Dr.M.G.R.
EDUCATIONAL AND RESEARCH INSTITUTE
UNIVERSITY
(Decl. U/S 3 of the UGC Act 1956)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.Tech – Computer Science Engineering (Part Time)
Curriculum
2013 Regulation

S.No	Sub.Code	Title of Subject	L	T	P	C
		I SEMESTER				
1	BCS13001	Data Structures and Algorithms	3	0	0	3
2	BCS13002	Introduction to OOPS with C++ and Java	3	0	0	3
3	BMA13007	Discrete Mathematics	3	1	0	4
4	BEC13004	Electrical and Electronics Devices	3	1	0	4
5	BCS13L02	Data Structures Using C++ Lab	0	0	3	1
		Total	**12**	**2**	**3**	**15**

S.No	Sub.Code	Title of Subject	L	T	P	C
		II SEMESTER				
1	BCS13004	Computer Graphics and Multimedia	3	1	0	4
2	BCS13005	Data Base Management Systems	3	0	0	3
3	BEC13007	Digital Electronics	3	0	0	3
4	BMA13012	Probability and Linear Programming	3	1	0	4
5	BCS13L03	DBMS Lab	0	0	3	1
		Total	**12**	**2**	**3**	**15**

S.No	Sub.Code	Title of Subject	L	T	P	C
		III SEMESTER				
1	BCS13007	Operating Systems	3	0	0	3
2	BCS13009	Computer Architecture	3	0	0	3
3	BEC13032	Microprocessors and Micro Controllers	3	0	0	3
4	BCS13011	Artificial Intelligence	3	1	0	4
5	BCS13L05	Operating Systems Lab	0	0	3	1
		Total	**12**	**1**	**3**	**14**

S.No	Sub.Code	Title of Subject	L	T	P	C
		IV SEMESTER				
1	BCS13006	Software Engineering	3	1	0	4
2	BCS13008	System Software	3	0	0	3
3	BCS13010	Object Oriented System Analysis and Design	3	0	0	3
4	BCS13016	Advanced Java Programming	3	1	0	4
5	BCS13L07	Software System Development Lab	0	0	3	1
		Total	**12**	**2**	**3**	**15**

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V SEMESTER						
S.No	Sub.Code	Title of Subject	L	T	P	C
1	BCS13012	Computer Networks	3	0	0	3
2	BCS13015	Web Technology	3	0	0	3
3	BMG13003	Principles of Management	3	1	0	4
4	BCS13EXX	Elective I	3	0	0	3
5	BCS13L08	Network Programming Lab	0	0	3	1
6	BCS13L11	Value Added Training Programme / Three Tier Application Project	0	0	2	1
		Total	**12**	**1**	**5**	**15**

VI SEMESTER						
S.No	Sub.Code	Title of Subject	L	T	P	C
1	BCS13018	Data Warehousing and Data Mining	3	1	0	4
2	BCS13EXX	Elective II	3	0	0	3
3	BCS13EXX	Elective III	3	0	0	3
4	BCS13014	Principles of Compiler Design	3	0	0	3
5	BCS13L10	Compiler Design Lab	0	0	3	1
		Total	**12**	**1**	**3**	**14**

VII SEMESTER						
S.No	Sub.Code	Title of Subject	L	T	P	C
1	BMG13004	Entrepreneurship Development	3	1	0	4
2	BCS13017	Dot Net Framework	3	0	0	3
3	BCS13019	Information Storage Management	3	0	0	3
4	BCS13L13	Dot Net Lab	0	0	3	1
5	BCS13L18	Project	0	0	12	6
		Total	**9**	**1**	**15**	**17**

Summary of Credits:

1st Semester Credits	15
2nd Semester Credits	15
3rd Semester Credits	14
4th Semester Credits	15
5th Semester Credits	15
6th Semester Credits	14
7th Semester Credits	17
Total	**105**

B.Tech - Computer Science and Engineering – 2013 Regulation

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S.No	Sub.Code	Title of Subject	L	T	P	C
		CSE Elective Stream – Database Specialization				

S.No	Sub.Code	Title of Subject	L	T	P	C
1	BCS13E01	Database Tuning	3	0	0	3
2	BCS13E02	Advanced Knowledge Management	3	0	0	3
3	BCS13E06	Advanced Databases	3	0	0	3

CSE Elective Stream – Networking Specialization

S.No	Sub.Code	Title of Subject	L	T	P	C
1	BCS13E07	Mobile and Wireless Networks	3	0	0	3
3	BCS13E09	Ad-hoc Networks	3	0	0	3
5	BCS13E11	Network Security and Cryptography	3	0	0	3

