

Unit – V
      9

Database (homology) searches using different versions of BLAST and interpretation of the results to derive the biologically significant relationships of the query sequences (proteins/DNA) with the database sequences- Database (homology) searches using different versions of FASTA & interpretation of the results to derive the biologically significant relationships of the query sequences (proteins/DNA) with the database sequences - Multiple sequence alignments of sets of sequences using web-based and stand-alone version of CLUSTAL. Interpretation of results to identify conserved and variable regions and correlate them with physico-chemical & structural properties - Exploring and using the derived databases: PROSITE, PRINTS, BLOCKS, Pfam and Prodom for pattern searching, domain searches etc - Search & retrieval: genomic and OMIM data at NCBI server -Studying the format & content of structural databases & visualization of structures using Rasmol, Cn3D and other utilities

Total 45

Text Books:

1. Bioinformatics: A Practical Guide to the analysis of Genes and Proteins (2nd Ed.) by Baxevanis, A.D. & Ouellettee, B., F. F., New York, John Wiley & Sons, Inc. Publications, 2002.

Reference Books :

1. Introduction to Bioinformatics by Attwood, T.K. & Parry-Smith, D.J., Delhi, Pearson Education (Singapore) Pte.Ltd., 2001.
2. Bioinformatics: Sequence and Genome Analysis by Mount, David, New York, Cold Spring Harbor Laboratory Press, 2004.
3. Current Protocols in Bioinformatics by Baxevanis, A.D., Davison, D.B., Page, R. D. M. & Petsko, G.A., New York, John Wiley & Sons Inc., 2004.

BCSE63	Cell Biology and Genetics	3	0	`0	3

Unit – I   9

Prokaryotic and eukaryotic cells; membranes and cellular compartmentation; An overview of organelles, (mitochondria, chloroplasts, ER, Golgi, lysosomes and peroxisomes; nucleus and nucleolus) and organelle genetic systems - Cellular membranes: Structure, transport, channels, carriers, receptors, endocytosis, membranepotentials.

Unit – II   15

Cell motility and shape: cytoskeletal elements, cilia and flagella; motor proteins - Cell-cell interactions and signal transduction: Intercellular junctions, signaling by hormones and neurotransmitters; receptors, G-proteins, protein kinases and second messengers - Protein traffic in cells: Protein sorting and signal sequences; protein translocation in ER and vesicular transport to Golgi, lysosmes and plasma membrane; protein import into nuclei, mitochondria, chloroplasts and peroxisomes - Cell cycle and its regulation; events during mitosis and meiosis

Unit – III   7

Science of genetics – objectives, terminologies, methods - Mendelian principles of inheritance, sex linked inheritance - Chromosomes, linkage, linkage maps and recombination

Unit – IV   7

Mutations – molecular, gene/point and chromosomal - Genetics of viruses and bacteria - Phenotype and genotype relationships, role of environment, from gene to phenotype, gene interactions

Unit – V   7

Study of quantitative traits - Genetics of populations, genetics and evolution - Genetics and diseases, cancer

                                                              Total 45

Text Books
1. Essential Cell Biology (2nd edition), by B. Alberts, D. Bary, K. Hopkin, A. Johnson, J. Lewis, M. Raff, K. Roberts & P. Walter, Garland Science, 2004.
2. Molecular Biology of the Cell (4th edition) by B. Alberts, A. Johnson, J. Lewis, M. Raff, K. Roberts & P. Walter Garland Science, 2002.
3. The Cell: A Molecular Approach by G. M. Cooper, A. S. M. Press, 2000.
4. Molecular Cell Biology (5th edition) by H. Lodish, A. Berk, P. Matsudaira, C.A. Kaiser, M. Krieger, M. P. Scott, S. L. Zipursky & J. Darnell, W. H. Freeman & Company, 2004.
5. Principles of Genetics (8th edition) by E. J. Gardner, M. J. Simmons & D. P. Snustad John Wiley & Sons, 2002.
6. Concepts in Genetics (7th edition) by W. S. Klug & M. R. Cummings, Pearson Education, 2003.
7. Genetics: A Conceptual Approach by B. A. Pierce, W. H. Freeman & Company, 2003.

BCSE64	Programming in Perl	3	0	`0	3

Unit – I   12
Introduction: What is Perl? Why use Perl in Bioinformatics? History of Perl, Availability,
   Support, Basic Concepts- Scalar Data: What Is Scalar Data? Numbers, Strings, Scalar
   Operators, Scalar Variables, Scalar Operators and Functions - Arrays and List Data: What
   Is a List or Array? Literal Representation, Variables, Array Operators and Functions,
   Scalar and List Context- Control Structures: Statement Blocks - Hashes: What Is a Hash?
   Hash Variables, Literal Representation of a Hash, Hash Functions, Hash Slices - BasicI/O

Unit – II   9
Regular Expressions: Concepts About Regular Expressions, Simple Uses of Regular
   Expressions, Patterns, More on the Matching Operator, Substitutions, The split and join
   Functions - Subroutines: System and User Functions, The local Operator, Variable-length
   Parameter Lists, Notes on Lexical Variables - Miscellaneous Control Structures - File
   handles and File Tests: What Is a File handle? Opening and Closing a File handle, Using
   Pathnames and Filenames, A Slight Diversion: die, Using File handles, The -x File Tests,
   The stat Function

Unit – III   6
Formats: What Is a Format? Defining a Format, Invoking a Format - Directory Access:
   Moving Around the Directory Tree, Globbing, Directory Handles, Opening and Closing a
   Directory Handle, Reading a Directory Handle - File and Directory Manipulation

Unit – IV   6
Process Management: Using system and exec, Using Back-quotes - Other Data
   Transformation: Finding a Substring, Extracting and Replacing a Substring - Formatting
   Data: Sorting, Transliteration System Information: Getting User and Machine
   Information, Packing and Unpacking Binary Data

Unit – V   12
Getting Network Information - Database Manipulation: DBM Databases and DBM Hashes,
Opening and Closing DBM Hashes, Fixed-Length Random-Access Databases, Variable-
Length (Text) Databases, Win32 Database Interfaces (1) - CGI Programming: The CGI.pm
Module, Your CGI Program in Context, Simplest CGI Program, Passing Parameters via CGI,
Perl and the Web Object oriented perl: Introduction to modules, Creating Objects - Bioperl:
Introduction, Installation procedures, Architecture, Uses of bioperl

                                                                      Total: 45

Text Books:
1. Beginning Perl for Bioinformatics by James Tisdall, O-Reilly.
2. Developing Bioinformatics Computer Skills by Cynthia Gibas, Per Jambeck, O-Reilly
3. Learning Perl by Randal L. Schwartz, Tom Phoenix, O-Reilly.
4. Programming Perl by Larry Wall, Tom Christiansen, Jon Orwant, O-Reilly.
5. Programming the Perl DBI by Alligator Descartes, Tim Bunce, O-Reilly.
6. Advanced Perl Programming by Sriram Srinivasan, O-Reilly.

BCSE65	Tools & Techniques for biological data mining	3	0	`0	3

Unit – I   *9*

Quality of Biological Data & Data Accuracy -General issues regarding Biological Databases; Representation of errors due to (machines, 3D structural and sequence data of proteins and nucleic acid, Proteomics and Microarray data) - Optimization Techniques: Steepest Descent, Conjugate Gradient, Newton-Raphson, Simulated annealing in Biomolecular Structure Optimization

Unit – II   **9**

GeneticAlgorithms - *Ab initio* methods for structure prediction:Lattice, SOM, etc, Information theory, entropy and relative entropy, Stochastic Grammars & Linguistics

Unit – III   **9**

Clustering & Classification Algorithms: Hierarchical and non-hierarchical Clustering, K-Means Clustering, Grid based clustering, Analysis of MD trajectories, Microarray and Protein Array data Analysis

Unit – IV   **9**

Dynamic Programming & application in Sequence Alignments, Structure Alignments
Foundations for Machine learning Techniques: Hidden Markov Model, Neural Network, Bayesian Modeling, The Cox-Jaynes Axiomes

Unit – V   **9**

Support Vector machine & Ant colony optimization applied to Multiple Sequence Alignments, Biomolecular Structure Prediction - Fuzzy logic system& application in Clustering and classifications,Microarray and Protein Array data Analysis

Total:45

Text Books:
1. Data Mining: Concepts and Techniques by Han and Kamber, Morgan Kaufmann.
2. Machine Learning by Tom Mitchell, McGraw Hill.
3. Data Mining: Practical Machine Learning Tools and Techniques by Witten and Frank, Elsevier.
4. Biological Sequence Analysis: probabilistic models of proteins and nucleic acids by Durbin, R., Eddy, S., Krogh, A. & Mitchison, G.Cambridge Univ. Press, 1998.
5. Optimization Theory and Application by Rao, S.S., 1984.
6. Discrete optimization by Parker, R. G. & Rardin, R. L., 1988.
7. • Stochastic simulation by Repley, Brian D, Wiley series, 1987.
8. Methods of microarray data analysis III by Johnson, K.F. & Lin, S.M. Boston. Kluwer academic publishers, 2003.
9. Exploration and analysis of DNA microarray and protein array data by Amaratunga, D. & Cabrera, J.New Jersey. John Wiley & Sons Inc., 2004.

BCSE66	Advanced Techniques for Sequence and Structure Analysis	3	0	`0	3

Unit – I   **9**

Advanced Techniques for Sequence Analysis : Sequence Profiles: Derivation, Databases, Application, Gapped BLAST, PSI-BLAST, PHI-BLAST - Advanced Techniques for Structure Analysis: Molecular replacement method, Direct method & Fiber diffraction,Methods for Comparison of 3D structures

Unit – II   **9**

Application of the optimization techniques in Sequence Alignments, Prediction of Protein Structure Docking Simulations

Unit – III   **9**

Advance techniques in Prediction of 3D Structure: Hidden Markov Model,Neural networks Rossetta Stone

Unit – IV   **9**

Molecular Dynamics Simulations & Monte Carlo Methods: Electrostatics of biomolecules, Simulations of Bio-macromolecular Structures in Water & membrane,Free energy perturbation method

Unit – V   **9**

Simulated Annealing:Multiple Sequence Alignments,Simulations of Bio-macromolecular Structures Designing of molecules like drug, inhibitors using Structure based & ligand based docking Methods, Different Scoring schemes

    Total 45

Text Books:
1. Hidden markov models for Bioinformatics by Koski, T, Dordrecht Kluwer, Academic Publishers, 2001.
2. Neural Networks: A Comprehensive Foundation (2nd Edition) by Simon Haykin.
3. Genetic algorithms in search, optimization an machine learning by Goldberg, D.E. 2002 Delhi, Pearson Education Pte. Ltd.
4. Molecular dynamics of lipid bilayers by Nagumo, M. & Bruce, P.G.,1996.
5. Genetic algorithms in molecular modeling by Devillers, J., Ed, 1996.
6. Molecular dynamics: applications in molecular biology by Goodfellow, Julia M., 1991.
7. Biological Sequence Analysis: probabilistic models of proteins and nucleic acids by Durbin, R., Eddy, S., Krogh, A. & Mitchison, G.: Cambridge Univ. Press, Cambridge, 1998.
8. Methods in Enzymology, (V. 183), Molecular evolution: computer analysis of protein & nucleic acid seqs. 1990.
9. Sequence analysis in molecular biology: treasure trove or trivial pursuit by Heijne, Gunnar von, 1987.
10. Simulation Modeling and Analysis by Averill M. Law d and W. David Kelton, Tata MacGraw – Hill, 2000.
11. Protein Bioinformatics: An Algorithmic Approach to Sequence and Structure Analysis by Ingvar Eidhammer, Inge Jonassen, William R. Taylor John Wiley, 2003.

BCSE71	DIGITAL IMAGE PROCESSING	3	0	0	3

UNIT I – Introduction   9 0 0

Digital image representation-Fundamental steps in image processing -Elements of digital image processing systems,Digital Image Fundamentals - :Elements of visual perception-A simple image model -Sampling and quantalization -Some basic relationship between pixels-Imaging geometry -Photographic film.

UNIT II - Image Transforms   9 0 0

Introduction to the Fourier transform -The Discrete Fourier transform -Some properties of the two dimenstional Fourier transform -The fast Fourier transform-Other seperable image transforms-The hotelling transform.

UNIT III - Image Enhancement: 9 0 0

Background -Enhancement by point Procesing -Spatial filtering-Enhancement in the frequency domains -Generations of the spatial masks from frequency Domain specifications-Color image processing -Image Restoration: Degradation Model -diagonalization of Circulant and Block circulant Matrices -Algebraic approach to restoration-Inverse filtering -Least mean square filter -constrained least square restoration-Restoration in spatialdomain-Geometric transformation.

UNIT IV - Image compression   9 0 0

Fundamentals -image Compression models -Elements of information Theory - Error-free Compression - Lossy Compression - Image Compression standards, Images Segementation : Edge linking and boundary detection - Thresholding - Region - Oriented segmentation - The use of motion in segmentation.

UNIT V - Representation and Description   9 0 0

Representation Schemes - Boundary descriptors - Morphology - Relational descriptors, Recognition and Interpretation: Elements of image Analylsis - Pattern and pattern classes - Decision theoretic methods - Structural Methods - Interpretation.

                                                    Total : 45hrs

TEXT BOOKS:
1. RAFAEL C.GONZALEZ and RICHARD E.WOODS. Digital Image Processing - 2008, Prentice Hall.
REFERENCE BOOKS :
1. M.A.SID AHMAED, Image Processing Theory, Algorithm and Architecture - McGraw Hill, 1995
2. DON PEARSON, Image Processing, McGraw Hill, 1991

BCSE72	PATTERN RECOGNITION	3	0	0	3

UNIT-I   **9 0 0**

Fundamentals of Pattern Recognition: Basic concepts of pattern recognition - Decision theoretic algorithms - Structural pattern recognition.

UNIT-II   **9 0 0**

Introductory Neural Networks : Artificial Neural Network structures - Supervised training via error back propagation: derivations.

UNIT-III   **9 0 0**

Advanced Fundamentals of Neural Networks: Acceleration and Stabilization of supervised gradient training of MLPs - Advances in Network
Algorithms for classification and recongnition - Recurrent Neural Networks.

UNIT-IV   **9 0 0**

Neural, Feature, and Data Engineering: Neurall Engineering and Testing of FANNs - Feature and Data Engineering.

UNIT-V   **9 0 0**

Testing and Applications: Some comparative studies of forward artificial Neural Networks - Pattern Recognition Applications in texture
classification & recognition - Speech recognition - Neural processing of Digital images - Character recognition.

Total : 45hrs

Text Book:
1. CARAL G. LOONEY, Pattern Recognition Using Neural Networks - Theory and Algorithms for Engineering and Scientists - NewYork Oxford University Press 1997.

Reference Book :
1. J. P. Marques de Sá, Pattern recognition: concepts, methods, and application, Springer, 2001, ISBN 3540422978, 9783540422976

BCSE73	Medical Imaging Techniques	3	0	0	3

UNIT - I IMAGE FUNDAMENTALS   **9 0 0**

Image perception, MTF of the visual system, image fidelity criteria, image model, image sampling and quantization - two dimensional sampling theory, image quantization, optimum mean square quantizer, image transforms - 2D-DFT and other transforms.

UNIT - II IMAGE PREPROCESSING AND ANALYSIS   **9 0 0**

Image enhancement - point operation, histogram modeling, spatial operations, transforms operations. Image restoration-image degradation model, inverse and Wiener filtering. Image analysis - spatial feature extraction, edge detection, image segmentation classification techniques - statistical methods, neural network approaches.

UNIT – III RECONSTRUCTION OF CT AND MRI IMAGES.   **9 0 0**

Image reconstruction from projections - Radon transforms, filter back projection algorithm, algebraic methods, 3D tomography, imaging methods in CT images, imaging methods in magnetic resonance imagers, Fourier reconstruction of magnetic resonance images.

UNIT – IV TRANSMISSION OF MEDICAL DATA   **9 0 0**

Medical image data compression and transmission œ transform coding pixel coding, predictive coding, interframe coding.

UNIT – V SELECTED TOPICS IN MEDICAL IMAGE PROCESSING   **9 0 0**

Application of image processing techniques in thermography, SPECT, PET, DSA, AI techniques in medical imaging. Bio magnetic diagnosis in connection with medical imaging of CT or MRI. Software implementation of image processing algorithms on medical images, Design consideration for RF cage

                                                                Total : 45hrs

Text Book and References:
1. Albert Macouskl, Medical Imaging Systems, Prentice Hall New Jersery, 1983.
2 Gerald Schaefer, Aboul Ella Hassanien, J. Jiang, Computational Intelligence in Medical Imaging: Techniques and Applications, CRC Press, 2009, ISBN 1420060597, 9781420060591
3. Eric Krestel Imaging Systems for Medical diagnosis, Siemens Aktlengesellschaft, FRG, 1 99.
4. Anil K. Jain, Fundamental of Digital Image Processing, Prentice Hall of India Pvt Ltd., New Delhi, 1995.
5. Anup Majumder, Medical Imaging Systems: Principles, Analysis, and Applications, Cengage Learning, 2010, ISBN 1418063134, 9781418063139

BCSE74	DIGITAL IMAGE PROCESSING ALGORITHMS	3	0	0	3

UNIT - I Digital image transform algorithms   9 0 0

Two-dimensional discrete Fourier transform   - Row-column FFT algorithm - Memory problems in 2-d DFT calculations - Vector-radix fast Fourier Transform algorithm - Polynomial transform FFT - Two-dimensional power spectrum estimation **-** Discrete cosine transform - Two-dimensional discrete cosine transform - Discrete wavelet transform

UNIT – II Digital image filtering and enhancement   9 0 0

Direct implementation of two-dimensional FIR digital filters - Fast Fourier transform implementation of FIR digital filters - Block methods in the linear convolution calculation Inverse filter implementations - Wiener filters - Median filter algorithms - Digital filters based on order statistics - Signal Adaptive order statistic filters   - Histogram and histogram - equalization techniques - Pseudo coloring algorithms - Digital image half toning - Image interpolation algorithms - Anisotropic Diffusion - Image Mosaicing - Image watermarking

UNIT III Edge detection and Image Segmentation algorithms   9 0 0

Edge detection - Edge thresholding   - Hough transform - Edge-following algorithms - Image segmentation by thresholding - Split/merge and region growing algorithms - Relaxation algorithms in region analysis - Connected component labeling - Texture description

UNIT IV Shape description   9 0 0

 Chain codes - Polygonal approximations - Fourier descriptors - Fourier descriptors - Quad trees - Pyramids - Shape features - Moment descriptors - Thinning algorithms - Mathematical morphology - Grayscale morphology - Skeletons - Shape decomposition - Voronoi tesselation - Watershed transform - Face detection and recognition

UNIT V Digital Image Processing case study with EIKONA   9 0 0

Structure - BW image processing -   Color Image Processing - Arts module - Crack Restoration - Watermark module - EIKONA Source, Library/DLL

Total : 45hrs

TextBook :
1. Ioannis Pitas, Digital image processing algorithms and applications, Wiley-IEEE, 2000, ISBN - 0471377392, 9780471377399

Reference Books:
1. RAFAEL C.GONZALEZ and RICHARD E.WOODS. Digital Image Processing - 2008, Prentice Hall.
2. M.A.SID AHMAED, Image Processing Theory, Algorithm and Architecture - McGraw Hill, 1995

BCSE75	INTELLIGENT IMAGE DATABASES	3	0	0	3

UNIT - 1   The Multimedia Revolution   9 0 0

Multimedia Environment- Multimedia Data Types - Multimedia and Imaging Databases
Evolution of Database Technologies - Network and Hierarchical Models - The Relational
Model - Semantic and Functional Data Models - Extended- and Object-Relational Models -
Nested Relational and Complex Object Models - Object-Oriented Databases - **Multimedia
Databases -** Various Definitions of Multimedia Databases **-** Multimedia and Object-Oriented
Databases - Other Basic Multimedia Database Management System Features - Integrating
Conventional DBMSs with lR and Hierarchical Storage Systems

Unit II Object Orientation: Concepts, Analysis, and Design for Multimedia Databases   9 0 0

 Relationship between Object Orientation and Multimedia - Abstract Data Types
 Advantages of Abstract Data typing for Multimedia Database - **Inheritance -** Advantages of
Inheritance for Multimedia database application Development **-**   Advantages of Object
Identity in multimedia Database Application Development - **Schema Development.
Modeling, and Design for Multimedia Databases -** Overview of OO Analysis and Design
for Multimedia Database Applications - Development Life Cycle - Integrity Constraints for
Multimedia Database Applications**.**

UNIT III - Database Management Systems for Multimedia Databases   9 0 0

Taxonomy of Multimedia Databases - **Multimedia Objects in Relational Databases** i-
OODatabases and Multimedia Database Applications - **Integrating** Object-Oriented and
Database Capabilities - **Extending a** Database **Language with** OO **Capabilities** -
Extending an Existing Object-Oriental **Programming** Language with Database **Capabilities**
- **Application Specific** Products with an Underlying **OODBMS**

UNIT IV – Operations and issues with Multimedia Databases   9 0 0

Extracting Attributes and Key Features-   Objects as Attributes versus Attributes as Objects
- Searching Multimedia Objects - Multikey Searching of Multimedia Objects - Spatial
Databases and Data Types - Iconic Indexing - Content Searching - Content Retrieval for
Text Documents - Content Retieval for Images - Indexing and Retrieval *for* Electronic
video Libraries - Database Querying: Virtual-Reality Interfaces Transactions, Concurrency,
and Recovery in Multimedia Databases -   Transactions - ACID Test - Transactions for
MMDBMS Applications - Transactions Involving the Three Subsystems of an MMDBMS -
Concurrency Control - Recovery – Versioning

UNIT _ V Access Methods and Clustering for Multimedia Object Storage   9 0 0

Introducton - Partitioning search spaces -Indexing strategies and data structures for
indexing - Single-Key Index Structures - Index structures for BLOBs positional access-
Multi attribute and spatial indexing of Multimrdia objects - Indexing for Content – Retrieval-
Clustering - Alternative storage strategies

                                                                    Total : 45hrs

Text Book :
1. Multimedia and imaging databases, Setrag Khoshafian, A. Brad Baker, Morgan Kaufmann,
1996, ISBN 1558603123, 9781558603127
References:
1. Yihong Gong, Intelligent image databases: towards advanced image retrieval, Springer,
1998, ISBN - 0792380150, 9780792380153
2. Content based Image and Video Retrieval , By Oge Marques, Borivoje Furht, Springer,
2002, ISBN - 1402070047, 9781402070044

BCSE76	GEOGRAPHICAL INFORMATION SYSTEMS	3	0	0	3

UNIT –I   **9 0 0**

Introduction - Coordinate Systems - Vector Data Model - Raster Data Model

UNIT II   **9 0 0**

GIS Data Acquisition - Geometric Transformation - Spatial Data Editing - Attribute Data Input and Management - Data Display and Cartography

UNIT III   **9 0 0**

Data Exploration - Vector Data Analysis - Raster Data Analysis - Terrain Mapping and Analysis - Viewsheds and Watersheds

UNIT – IV   **9 0 0**

Spatial Interpolation - Geocoding and Dynamic Segmentation - Path Analysis and Network Applications

UNIT – V   **9 0 0**

GIS Model and Modeling

Total : 45hrs

Text Book:

1. Kang-tsung Chang, Introduction to Geographic Information Systems, 5/e, Mcgrawhill, 2008

Reference Book:

1. Prithvish Nag And Smita Sengupta, Introduction To Geographical Information Systems, Concept Publishing Company, 2007, ISBN 8180694399, 9788180694394
2. Paul Longley, Geographical information systems, 2/e, Wiley, 1999,Digitised 2007, ISBN - 0471321826, 9780471321828

BCSE81	SOFTWARE AGENTS	3	0	0	3

UNIT I: AGENTS – OVERVIEW 9

Agent Definition – Agent Programming Paradigms – Agent Vs Object – Aglet – Mobile Agents – Agent Frameworks – Agent Reasoning.

UNIT II: JAVA AGENTS 9

Processes – Threads – Daemons – Components – Java Beans – ActiveX – Sockets – RPCs – Distributed Computing – Aglets Programming – Jini Architecture – Actors and Agents – Typed and proactive messages.

UNIT III: MULTIAGENT SYSTEMS 9

Interaction between agents – Reactive Agents – Cognitive Agents – Interaction protocols – Agent coordination – Agent negotiation – Agent Cooperation – Agent Organization – Self-Interested agents in Electronic Commerce Applications.

UNIT IV: INTELLIGENT SOFTWARE AGENTS 9

Interface Agents – Agent Communication Languages – Agent Knowledge Representation – Agent Adaptability – Belief Desire Intension – Mobile Agent Applications.

UNIT V: AGENTS AND SECURITY 9

Agent Security Issues – Mobile Agents Security – Protecting Agents against Malicious Hosts – Untrusted Agent – Black Box Security – Authentication for agents – Security issues for Aglets.

TOTAL = 45

TEXT BOOKS:

1. Bigus & Bigus, " Constructing Intelligent agents with Java ", Wiley, 1997.
2. Bradshaw, " Software Agents ", MIT Press, 2000.
3. Russel, Norvig, "Artificial Intelligence: A Modern Approach", Second Edition, Pearson Education, 2003.
4. Richard Murch, Tony Johnson, "Intelligent Software Agents", Prentice Hall, 2000.
5. Gerhard Weiss, "Multi Agent Systems – A Modern Approach to Distributed Artificial Intelligence", MIT Press, 2000.

BCSE82	FUZZY SET THOERY AND APPLICATIONS	3	0	0	3

Unit – I   **9**

Basic concepts of fuzzy sets and fuzzy logic, Motivation, Fuzzy sets and their representations, Membership functions and their designing, Operations on fuzzy sets, Convex fuzzy sets, Alpha-level cuts.

Unit – II   **9**

Geometric interpretation of fuzzy sets, Fuzzy numbers and Linguistic variables, Fuzzy rules, Composition of fuzzy relations, Arithmetic operations on fuzzy numbers, Fuzzy reasoning.

Unit – III   **9**

Fuzzy mapping rules and fuzzy implication rules, Fuzzy rule-based models for function approximation, Types of fuzzy rule-based models (the Mamdani, TSK, and standard additive models), Fuzzy implications and approximate reasoning.

Unit – IV   **9**

Fuzzy logic and probability theory, Possibility versus probability, Probability of a fuzzy event, Baye's theorem for fuzzy events, Probabilistic interpretation of fuzzy sets.

Unit – V   **9**

Decision making in Fuzzy environment, Fuzzy Decisions, Fuzzy Linear programming, Fuzzy Multi criteria analysis, Multi-objective decision making.

Text Books: **TOTAL = 45**

1. George J. Klir and Bo Yuan, "Fuzzy Sets and Fuzzy Logic-Theory and Applications", Prentice Hall, 1995.
2. James A. Freeman and David M. Skapura, "Neural Networks Algorithms, Applications, and Programming Techniques", Pearson Edn., 2003.
3. David E. Goldberg, "Genetic Algorithms in Search, Optimization and Machine Learning", Addison Wesley, 1997.
4. S. N. Sivanandam, S. Sumathi and S. N. Deepa, "Introduction to Fuzzy Logic using MATLAB", Springer, 2007.

BCSE83	PARALLEL ALGORITHMS	3	0	0	3

UNIT I: **9**
PRAM Model – PRAM Algorithms – Parallel Reduction – Prefix Sums – List Ranking – Preorder Tree Traversal – Merging Two Sorted Lists – Graph Coloring – Reducing Number of Processors – NC Class.

UNIT II: **9**
Classifying MIMD Algorithms – Hypercube SIMD Model – Shuffle Exchange SIMD Model – 2D Mesh SIMD Model – UMA Multiprocessor Model – Broadcase – Prefix Sums.

UNIT III: **9**
Enumeration Sort – Lower Bound on Parallel Sorting – Odd-Even Transposition Sort – Bitonic Merge – Parallel Quick Sort – Complexity of Parallel Search – Searching on Multiprocessors.

Unit IV: **9**
P-Depth Search – Breadth Death Search – Breadth First Search – Connected Components – All pair Shortest Path – Single Source Shortest Path – Minimum Cost Spanning Tree.

UNIT V: **9**
Matrix Multiplication on 2-D Mesh, Hypercube and Shuffle Exchange SIMD Models – Algorithms for Multiprocessors – Algorithms for Multicomputers – Mapping Data to Processors.

                                                                                        TOTAL : 45

TEXT BOOKS:

1. Michael J. Quinn, Parallel Computing : Theory & Practice, Tata McGraw Hill Edition, 2003.
2. Ananth Grame, George Karpis, Vipin Kumar and Anshul Gupta, Introduction to Parallel Computing, 2nd Edition, Addison Wesley, 2003

BCSE84	SPEECH PROCESSING	3	0	0	3

UNIT I: INTRODUCTION 9

Spoken Language System Architecture and Structure – Sound and Human Speech System – Phonetics and Phonology – Syllables and Words – Syntax and Semantics – Probability Theory – Estimation Theory – Significance Testing.

UNIT II: SPEECH SIGNAL REPRESENTATION AND CODING 9

Short Time Fourier Analysis – Acoustic Model of Speech Production - Linear Predictive Coding – Cepstral Processing – Perceptual Motivated Representations – Formant Frequencies – Role of Pitch – Scalar Waveform Coders – Scalar Frequency Domain Coders – Code excited linear Prediction – Low – Bit rate Speech coders.

UNIT III: SPEECH RECOGNITION 9

Hidden Markov Models (HMM) – Practical Issues in Using HMMs – HMM Limitations Acoustic Modeling – Phonetic Modeling – Language Modeling - Speaker Recognition Algorithms – Signal Enhancement for Mismatched Conditions.

UNIT IV: SPEECH SYNTHESIS 9

Formant Speech Synthesis – Concatenative Speech Synthesis – Prosodic Modification Of Speech – Source Filter Models For Prosody Modification – Evaluation Of Text To Speech System.

UNIT V: SPOKEN LANGUAGE UNDERSTANDING 9

Dialog Structure – Semantic Representation – Sentence Interpretation – Discourse Analysis – Dialog Management – Response Generation And Rendition – Case Study.

TOTAL = 45

TEXT BOOKS:

1. Thomas F.Quatieri, "Discrete-Time Speech Signal Processing", Pearson Education, 2002.
2. Xuedong Huang, Alex Acero, Hsiad, Wuen Hon, " Spoken Language Processing", Prentice Hall ,2001.
3. B.Gold and N.Morgan, "Speech and Audio Signal Processing", Wiley and Sons, 2000.
4. M.R.Schroeder, "Computer Speech – Recognition, Compression, Synthesis", Springer Series in Information Sciences, 1999.
5. A Brief Introduction to Speech Analysis and Recognition, An Internet Tutorial - http://www.mor.itesm.mx/~omayora/Tutorial/tutorial.html
6. Daniel Jurafsky & James H.Martin, "Speech and Language Processing", Pearson Education ,2000.

BCSE85	SOFT COMPUTING	3	0	0	3

UNIT I: INTRODUCTION TO SOFT COMPUTING AND NEURAL NETWORKS 9

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

UNIT II: GENETIC ALGORITHMS 9

Introduction to Genetic Algorithms (GA) – Applications of GA in Machine Learning - Machine Learning Approach to Knowledge Acquisition.

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 – Rulebase Structure Identification – Neuro-Fuzzy Control – Case studies.

TOTAL = 45

TEXT BOOKS:
1. Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, "Neuro-Fuzzy and Soft Computing", Prentice-Hall of India, 2003.
2. George J. Klir and Bo Yuan, "Fuzzy Sets and Fuzzy Logic-Theory and Applications", Prentice Hall, 1995.
3. James A. Freeman and David M. Skapura, "Neural Networks Algorithms, Applications, and Programming Techniques", Pearson Edn., 2003.
4. Mitchell Melanie, "An Introduction to Genetic Algorithm", Prentice Hall, 1998.
5. David E. Goldberg, "Genetic Algorithms in Search, Optimization and Machine Learning", Addison Wesley, 1997.
6. S. N. Sivanandam, S. Sumathi and S. N. Deepa, "Introduction to Fuzzy Logic using MATLAB", Springer, 2007.
7. S.N.Sivanandam · S.N.Deepa, " Introduction to Genetic Algorithms", Springer, 2007.
8. Jacek M. Zurada, "Introduction to Artificial Neural Systems", PWS Publishers, 1992.

BCSE86	MACHINE LEARNING	3	0	0	3

UNIT I: INTRODUCTION   9

Learning Problems – Perspectives and Issues – Concept Learning – Version Spaces and Candidate Eliminations – Inductive bias – Decision Tree learning – Representation – Algorithm – Heuristic Space Search.

UNIT II: NEURAL NETWORKS AND GENETIC ALGORITHMS   9

Neural Network Representation – Problems – Perceptrons – Multilayer Networks and Back Propagation Algorithms – Advanced Topics – Genetic Algorithms – Hypothesis Space Search – Genetic Programming – Models of Evalution and Learning.

UNIT III: BAYESIAN AND COMPUTATIONAL LEARNING   9

Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – Bayesian Belief Network – EM Algorithm – Probability Learning – Sample Complexity – Finite and Infinite Hypothesis Spaces – Mistake Bound Model.

UNIT IV: INSTANT BASED LEARNING   9

K- Nearest Neighbour Learning – Locally weighted Regression – Radial Bases Functions – Case Based Learning.

UNIT V: ADVANCED LEARNING   9

Learning Sets of Rules – Sequential Covering Algorithm – Learning Rule Set – First Order Rules – Sets of First Order Rules – Induction on Inverted Deduction – Inverting Resolution – Analytical Learning – Perfect Domain Theories – Explanation Base Learning – FOCL Algorithm – Reinforcement Learning – Task – Q-Learning – Temporal Difference Learning

Total =45

TEXT BOOKS:

1. Tom M. Mitchell, "Machine Learning", McGraw-Hill Science /Engineering /Math; 1 edition, 1997
2. Ethem Alpaydin, "Introduction to Machine Learning (Adaptive Computation and Machine Learning)", The MIT Press 2004
3. T. Hastie, R. Tibshirani, J. H. Friedman, "The Elements of Statistical Learning", Springer; 1 edition, 2001

BCSE91	SOFTWARE ARCHITECTURE	3	0	0	3

INTRODUCTION   9   0   0

Introduction - Software Architecture - Definition - Prospects - State of Art - Architectural Styles - Pipes and Filters - Layered Systems - Repositories - Process Control - Other familiar Architecture – Heterogeneous Architectures.

SHARED INFORMATION SYSTEMS   9   0   0

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

ARCHITECTURE DESIGN   9   0   0

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

USER INTERFACE ARCHITECTURE.   9   0   0

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

TOOLS   9   0   0

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

Total No of periods: 45

Text Book:
  Mary Shaw and David Garlan, 'Software Architecture – Perspectives on an emerging Discipline", PHI, 2003

References:
1. Bass, L., Clements P. and Kazman, R., "Software Architecture in Practice, Addison Wesley, 2003.
2. John Robinson, "Software Design for Engineers and Scientists", Newnes, 2004.
3. R. S. Pressman, "Software Engineering", 6th Edition, McGraw Hill Inc., 2009.
4. A. G. Suteliffe, "Human Computer Interface Design", Second Edition Macmillan, 1995.
5. Wolfgang pree, " Design patterns for object Oriented Software Development ", Addison Wesley, 1995.
6. Software Architecture :foundation ,theory & practice by R.N.Taylor,N.Medvidoic,and E.M.Dashofy,2009.
7. Interaction Design,beyond human computer interaction by DR.helen sharp,protessor Yvonne Rogers,2007.

BCSE92	SOFTWARE DESIGN	3	0	0	3

UNIT 1.   9 0 0

DESIGN FUNDAMENTALS - The nature of Design process, Software design processes-Building Modules-transferring design knowledge-Constraints up on the design process and product-recording design decisions, Design qualities-assessing the design-quality attribute of the design product..

UNIT 2.   9 0 0

DESIGN KNOWLEDGE - Describing a design solution-representing abstract ideas-design viewpoints for software,, transferring design knowledge-the need to share knowledge-architectural concept-design methods-design patterns, Rationale for method-software design method-support provided by design method-problem domains and their influences, design process and design strategies-role of strategy in methods-desciding design process-top-down de-composition-design by composition-organizational influences upon design., design patterns-template-reuse.

UNIT 3.   9 0 0

DESIGN MODELS - Stepwise refinement-architectural consequences-strengths and weakness, Structured system analysis and design method-SSA/SD representation forms-process-role of heuristics, Jackson structured programming-background-representation forms-process-heuristics, Jackson system development-representation forms-process-heuristics, Design with objects-object concept-design practices for object oriented paradigm-object oriented frameworks-OOdesign-object based design.

UNIT 4.   9 0 0

HCL - Human Computer Interaction – 8 golden rules for interface design – interaction styles-display devices-input and output devices, usability.

UNIT 5.   9 0 0

DESIGN PRACTICES - Component based design-component concept-designing components, A formal approach to design-model based strategies-Property based strategies.

Total No of periods   :45

Text book:
   1. David Budgen, " Software Design ", Addison-Wesley, 2003.
References:
   1. Pressman R.S, " Software Engineering ", 4th Edition, McGraw Hill Inc., 2006.
   2. Steve McConnell, " Code Complete ", Microsoft press, 2004.
   3. Ed Downs, Peter Clare, Jan coe, " Structured System Analysis and Design methods
   4. Application and Context ", Prentice Hall, 2004.
   5. A.G. Suteliffe, " Human Computer Interface Design ", II Edition Macmillan 2008.

BCSE93	SOFTWARE QUALITY AND TESTING	3	0	0	3

Unit-I Software Quality 9 0 0

Views of quality-hierarchical modeling-Boehm and McCall's models-quality criteria-interrelation-measuring quality-quality metrics-overall measure of quality
Developments in measuring quality: Gilb approach-quality profiles-Management of quality-tools for quality-quality standards

Unit-II Quality Management System 9 0 0

Historical perspective -elements of QMS-Human Quality Culture- QMS for software - Quality Assurance- ISO9000-3-ISO9000 series a generic quality management standard-Impact of ISO9000 and Tick IT-Models and Standards for Process Improvement**:** CMM-Levels of CMM-Role of CMM-SPICE

Unit –III Software Testing 9 0 0

Role of software testing –Testing Defect- Testing Strategy**:** SDLC- A structural approach to testing –Test Strategy-Testing methodology**:** Verification and Validation-Functional and Structural Testing-Developing Testing Methodologies.

Unit-IV Software Testing Methods and Installation 9 0 0

Software Testing Techniques-Selecting and Installing Software Testing Tools–Testing RAD-Testing Security-Creating Test Documentation-Testing System Documentation

Unit-V Software Testing Strategies 9 0 0

Software Testing Process-Overview-Project Management Development Estimate and Status – Developing Test Plan-Requirement Phase Testing-Design Phase Testing-Program phase Testing-Execute Test and Record Results-Acceptance Test-Report Test results – Testing Software Installation-Testing Software Changes – Test Effectiveness Evaluation – Test Measurement Process – Test Metrics.

Total : 45

Text Book:

1. Alan Gillies: "Software quality: Theory and Management", International Thompson, Computer press 1997
2. William Perry, "Effective Methods for Software Testing", Willam Perry, USA, 2006.

Reference Books:
1. Ron patton ,"Software Testing" Techmedia,2005.
2. Stephen H.Khan,"Metrics and models in software quality engg", Addison –Wesley 2002.
3. Sue Carroll, Taz Daughtrey ,"Fundamental Concepts for the Software Quality Engineer - Business & Economics - 2007 .
4. Jeff Tian, " Software Quality Engineering: Testing, Quality Assurance and Quantifiable" - Computers – 2006.

BCSE94	SOFTWARE METRICS	3	0	0	3

UNIT I   MEASUREMENTS THEORY   9   0   0

Fundamentals Of Measurement - Measurements In Software Engineering - Scope Of Software Metrics - Measurements Theory - Goal Based Framework - Software Measurement Validation.

UNIT II   DATA COLLECTION AND ANALYSIS   9   0   0

Empirical Investigation - Planning Experiments - Software Metrics Data Collection - Analysis Methods – Statistical Methods.

UNIT III   PRODUCTS METRICS   9   0   0

Measurement Of Internet Product Attributes - Size And Structure - External Product Attributes - Measurement Of Quality.

UNIT IV   QUALITY METRICS   9   0   0

Software Quality Metrics - Product Quality - Process Quality - Metrics For Software Maintenance - Case Studies Of Metrics Program - Motorola - Hp And IBM.

UNIT V   MANAGEMENT METRICS   9   0   0

Quality Management Models - Rayleigh Model - Problem Tracking Report (PTR) Model - Reliability Growth Model - Model Evaluation - Orthogonal Classification.

TOTAL PERIODS = 45

REFERENCES:

1.   Norman E – Fentar, Share Lawrence Pflieger, "Software Metrics", International Thomson Computer Press, 1998.
2.   Stephen H. Kin, "Metric and Models in Software Quality Engineering", Addison Wesley, 2002.
3.   software measurement establish – extract-evaluate-execute by Christof ebert and Reiner Dumke , 2007.
4.   Software estimation:Demstifying the Black Art(Best Practices(Microsoft)) by Steave McConnell,2006.
5.   Software metrics: a guide to planning, analysis , and application by C.Ravindranath pandian,2003.
.

BCSE95	RISK MANAGEMENT	3	0	0	3

UNIT 1   9 0 0

The Risk management process - Introduction to software risk management, why do we need to manage risk in software development, Use, Objectives, Risk Management Paradigm, Risk management and litigation. Models for Risk Management.

UNIT 2   9 0 0
Discovering Risk In Software Development -   Risk attributes and Identification, Identifying software risk, Common software project risks, Risk Taxonomy, Risk Mapping, statements, reviews., Risk ownership and stakeholder management.

UNIT 3   9 0 0
Risk Assessment In Software Projects - Objectives and goals. Approach to assessment, Risk assessment tools and techniques, presenting the risk findings.

UNIT 4   9 0 0
Planning Risk Mitigation Strategies - Risk Planning, Best practices in the risk planning, Risk management tools, Risk mitigation strategies, Formulating and Implemeting risk management plans.

UNIT 5   9 0 0
Monitoring Risk In Software Projects - Developing a process for monitoring risk, formulating a project risk database, Managing and tracking risk, Risk support tools. Software Risk Metrics, organization, estimation, development methodology.

TOTAL = 45 PERIODS

REFERENCES:

1. Yacov Y. Haimes, "Risk Modeling, Assessment, and Management", Wiley, 2009
2. John Mcmanus, " Risk Management in software development projects", Elsevier, 2004
3. Martin Loosemore, John Raftery, "Risk management in projects",Taylor & Francis Ltd, 2006
4. Ravindranath P. C, "Applied Software Risk Management", Auerbach, 2007
5. Dale Walter Karolak,"Software engineering risk management", Wiley-Ieee Computer Society, 1995

| BCSE96 | SECURITY PRINCIPLES AND PRACTICE | 3 | 0 | 0 | 3 |

UNIT I   INTRODUCTION & MATHEMATICAL FOUNDATION   9   0   0

Beginning with a simple communication game – wresting between safeguard and attack – Probability and Information Theory - Algebraic foundations – Number theory.

UNIT II   ENCRYPTION – SYMMETRIC TECHNIQUES   9   0   0

Substitution Ciphers - Transposition Ciphers - Classical Ciphers – DES – AES – Confidentiality Modes of Operation – Key Channel Establishment for symmetric cryptosystems.

UNIT III   ENCRYPTION –ASYMMETRIC TECHNIQUES & DATA INTEGRITY TECHNIQUES   9   0   0

Diffie-Hellman Key Exchange protocol – Discrete logarithm problem – RSA cryptosystems & cryptanalysis – ElGamal cryptosystem – Need for stronger Security Notions for Public key Cryptosystems – Combination of Asymmetric and Symmetric Cryptography – Key Channel Establishment for Public key Cryptosystems - Data Integrity techniques – Symmetric techniques - Asymmetric techniques

UNIT IV   AUTHENTICATION   9   0   0

Authentication Protocols Principles – Authentication protocols for Internet Security – SSH Remote logic protocol – Kerberos Protocol – SSL & TLS – Authentication frame for public key Cryptography – Directory Based Authentication framework – Non - Directory Based Public-Key Authentication framework .

UNIT V   SECURITY PRACTICES   9   0   0

Protecting Programs and Data – Information and the Law – Rights of Employees and Employers – Software Failures – Computer Crime – Privacy – Ethical Issues in Computer Security.

REFERENCES

1. Wenbo Mao, "Modern Cryptography – Theory and Practice", Pearson Education, First Edition, 2006.
2. Douglas R. Stinson ,"Cryptography Theory and Practice ", Third Edition, Chapman & Hall/CRC,2006.
3. Charles B. Pfleeger, Shari Lawrence Pfleeger, "Security in Computing", Fourth Edition, Pearson
   Education, 2007.

BCSEA1	UNIX INTERNALS	3	0	0	3

UNIT I   9 0 0

UNIX Operating System – History – Commands – System Structure – Shell Programming – System/call – UNIX Communication – Architecture – File Sub System and Process – Sub – System – User – Kernel Modes – Process States and Transition – Sleep and Wakeup.

UNIT II   9 0 0

Buffers- Structures and Representator – Implementation of System Calls.

UNIT III   9 0 0

Structure – Context – Address Space – Creation – Scheduling – Thread implementation of System Call.

UNIT IV   9 0 0

Swapping – Segmentation – Demand Paging - implementation of System Call.

UNIT V   9 0 0

Drivers – Streams – Implementation of IPC Mechanism.

TEXT BOOKS:

1. M.J.Bach, "The Design of the UNIX OS", Prentice Hall, 2007.

REFERENCE BOOKS :

1. Goodheart B. Cox J, "The Magic Garden Explained", Prentice Hall of India, 1996
2. M.J.Bach, "The Design of the UNIX OS", Prentice Hall, 2007.
3. W. Richard Stevens "UNIX-Network Programming". Volume1, 2nd Edition, Pearson Education, 2008.
4. Das Sumitabha, "UNIX concepts and Applications", 4th Edition, TMH,2006.
5. W. Richard Stevens "UNIX-Network Programming". Volume2, 2nd Edition, Pearson Education, 1999.5. Kay A, Robbins and Steven Robbins, "Practical UNIX Programming", PHI,2009

BCSEA2	DISTRIBUTED COMPUTING	3	0	0	3

UNIT-I   **9 0 0**

Fundamentals: Introduction to distributed computing system, Evolution, Differentmodels, Gaining popularity, Definition, Issues in design, DCE, Message passing-Introduction, Desirable features of a good message passing system, Issues in IPC, Synchronization, Buffering, Multidatagram, Process addressing, Failure handling, Group communication.

UNIT-II   **9 0 0**

RPC: Introduction, RPC model, transparency of RPC, Implementing RPC mechanism, Stub generation, RPC messages, Marshalling arguments and results, Sever management, parameter-passing semantics, Call semantics, Communication protocols for RPCs, Complicated RPC, Client-server binding, exceptional handling, security, special types of RPC, RPC in heterogeneous environments, Lightweight RPC, Optimization for better performance ,Case studies-Sun RPC,DCE,RPC.

UNIT-III   **9 0 0**

Distributed Shared Memory and Synchronization: Introduction, General architecture of DSM systems, Design and implementation issues of DSM, Granularity, Structure of shared memory space, Consistency model, Replacement strategy, Thrashing, Different approaches to DSM, Advantages of DSM, Clock synchronization, Event ordering, Mutual exclusion, Deadlock, Election algorithm.

UNIT-IV   **9 0 0**

Resource and Process Management: Introduction, Desirable features of a good global scheduling algorithm, Task assignment approach, Load-balancing approach, Load sharing approach, Process migration, Threads.

UNIT-V   **9 0 0**

DFS and Security: Desirable features of good DFS, File models, File accessing, models, File sharing semantics, File caching schemes, File replication, Fault tolerance, Atomic Transaction, Design principles, Case Study: DCE DFS, Potential attacks to computer system, Cryptography, Authentication, Access control, Digital signatures, Design principles, DCE security service.

TEXT BOOK

PRADEEP K. SINHA, Distributed Operating System Concepts and Design" PHI, 1997.

REFERENCE BOOK:

1. ANDREW S. TENENBAUM, Modern Operating System – 3rd Edition, PHI, 2007.
2. AJAY D. KSHEMKALYANI , MUKESH SINGHAL Distributed computing : principles, algorithms and systems – Cambridge University Press-2008
3. ANDREW S. TENENBAUM &MAATREN VANSTEEN, Distributed systems: Principles & Paradigms – 3rd Edition, PHI-2006
4. HAGIT ATTIYA AND JENNIFER WETCH ,Distributed computing fundamentals, simulations and Advanced Topics – 2nd Edition-2004
5. JEAN DOLLIMORE, TIM KINDBERG, AND GEORGE COULOURIS Distributed Systems: Concepts and Design -4th Edition) - May 20, 2005

BCSEA3	REALTIME SYSTEM DESIGN	3	0	0	3

INTORDUCTION   9 0 0

Architecture of real time systems/embedded systems-operating systems issues-performance measures-estimating program run times

TASK ASSIGNMENT AND SCHEDULING   9 0 0

Uniprocessor scheduling-IRIS tasks-task assignment mode charges -fault tolerance scheduling

PROGRAMMING LANGUAGES AND TOOLS   9 0 0

Desired characteristics based on ADA-data typing-control structures-packages-exception handling-overloading-multitasking-timing specification-task scheduling-just in time compilation-run time support.

REAL TIME DATABASES   9 0 0

Basic networking principles-real time databases -transaction processing-concurrency control-disk scheduling algorithms-serialization and consistency.

FAULT TOLERANCE, RELIABILITY AND SYNCHORNIZATION   9 0 0

Fault types-fault detection and containment-redundancy-data diversity-reversal checks-obtaining parameter values-reliability models for hardware redundancy-software error models-clocks-fault tolerance synchronization-synchronization and software.

TEXT BOOKS:
1. C.M.Krishna, Kang.G.Shin, Realtime Systems, McGraw Hill 1997.

REFERENCE BOOKS:
1. Raymond j.a. Buhr -an introduction to real time systems from design to networking c and **c++,** Prentice Hall 1999.
2. Albert .m.k.cheng "real time systems- scheduling, analysis and verification., wiley interscience 2002
3. Jane.W.S.Liu ,"Real-Time System" Prentice Hall -2006.
4. Philip.a.laplante," real-time system design and analysis",
   Wiley-ieee press – 2004
5. Alan burns and andy wellings,"Real time systems and prog. Languages", 4 th edition,pearson ,2009.

BCSEA4	ADVANCED OPERATING SYSTEM	3	0	0	3

Unit I MULTIPROCESSOR OPERATING SYSTEMS 9 0 0

Threads –Process synchronization –Processor scheduling-Memory management-Reliability-Fault tolerance.

Unit II NETWORK OPERATING SYSTEMS   9 0 0

Types of NOS –NOS to LANs-Choosing and NOS-multiple NOS on a single network-NOS and network management –future trends

Unit III Distributed Operating Systems   9 0 0

Issues-Communication primitives-remote procedure call-Logical clocks-Vector clocks-distributed mutual exclusion-non token based algorithms-token based algorithms-issues in deadlock detection and resolution-centralized and distributed deadlock detection algorithms-election algorithms, classification of agreements problems-solutions to the Byzantine time agreement problem-impossibility result. Issues in load distributing –load distributing algorithms-performance comparison. Distributed file system design issues-mechanisms for building DFS-case studies.

Unit IV Database Operating Systems   9 0 0

Requirements-concurrency control model-serializability theory-distributed database systems-synchronization primitives-lock based and time stamp based algorithms-Fully replicated database systems.

Unit V Real time Operating Systems   9 0 0

Architecture of real time systems-OS issues-Performance measures-estimating program run times –uniprocessor scheduling-IRIS tasks-task assignment mode changes-fault –tolerance scheduling.

TEXT BOOK:

1.Mukesh   singhal,Niranjan.G.Shivarathiri-Advanced   Concepts   And   Operating Systems,Mcgraw Hill ,New York,1994(I,III,IV unit).

2.C.M.Krishna,Kang .G. Shin"Real Time Systems",Mcgraw Hill,1997(v unit)

3.Philip Hunter Network Operating Systems-Making Right Choices Addison Wesley 1995(II unit)

REFERECNCE BOOKS:

1.Andrew S. Tanenbaum -MODERN OPERATING SYSTEMS, 3 e, (c) 2008 Prentice Hall, (sec. 9-13 only).

2.Modern Operating Systems 3 e, (c) 2008 Prentice-Hall, Inc.

3.Gary Nutt –OPERATING SYSTEMS –A MODERN PERSPECTIVE Addison Wesley 2003.

BCSEA5	PARALLEL PROCESSING	3	0	0	3

UNIT I   9   0   0

Parallel Computer Models: Multiprocessors and Multi computers – Multi vector and SIMD Computers - PRAM and VLSI models - Program and Network properties - Program Flow Mechanism - System Interconnection Architectures - Parallel processing Applications - speedup performance.

UNIT II   9   0   0

Hardware Technologies: Processor and Memory Hierarchy: Advanced processor Technology – Super scalar and Vector Processors - Memory Hierarchy Technology - Virtual Memory Technology - Bus, Cache and Shared Memory organization.

UNIT III   9   0   0

Processor Development Techniques: Linear Pipeline Processors - Non-linear pipeline processors - Instruction pipeline Design: Introduction Execution Phases, Mechanism for Instruction pipelining, dynamic instruction scheduling - Arithmetic pipeline design: Computer Arithmetic principles, Multifunctional Arithmetic pipelines – Super scalar and super pipeline design.

UNIT IV   9   0   0

Parallel and Scalable Architectures: Multiprocessor system interconnection - Cache coherence and synchronization mechanisms: The Cache Coherence Problem, Snoopy Bus Protocols, Directory - based protocols - Message - passing mechanisms – multi vector multiprocessors - compound vector processing - SIMD computer organizations - Principles of multithreading - Fine-grain multi computers - Scalable and multithreaded Architectures.

UNIT V   9   0   0

Parallel Programming Software: Parallel programming models - parallel languages and compliers - dependence analysis of data arrays - code optimisation and scheduling - parallel programming environments - multiprocessor UNIX design goals - master-slave and multithreaded UNIX - multicomputer UNIX extensions.

TEXT BOOKS :
1. Kai Hwang, "Advanced Computer Architecture - Parallelism, Scalability, Programmability", McGraw Hill, 1993.

REFERENCE BOOKS :
l. Kai Hwang and Faye A Briggs, "Computer Architecture and Parallel Processing", McGraw Hill, 1985.
2. Michel J.Quinn, "Parallel Computing Theory and Practice", McGraw Hill, 1994. 3.Joel M.Crichlow,"An Introduction to distributed and parallel computing", 2nd Edn., PHI, 1997. 4.Kogge P.M, "The architecture of pipelined computers", McGraw Hill, 1981.
3. Michael A. Heroux, Padma Raghavan, Horst D. Simon," Parallel processing for scientific computing", Cambridge University Press, 2006.
4. Harald Kosch, László Böszörményi, Hermann Hellwagner," Euro-Par 2003 parallel processing", Springer, 2003.

BCSEA6	FAULT TOLERANCE SYSTEMS	3	0	0	3

UNIT- I **INTRODUCTION** 9 0 0

System structuring - Recovery blocks - Early implementations and experiments - Extensions and applications of basic recovery blocks- Recovery in concurrent systems - Linguistic support for software fault tolerance.

UNIT- II N-VERSION PROGRAMMING & ARCHITECTURAL ISSUES 9 0 0

Fault-tolerant software: Models and techniques - Building n-version software -Experimental investigations - A design paradigm for n-version software -The system context for fault -Tolerant software- Approaches to software-fault tolerance - Analysis of software fault tolerance-Definition and analysis of hardware software fault tolerant architectures.

UNIT III DEPENDABILITY MODELING FOR FAULT-TOLERANT SOFTWARE 9 0 0

System Descriptions- Modeling Assumptions And Parameter Definitions-System Level Modeling- Experimental Data Analysis- Quantitative System-Level Analysis-Sensitivity Analysis-Decider Failure Probability

UNIT-IV DISTRIBUTED RECOVERY BLOCK SCHEME 9 0 0

Non-Negligible Fault Sources And Desirable Recovery Capabilities-Basic Principles Of The DRB Scheme-Implementation Techniques-Experimental Validations Of Real-Time Recovery

UNIT-V SOFTWARE FAULT INSERTION TESTING 9 0 0

Testing fault tolerance using software fault insertion- Fault manager-Categorization of software faults, errors, and failures- sfit methodology-Sample sfit test plans-Application and results.

TEXT BOOK:

Software Fault Tolerance, Michael R. Lyu, John Wiley & Sons Ltd , 1995.

REFERENCE BOOK:
1.   Fault Tolerant Software Systems Techniques &Applications, Hoang Pharm,1992.
2.   Software Fault Tolerance Techniques And Implementations, Laura L. Pullam

CSEB1	DESIGN OF ALGORITHMS	3	0	0	3

Unit 1 ADVANCED ALGORITHMS   9 0 0

Polynomials-evaluation-matrices-multiplication-FFT and convolution-Binary matrices-Transitive closure-Number theoretic algorithm –Chinese remainder theorem-RSA public key crypto systems.

Unit II DIVIDE AND CONQUER   9 0 0

General methods-typical problems finding the minimum and maximum-strassen's matrix multiplications-convex hull.

Unit III GREEDY METHOD   9 0 0

General method-Knapsack problem-tree vertex splitting-job sequencing with deadlines.

Unit IV DYNAMIC PROGRAMMING   9 0 0

General method-0/1 Knapsack-Traveling salesman Problem-Flow shop scheduling.

Unit V BACK-TRACKING & BRANCH AND BOUND TECHNIQUES   9 0 0

General method-8 Queen's problem-Graph coloring-Branch and Bound method-0/1 Knapsack-Traveling Salesman.

TEXT BOOK:

1. Thomas H.Cormen, Charles.E.Leiserson, Ronald L.Rivest, INTRODUCTION TO ALGORITHMS 2001

REFERENCE BOOKS:

1. Ellis Horowitz, sartaj sahni, Sanguthevar rajashekar,"Computer algorithms", Prentice Hall of India.2008.
2. Sara base and Allen Van Gelder,"Computer algorithms", Galgotia 2000.
3. Johnsonbaugh & Schaefer "Algorithms" Pearson (Prentice-Hall) 2004.
4. Algorithms and complexity By Herbert S. Wilf second edition 2002.
5. Algorithms: design techniques and analysis By M. H. Alsuwaiyel reprint 2003

BCSEB2	NUMERICAL & STATISTICAL METHODS	3	0	0	3

Unit I: Numerical Methods I   **9   0   0**

Introduction to Numerical Methods œ Solution of algebraic and transcendental equations œ Newton's method œ Bisection Method œ Regula falsi method œ Secant method œ Newton Raphson Method œ Iteration Method .

Unit II: Numerical Methods II   **9   0   0**

Solution of simultaneous equations œ Gauss Elimination Method œ Euler's Modified Methods œ So lution of ord inary differential equations œ Taylor's Method œ Predictor and Corrector Method œ Runge Kutta Method œ Basic Concepts of Interpolation œ Quadatu re Formula œ Simpson's, Trapezoidal Rule.

Unit III: Statistics   **9   0   0**

Introduction of Statistics œ Mean, Median, Mode, - Concept of quartile, Percentile , S.D., Skew ness and Kurtosis with so me simple applications œ Simple Correlation and Regression.

Unit IV: Probability Distribution   **9   0   0**

Definition of Probability œ Basic Properties of Probability œ Conditional Probability œ Baye's Theroem œ Discrete and continuous Random Variables and their Probability Distributions - Standard Distributions œ Binomial, Poisson, Normal Distributionsœ Some Simple Ap plications.

Unit V: Sampling Techniques   **9   0   0**

Introduction to Sampling œ Random sampling œ Standard error œ Testing of Hypothesis - Level of Significance œ Confidence Interval œ Large Sample and Small Sample Test œ t-,F-,Chi Square Tests.

TEXT BOOK:
1. Kapur J.N. and Saxena ,H.C. - Mathematical Statistics œ S.Chand & Company.
REFERENCE:
1. S.C.Gupta & Kapur V.K. œ Fundamentals of Mathematical Statistics œ Sultan Chand & Sons (1999).
2. S.P.Gupta œ Statistical Methods - Sultan Chand & So ns.
3. Computer Oriented and Numerical Methods œ V.Rajaraman œ Prentice Hall of India.

BCSEB3	THEORY OF COMPUTATION	3	0	0	3

UNIT – I : REGULAR LANGUAGE: 9 0 0

Finite State Systems – Basic Definitions – Finite Automation – DFA & NFA – Finite Automation with E-moves – Regular Expression – Equivalence of NFA and DFA – Equivalence of NFA's with and without E-moves – Equivalence of Finite Automation and regular expressions – Pumping Lemma for Regular Sets – Problems based on Pumping Lemma.

UNIT – II: CONTEXT FREE LANGUAGES :   9 0 0

Context Free Grammars – Derivation and Languages – Relationships between derivation and derivation trees – Ambiguity –Simplification of CEG – Greiback Normal form – Chomskey normal form – Problems related to CNF and GNF.

UNIT – III: PUSHDOWN AUTOMATA: 9 0 0

Definition – Moves – Instantaneous descriptions – Deterministic Pushdown Automata - Pushdown automata and CFL – pumping lemma for CFL – Applications of pumping lemma

UNIT – IV: TURING MACHINES: 9 0 0

Turing Machines – Computable Languages and Functions – Turing Machine Constructions – Storage in finite control – Multiple tracks – Checking of symbols – Subroutines – Two way Infinite Tape.

UNIT – V : UNDECIDABLITY: 9 0 0

Properties of recursive and Recursively enumerable languages – Universal Turing Machines as an undecidable problem – Universal Languages – Rice's Theorem. The Chomskey Hierarchy.

Text Book:
1) J.E. Hopcroft and J.D. Ullman, " Introduction to Automata Theory, Languages and Computation", Narosa Publishers 2002

Reference Books:
1) Michael Chipser, " Introduction to the Theory of Computation", Brooke, Cole , Thomson Learning 2002
2) J.C Mortin, "Introduction to Language and Theory of Copmputation", McGrawHill, 2002
3) Ragade, "Automata and Theoretical Computer Science", Pearson Education 2004
4) Bernard M. Moret, "The Theory of Computation", Pearson Education Asia 2002
5) S. Sivanandan, M. JanakiMeera ,"Theory of Computation", I. K. International 2009

BCSEB4	ALGORTHIMIC GRAPH THEORY	3	0	0	3

UNIT I   9 0 0

Graphs and Graph Theory -Some Typical Applications- Outline of the Course-Labeled and Unlabeled Graphs - Invariants of a Graph- Order, Size, Degree-Computer representation of graphs/digraphs-Adjacency and incidence matrices - Adjacency and incidence lists -Graphical Sequence-A characterization of graphical sequences-Walks, Trails, Paths, Cycles- Subgraphs of a Graph-Induced Subgraphs-Spanning Subgraphs

UNIT II   9 0 0

Connected and Disconnected Graphs/Digraphs-Trees and Forests-Complete Graphs & Tournaments-Bipartite Graphs-A characterization of bipartite graphs-Hamiltonian Graphs-Eulerian Graphs/Digraphs-A characterization of Eulerian graphs-Iterative Graphs-Random Graphs-Other Special Graphs

UNIT III   9 0 0

Some Properties of Trees-Spanning Trees of a Graph-Optimal Spanning Trees-Different Optimality Criteria-Finding Optimal Spanning Trees-Some Applications

UNIT IV   9 0 0

Directed Trees-Some Properties of Directed Trees-Counting Trees-Counting Spanning Trees of a Labeled Graph-Maximum Flow-Problem Description-Evolution of Maximum-Flow Algorithms-Ford-Fulkerson Results-Edmond-Karp Algorithm-MPM Algorithm-Other MFAs

UNIT V   9 0 0

Applications Of Maximum-Flow-Finding Arc-Disjoint paths-Finding edge-disjoint Paths-Finding vertex-disjoint paths-Graph Connectivities-Problem Description-Evolution of Connectivity Algorithms-Computing _ of a Graph-Computing _ of a Digraph Connectivity-Generalizations-Problem Description-Conditional Connectivities-Restricted Connectivities-Some Applications Matchings-Problem Description-Matching Algorithms-Some Application

TEXT BOOK:
   1.Charles Golumpic ,Algorithimic Graph Theory 2004
REFERENCE BOOK:

1. Narsingh Deo, Graph theory with applications to Engineering and Computer Science, Prentice Hall of India (P)Ltd.,2004.
2. Algorithmic Graph Theory   by Alan M Gibbons 1999
3. Algorithmic Graph Theory and Perfect Graphs, by Martin Charles Golumbic second edition 2004.
4. Graphs, networks and algorithms By Dieter Jungnickel second edition 2005

BCSEB5	PRINCIPLES OF PROGRAMMING LANGUAGES	3	0	0	3

Unit I Preliminaries   9   0   0

     Programming domains, language evaluation criteria, language design -categories-tradeoffs, implementation methods, programming environments.

 Syntax and Semantics: Problem describing syntax-formal methods for describing syntax-recursive descent parsing, attribute grammar, dynamic semantics. Names, Bindings, Type Checking and Scopes: Names -variables-concept of binding-strong typing -type compatibility-scope and lifetime.

Unit II Data Types   9   0   0

     Primitive - character string –user- defined -array-associative array-record -unions -set-pointers-abstract data types.Expression and Assignment Statement: Arithmetic expressions-overloaded operators-type conversions-relational and Boolean expressions-assignment statements-mixed mode assignment.

Unit III Statement - level Control Structures   9   0   0

   Compound-selective-iterative statements, unconditional branching and guarded commands. Subprograms: Fundamentals -design issues-local referencing-parameter passing-overload subprograms-design issues of functions-accessing non-local environment-user defined overloaded operators-implementing sub programs**.**

Unit IV Abstract data types   9   0   0

     Concepts of abstraction, encapsulation, data abstraction, language examples-parameterized abstract data type   Support for Object Oriented Programming: Object oriented programming-design issue. Smalltalk -Example programs- features- evaluation. Support for object oriented programming in c++-java-Ada 95-eiffel, implementation of object oriented constructs.

Unit V Concurrency   9   0   0

     Subprogram level concurrency-semaphores-monitors-message passing-concurrency in Ada 95,java threads, statements level concurrency.Exception Handling: Exception handling in PL/I-ADA-C++-JAVA.

Textbook:

1. ROBERT. W.SEBESTA. "Concepts of programming languages"- Addison Wesley.

9th edition, 2009

Reference:

1. Pratt, Zelkowitz, "Programming Languages: Design and Implementation", Pearson Eduation, 4th Edition, 2009

2. Ravi Sethi, "Programming languages" Addison Wesley 3rd Edition.

3. Doris Appleby & Julius J Vande Kopple, "Programming Languages Paradigm and Practice". Tata McGraw Hill,2nd Edition 2003

4. Programming Languages Principles and Practice 2nd Edition by Kenneth C.

   Louden 2003

BCSEB6	NATURAL LANGUAGE PROCESSING	3	0	0	3

UNIT I

9 0 0

Introduction - The issues and difficulties in natural language processing - Lingustics and computational linguistics - Language understanding and generation - Understanding of spoken, written and textual information.

UNIT II

9 0 0

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 0 0

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

UNIT IV

9 0 0

Discourse 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 0 0

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

TEXT BOOK:
1. James Allen Benjamin Cummings, "Natural language understanding", Pearson Education 2003.

REFERENCE BOOKS:

1. Grosz, Jones & Webber, Readings in Natural Language Processing, Morgan Kanfamann Publishers, 2005.
2. Daniel Jurafsky and James H. Martin, Speech-Language-Processing PHI,2008.
3., Natural Language Processing and Information Retrieval ,Oxford Higher Education, 2008.

BCSEC1	HIGH PERFOMANCE MICROPROCESSOR	3	0	0	3

Unit I   CISC Principles   9 0 0

 Classic CISC Microprocessors – Advanced Processors of the Intel Family – Architecture – Paging and Segmentation – Real and Virtual Mode Execution – Protection Mechanism – Task Management.

Unit II CISC Microprocessor   9 0 0

 Study of a Current CISC Microprocessor Architecture Operating Modes – Bus Cycles – Performance – Related Features – Supporting devices – Bus System Support.

Unit III   RISC Principles   9 0 0

 RISC Processors – Principles – Architectural Features of DEC Alpha/ Power PC/Sun Sparc/MIPS RX100 Family.

Unit IV RISC Microprocessor   9 0 0

 Study of a Current RISC Microprocessor Architecture – Performance Related Features – Supporting Devices – Bus System Support.

Unit V   Case Studies: 9 0 0

 Case Studies and Comparison.

TEXT BOOK:
1.D. Tabak, "Advanced Microprocessors", McGraw –Hill, 1996.

REFERNCE BOOKS:
1. Barrey B.Brey,"The Intel Microprocessor 8086/8088, 801836/80188,80286,8036,80486, Pentium and Pentium Preprocessor – Architecture, Programming and Interfacing", Prentice Hall; 2003
2. Ramesh S Gaonkar, Microprocessor Architecture, Programming and application with 8085, 4th Edition, Penram International Publishing, New Delhi, 20002.
3. Mohammed Ali Mazidi and Janice Gillispie Mazidi, The 8051 Microcontroller and Embedded Systems, Pearson Education Asia, New Delhi, 2003
4. A.K. Ray and K.M.Burchandi, Intel Microprocessors Architecture Programming and Interfacing, McGraw Hill International Edition, 2000
5. M. Rafi Quazzaman, Microprocessors Theory and Applications: Intel and Motorola prentice Hall of India, Pvt. Ltd., New Delhi, 2003.

BCSEC2	COMPUTER PERIPHERALS AND INTERFACING	3	0	0	3

Unit I Microcomputer System   9 0 0

Peripheral Devices-Keyboard-CRT Display Monitor-Printer-Magnetic Storage Devices-FDD-HDD-Special Peripherals-PC Hardware Overview-BIOS-DOS Interaction-PC Family-PC Hardware-Mother board Logic-Memory Space-I/O Data transfer-DMA channels-Keyboard Interface-Parallel Interface-Serial Interface-CRT Display Controller-FDC-HDC-Hard disk card-Memory Refresh-POST sequence.

Unit II Hardware Components and ICs   9 0 0

Microprocessors in PC-Intel 8088-Internal Organization-Bus Cycle-8088 Operation-I/O Addressing-Interrupt Handling-8088 Instruction-Coprocessor-Support chips in the Mother-board-Dump and Smart Chips-Clock Generator 8284-Bus Controller-Interrupt Controller 8259A-Programmable Interval Timer 8253-8255A-5PPI-DMA Controller 8237A5.

Unit III Motherboard Circuits   9 0 0

Motherboard functions-Reset Logic- CPU Nucleus Logic-Wait state logic-Bus Arbitration-RAM Logic-ROM Decode Logic-RAM Parity Logic-NMI-Logic-I/O Ports Decode Logic-Time of day (TOD) Logic-Dynamic Memory Refresh Logic-Speaker Logic-Mode Switch Input Logic-Keyboard Interface-Coprocessor Unit-Control Bus Logic-Address Bus Logic-Data Bus Logic-I/O Slot Signals-New Generation Mother Board-Mother Board Connectors and Jumpers-Design Variations-SMPS-Printer Controller -Floppy Disk Controller.

Unit IV Hard Disk Controller Subsystem-Display Adaptor   9 0 0

Hard Disk Controller Subsystem-Display Adaptor-CRT Display-CRT Controller Principle-CRT Controller Motorola 6845-MDA Design Organization-Color/Graphics Adapter-Advanced Graphics Adapter-New Generation Display Adapters-Device Interface-Auxiliary Sub-Systems-Serial Port in PC-RTC-LAN.

Unit V Installation and Preventive Maintenance   9 0 0

Pre-installation planning-Practice-Routine Checks-Special Configurations-Memory, Hard Disk up gradation-DOS and Software-Preventive Maintenance-System Usage-Trouble-shooting-Nature and Types of Faults-Trouble-shooting Tools-Post- Motherboard Problems-Diagnosis-FDC, FDD, HDC, HDD Problems-Overview of Advanced PCs.

TEXT BOOK:
1. B.GOVINDARAJULU, IBM PC and Clones Hardware, Trouble Shooting and maintenance-Tata McGraw Hill Pub.Ltd, 2002.

REFERENCE BOOKS:
1. Antonakus, "An introduction to the Intel family of microprocessors", III ed., Pearson Education, 2004.
2. Buchanan, "PC Interfacing, Communications and Windows Programming", Pearson Education, 2002.
3.Computer Peripherals (Hardcover - 1995-09), Prentice Hall- Gale
4. Computer Interfacing: A Practical Approach To Data Acquisition   And Control Prentice Hall

BCSEC3	ROBOTICS	3	0	0	3

UNIT –I 9 0 0

The scope of Industrial Robotics – Definition of an Industrial Robot – Need for Industrial Robots – Applications – Fundamentals of Robot Technology – Automation and Robotics – Robot Anatomy – Work Volume – Precision of Movement End Effectors – Sensors.

UNIT– II 9 0 0

Robot Programming – Methods – Interlocks Textual Languages – Characteristics of Robot Level Languages – Characteristics of Task Level Languages.

UNIT – III 9 0 0

Puma Robot Arm Control – Computated Torque Technique – Near Minimum Time Control – Variable Structure Control – Non-linear Decoupled Feedback Control – Reserved Motion Control – Adaptive Control.

UNIT– IV 9 0 0

Robot Cell Design and Control – Remote Center Compliance – Safety in Robotics.

UNIT – V 9 0 0

Advanced Robotics, Advanced Robotics in space – Specific features of Space Robotics Systems – Long Term Technical Developments – Advanced Robotics in Underwater Operations – Robotics Technology of the Future - Future Application.

TEXT BOOK:

1.Barry Leatham Jones, "Elements of Industrial Robotics" Pitman Publishing, 1987.

REFERENCE BOOKS:

1. Mikell P.Groover, Mitchell Weiss, Roger N.Nagel, Nicholas G. Odrey, "Industrial Robotics Technology, Programming And Applications", McGraw Hill Book Company, 2008.
2. Asfahl C.R. "Robots and Manufacturing Automation", 2nd edition, Wiley 1992.
3. Helena Domaine," Robotics", Lerner Publications, 2006.
4. Stefano Nolfi, Darío Floreano," Evolutionary robotics: the biology, intelligence, and technology of self-organizing machines", MIT Press, 2000

BCSEC4	MULTI CORE ARCHITECTURE AND PROGRAMMING	3	0	0	3

Unit I: 9   0   0   0
Introduction: Evolution of Computer Architecture - Trends; Fundamentals of Parallel Computers; Need for multi-core architectures
Unit II: 6   0   3   0
Parallel Programming: Overview, Parallel programming design patterns, Multithreading goals and issues, OpenMP Directives – Parallel, work sharing, task, synchronization constructs & other directives, Exercises on Multithreading with OpenMP.
Unit III: 6   0   3   0
Software Optimization & Performance Analysis: Processor Architecture basics, Need for software optimization, Algorithms analysis, Performance analysis - Hot spots, Branching, Memory, Loops
Unit IV: 6   0   3   0
Benchmarking multi-core architecture: Bench marking of processors. Comparison of processor performance for specific application domains.
Unit V: 0   0   9   0
Case Studies & Lab Experiments: will be the content for asking questions in the SEE
Total Hours : 27+18 = 45
Text Books:
1. The Software Optimization Cookbook; Richard Gerber, Aart J.C. Bik, Kevin B. Smith and Xinmin Tian; Intel Press.
2. Multi-Core Programming; Shameem Akhter and Jason Roberts; Intel Press.
References:
   1. OpenMP Spec 3.0 handbook available on the Web
   2. Lecture Notes & Web References
Students are required to carry out 10 experiments from the list of Experiments and complete a mini project for the successful completion of the course
   1. Hello World Program – Basic
   2. Hello World Program – Modified – Private
   3. Addition of two array A & B to get array C
   4. There are two arrays A and B write a program that has two blocks: one for generating array C = A+B and another array D = A*B, such that work in blocks will be done by different threads.
   5. Example on using critical Directive
   6. Add two arrays A & B each of 1000 to generate an array C using reduction clause
   7. Multiply two matrices A & B and find the resultant matrix C
   8. Write a program to find the number of processes, number of threads etc (Environment information)
   9. Write a program to find the largest element in an array
   10. Write a program to find the largest element in an array (usage of locks)
   11. Write a program to find the sum of an array A
   12. Write a program to Multiply a matrix by a vector and get the result of the operation
   13. Write a program to print all the letters of the alphabet A- Z using threads.
   14. Write a program to show how first private clause works.(Factorial program)
   15. Write a program to show how last private clause works. (Sum of powers)
   16. Write a program to find prime numbers (split)

BCSED1	DECISION SUPPORT SYSTEM	3	0	0	3

UNIT-I   Introduction   9 0 0
Decision support at roadway package system , Managers and decision making ,Managerial decision making and informative system ,Mangers and computerized support ,Framework and concept of decision support ,Systems, Models , Modeling process, intelligence phase , Design phase , Implementation phase**.**

UNIT-II   DSS   9 0 0
DSS configuration , Characteristics and capabilities of DSS, component of DSS , Data management subsystem ,Model management subsystem, Dialog subsystem , classification of DSS, Distinguishing DSS from MIS and management science ,Modelling for MSS , Static and dynamic models, Treating certainity, Uncertainity and risk , Influence diagrams, Optimization via mathematical programming , Heuristic program, Simulation, Multidimensional modeling, Visual spreadsheet, Financial and planning modeling

UNIT-III   Intelligent DSS, User Interface   9 0 0
Knowledge based DSS concepts and definitions, Artificial intelligence versus natural intelligence, Knowledge in AI, Types of knowledge based DSS, Intelligent DSS, User interface, Interface models ,Graphics, Multimedia and hypermedia ,GIS, NLP overview, methods ,DSS development strategies, Development process, Team development DSS , DSS development tools**.**

UNIT-IV   Enterprise Support System   9 0 0
Networked Decision Support: The internet, Intranet and collaborative technologies, Group decision support system -Decision making in groups , Goal of GDSS , GDSS software , Idea generation , Negotiation support system -EIS concepts and definition , Executive role , Characteristics of EIS, Comparing and integrating EIS and DSS, Enterprise EIS, EIS implementation.

UNIT-V   Expert System and Intelligent System: 9 0 0
Fundamentals of expert system, Expert system concepts, Structure, Human elements , Working, Benefits, Limitation, Success factors, Types, Knowledge engineering, Scope of knowledge, Difficulties in knowledge acquisition, Methods of knowledge acquisition, Knowledge representation, Inferencing with rules, Frames , Model-based reasoning, Case-based reasoning, Introduction to building expert systems.

TEXT BOOK:

1. EFRAIM TURBAN, JAYE, ARONSON, Decision Support Systems and Intelligence Systems-7th Edition, Addison Wesley, 2004..

REFERENCE BOOKS:

1. Turban E., "Decision Support and Expert Systems, Management Support Systems", 7th Ed., Maxwell Macmillan, 1995.
2. V.S. Janaki Raman and K. Sarukesi, "Decision Support Systems", Prentice Hall of India Pvt. Ltd., 2004

3. Clyde W. Holsapple and Andrew B. Whinston. ,"Decision Support Systems: A Knowledge-Based Approach", Thomson Learning Custom,2000.

4., Ramesh Sharda, and Dursun Delen," Decision-Support-Business-Intelligence Systems ,Prentice Hall; (2010)

BCSED2	MANAGEMENT INFORMATION SYSTEMS	3	0	0	3

UNIT I   INTRODUCTION   9   0   0

Definition of MIS - Data Processing, Decision Support Systems - Information Resource Management, End User Computing Management, End User Computing Managerial Accounting, Or Management Theory, Sub-Systems of MIS.Data Base Query Languages, Report Generators, Statistical packages,modelling languages,V.H.L. Languages. Batch System, Online systems. Communication systems, Front End Processors, LAN, WAN, Distributed Systems.

UNIT II   9   0   0

Logical Data Concepts, Sequencing of Data, Types of files, data bases.
Serial Access and Direct Access Devices. Sequential, Hashed and Indexed File Organization-Data Base Organizations - Single Flat File - Hierarchial, Network, Relational DB Structures.Transaction   Processing   -   Controls   and   retrieval.   Word   and   Text Procesing,Document filing,Computer graphics,Composition and Reproduction,Document Distribution,Fascimile transmission,Message Systems,Information Processing Control - Availability Controls.

UNIT III   9   0   0

Decision making process - Problem Formulation - Programmed vs Non-programmed decisions - Criteria for Decision making - Classical Economical Model - Administrative model - Resolution of Conflict - Uncertainity avoidance - Problemstic search - Incremental Decision Making - Optimization Techniques under certainity.Pay off Matrices - Decision Trees - Game Theory - Statistical inference - Documenting and Communicating Decision Rules - Support for decision making phases.

UNIT IV   9   0   0

 Hierarchy of Information - Redundancy - Sending and recieving efficiency - Utility of information - Errors and Bias - Value of information and Sensitivity Analysis - Information System Design.Types o Systems - Subsystems - Preventing Subsystem entropy - System Stress - Organizational efficiency and effectiveness .Use of subsystems in Informational System Design - Decoupling of Information Systems - Project management.

UNIT V   9   0   0

Hierarchy of Planning - Planning of models - Computational Support for planning - Organizational Structure Implications and Management Theory in System Design - Decision Support Systems and Expert Systems - Computational Support for Intelligence, Design and Choice phases - Spread sheet processor - Analysis package -Model Generator - Planning Software Systems - Data base Query Systems for planning.

TEXT BOOKS :

1. Gordon B.Davis and Margrethe H.Olson, Management Information Systems ,-McGrawHill Editions – 3e,2004.

REFERENCE BOOKS :

1.RobertG.Murdrick,JoelE.Ross and James.R.Claggest,InformationSystems for Modern Management,3rd Edition 1992,PHI.

2.Jerome Kanter, Management Information Systems,3rd Edition,1990.PHI.

3. Haag Stephen, Cummings Maeve, "Haang Management Information System", McGraw Hill , 8e, 2009.

4. Douglas V Hall, Microprocessors and Interfacing. Programming and Hardware. Tata McGraw Hill Pub.Ltd.2e,2005.

BCSED3	MAINFRAME COMPUTING	3	0	0	3

Unit 1 MVS CONCEPTS: 9   0   0

MVS overview-system initialization-storage management-job management-managing work-data management-I/O processing-termination and recovery.TSO commands-general syntax of JCL statements

Unit II JCL AND VSAM :   9   0   0

Explanation of job statements-explanation of EXEC statements-explanation of DD statements-additional parameters on JOB,EXEC,DD statements-classification-instream and catalog procedures-utilities-abend codes.VSAM data set organization structure-IDCAMS commands-JCL for VSAM-buffering-alternative index-repro-backup and recovery-export and import.

Unit III COBOL/370 :   9   0   0

Structured programming constructs-fundamentals of COBOL-data definition-conditional statements-perform statements-compiler option-table definition-COBOL call and parameter passing-file handling.

Unit IV DB2 :   9   0   0

RDBMS concepts-structural query language-normalisation-DB2 architecture-DB2 objects-locks-program preparation-cursors-null indicators-optimer-utilities.

Unit V CICS :   9   0   0

CICS introduction-terminal control-application housekeeping-EXEC,interface locks-supply transactions –CESM,CESF,CEMT,CEDF-NMDS-BMS-abend codes-file control-program control-TSQ-TDQ-pseudo conversation-recovery and roll back.

TEXT BOOK
1.DOUG LOWE ,"MVS",MIKE MURACH ASSOCIATES 1994. 2nd Ed
2.SabaZamir&Chandan Ranade ,IBM Ranade Series"MVSJCLPrimer"McGrawhill,2007

REFERNCE BOOKS
1.GARY D.BROWN AND S.A.M SMITH "MVS/VSAM FOR THE APPLICATION PROGRAMMER",JOHN WILEY AND SONS 1993.
2.M.K. ROY AND D.GOSH DASTIDAR "COBOL PROGRAMMING",JOHN WILEY AND SONS, 1996.
3.STERN & STERN "STRUCTURED COBOL PROGRAMMING" ,JOHN WILEY INDIA ,2007, 8TH ED
4. MULLINS,"DB2 DEVELOPER'S GUIDE", SAM PUBLISHING, 2004
5.C.J.DATE "DB2"
6. SAS 9.2 VSAM PROCESSING FOR Z/OS , SAS PUBLISHING, 2007
7. BEGINNING DB2 : FROM NOVICE TO PROFESSIONAL , GRANT ALLEN , APRESS , 2008

BCSED4	E – COMMERCE	3	0	0	3

Electronic Commerce: 9 0 0

Electronic commerce , Electronic Data Interchange (EDI), Value added networks ,Electronic commerce over internet, PC and networking, Networking, Communication media ,Computer communication system, ISO model ,X.400 message handling system ,Internet E-mail,E-mail security , Light weight directory access protocol ,Internet -Introduction ,communication protocols ,Internet Search , Internet 2, Intranet -Introduction,services.

EDI: 9 0 0

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 for electronic commerce.

Technology and Security Issues: 9 0 0

Technology issues -Bandwidth issues , Technology issues for the internet ,NNI Standard, Nil services , Nil agenda ,GII, security issues Security concerns , Security solutions , Electronic cash over the internet, Internet security ,Guide lines for cryptography policy.

Reengineering: 9 0 0

Business process reengineering , Approach for BPR, Strategic alignment model, BPR methodology ,Change management, Change management in public administration, Implementation plan , Legal issues, Risks-Paper document versus electronic document, Technology for Authenticating an electronic document, Laws for e-commerce, EDI interchange agreement.

Case Studies: 9 0 0

EDI in Indian customs ,US electronic procurement, Banks , Automotive industry, SNS, E-Commerce in India -EDI in India , Internet in India ,Laws for e-commerce in India , UNCITRAL model law on electronic commerce ,Model interchange agreement for international commercial use of EDI.

TEXT BOOK:
1. KAMLESH K.BAJAJ, E-Commerce-Tata McGraw Hill, 2004
2. KALAKOTA, frontiers of E-commerce", Pearson education, 2002

REFERENCE BOOOK
1. David Ferris and Larry ripple, "E-business building Intelligence", 2002
2. Landon,E-Commerce business technology,2004
3.Electronic Commerce – Framework, Technology and Application", TMH, Bharat Bhaskar, 2003.
4.Kenneth Laudon and Carol Guercio Traver "E-Commerce business ,Technology, Society",2009 Prentice Hall.

BCSED5	TOTAL QUALITY MANAGEMENT	3	0	0	3

Unit I Principles Of Quality Management   9 0 0

Definitions of quality, quality philosophies of dimming, crossby and miller, service vs. product quality, customer focus quality and business performance leadership for quality management, quality planning, designing for quality and manufacturing for quality,vision,mission statements, quality policy.

Unit II Total Quality Management   9 0 0

Evolution of TQM ,TQM models, human and system components for continuous improvement strategies, Deming wheel, internal external customer concepts, customer satisfaction index, customer retention, team work and team building,empowerment,TQM culture, quality circle,5 s priciples,top management commitment and involvement.

Unit III Quality Management Tools For Business Application   9 0 0

Principles and applications of quality functions deployment, failure mode and effect analysis,taguichi techniques,7 old QC tools,7 new management tools, statistical quality control techniques, mistake proofing, bench marking,8D methodologies, IT and Kanban.

Unit IV Quality Imperative For Business Improvements   9 0 0

Dimensions of quality, reliability prediction analysis, total productive maintenance, cost of quality, business process re-engineering, process capability analysis, quality assurance and ISO 9000 and QS 9000 certifications.

Unit V TQM Implementation Strategies   9 0 0

Organizational structures and mind set of individuals, motivational aspects of TQM,change management strategies, training for TQM,TQM roadmap, quality improvement index**.**

TEXT BOOKS:
1. Joel E Ross "TOTAL QUALITY MANAGEMENT", C R C Press LLC, 2005 , 3/e.

REFERENCE BOOKS:
1.William J.Kolarik,"Creating Quality", McGraw Hill Inc, NY, 1999.
2. Jill a. Swift, joel e.ross and vincent k.omachonu,"principles of total quality",. CRC Press, 2004
3.Samuel K.Ho,Tqm   An Integrated Approach, Kogan Page India (P) Ltd.2002
4.Dale H.Besterfield Et Al, Total Quality Management , Prentice Hall, 2003

BCSED6	MAN MACHINE INTERFACE	3	0	0	3

UNIT I: Human Factors of Interactive Software, Theories & principles   9 0 0

Introduction, Goals of system Engineering, Goals of User – Interface Design, Motivations for human factors for design, accommodation of human diversity, Goals for profession, High level theories, Object – action interface mode, Recognize the diversity, Eight golden rules of interface design, Prevent errors, Guidelines for Data Display, for data Entry.

UNIT II: Design Process and Expert Review   9 0 0

Organizational design to support usability, Three pillars of design, Development methodologies, Ethnographic observation, participatory design Scenario development, Expert reviews, Usability testing, Surveys, Acceptance tests, Evaluation during active use.

UNIT III: Tools and Environment   9 0 0

Specification methods, Interface – building tools evaluation and critiquing tools, Examples of direct manipulation system, Explanation of direct manipulations, Visual Thinking and icons – Direct manipulation Programming, Home automation, remote direct manipulation, Virtual Enviornments,Menu selection, Form filling and Dialog boxes.

UNIT IV: Command and Natural Languages, Interaction Devices   9 0 0

Functionality to support users tasks, Command – Organization strategies, benefits of structure, naming and abbreviations, Command menus, Natural language in computing, Interaction devices - Keyboard and function keys, Pointing devices, Speech recognition, Digitization and generation, Image and video displays, printers.

UNIT V: Response Time and Presentation Styles   9 0 0

Theoretical foundations, Expectations and attitudes, User productivity, variability, error messages, Non-anthropomorphic design, Display design, Color, Printed manuals, Online help and tutorials, Multiple window strategies.

TEXT BOOK:
BEN SHNEIDERMAN, Designing the User Interface – 5th dition. Pearson Education.2009.

REFERENCE BOOK:
John M. Carroll, "Human –Computer Interaction in the new millennium", Pearson Education 2002.
Dark Horse." Man manchine Interface"Vol2, 2005.
Andrew Sears, Julie A. Jako." Hand Book of Human computer Interaction"CRC Press..2007.
Matt Jones and Gary Marsden-2006. *Mobile Interaction Design*, John Wiley and Sons Ltd.