CSE Elective Stream – OS Specialization

S.No	Sub.Code	Title of Subject	L	T	P	C
1	BCS13E13	Unix Internals	3	0	0	3
2	BCS13E14	Distributed computing	3	0	0	3
3	BCS13E15	Real Time System Design	3	0	0	3

CSE Elective Stream – Computational Theory Specialization

S.No	Sub.Code	Title of Subject	L	T	P	C
1	BCS13E19	Design of Algorithms	3	0	0	3
2	BCS13E20	Theory of Computation	3	0	0	3
3	BCS13E23	Natural Language Processing	3	0	0	3

CSE Elective Stream – VLSI & Embedded Specialization

S.No	Sub.Code	Title of Subject	L	T	P	C
1	BEC13E31	VLSI Technology	3	0	0	3
2	BEC13E32	System Modeling Using Hardware Description Languages	3	0	0	3
3	BEC13E33	VLSI Design	3	0	0	3

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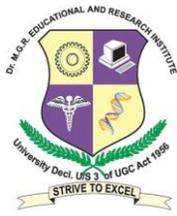
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CSE Elective Stream – BioInformatics Specialization						
S.No	Sub.Code	Title of Subject	L	T	P	C
1	BBT13E31	Bio Informatics	3	0	0	3
2	BBT13E32	Biological Database and Data Analysis	3	0	0	3
3	BCS13E25	Programming in PERL	3	0	0	3

CSE Elective Stream – Digital Image Processing Specialization						
S.No	Sub.Code	Title of Subject	L	T	P	C
1	BCS13E26	Digital Image Processing	3	0	0	3
2	BCS13E27	Pattern Recognition and Neural Networks	3	0	0	3
3	BCS13E33	Geographical Information System	3	0	0	3

CSE Elective Stream – Artificial Intelligence Specialization						
S.No	Sub.Code	Title of Subject	L	T	P	C
1	BCS13E35	Knowledge Engineering	3	0	0	3
2	BCS13E36	Parallel Algorithms	3	0	0	3
3	BCS13E38	Soft Computing	3	0	0	3

CSE Elective Stream – Hardware Specialization						
S.No	Sub.Code	Title of Subject	L	T	P	C
1	BCS13E40	Advanced Computer Architecture	3	0	0	3
2	BCS13E41	Robotics	3	0	0	3
3	BCS13E42	Multi Core Architecture and Programming	3	0	0	3

CSE Elective Stream – Societal Specialization						
S.No	Sub.Code	Title of Subject	L	T	P	C
1	BMG13E01	Disaster Management	3	0	0	3
2	BMG13E02	Professional Ethics	3	0	0	3
3	BMG13E05	Human Values and Human Rights	3	0	0	3

BCS13001   **DATA STRUCTURES AND ALGORITHMS**   **3 0 0 3**

OBJECTIVES:

➢ The students will be able to identify, model, solve and develop code for real life problems like shortest path using graph theory.
➢ Interpret and compute asymptotic notations of an algorithm to analyze the consumption of resources (time/space).
➢ Identify appropriate data structure and algorithm for a given contextual problem and develop in C++.

UNIT I : LINEAR DATA STRUCTURES   **9 Hrs**

Stacks, - Queues - Implementation and Applications - Singly linked list-Doubly linked Lists-circular linked list-Applications

UNIT II : NON LINEAR DATA STRUCTURES   **9 Hrs**

Trees – Binary Trees – Binary Search Tree Implementation – Tree Traversals – AVL Trees

UNIT III : ALGORITHM ANALYSIS   **9 Hrs**

Sorting and Searching – Space Complexity - Time Complexity Linear and Binary Searching Analysis - Quick Sort - Heap Sort - Merge Sort - Selection Sort - RADIX Sort - Bubble Sort - Insertion Sort - Shell Sort - Analysis

UNIT IV : GRAPH ALGORITHMS   **9 Hrs**

Graph Operations – DFS – BFS - Minimum Cost Spanning Tree - Krushkal's Algorithm - Prim's Algorithm - Applications of Graphs

UNIT V : ALGORITHM DESIGN METHODS   **9 Hrs**

Greedy method – Shortest path – Divide and Conquer – Matrix Multiplication - Dynamic Programming - Back Tracking – Branch and Bound - NP Complete Traveling Sales Person Problem - N Queens Problem

Total No. of Hrs: 45

TEXT BOOKS

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

REFERENCES

1. Weiss Mark Allen (2007) *Data Structures and Algorithm Analysis in C* (3rd ed.) Pearson Education

2. Horowitz, E. Sahni. Sanguthevar R. (2007) *Fundamentals of Computer Algorithms*, Galgotia Publications

3. Jean-Paul Tremblay. Paul G. S. (2007) *An Introduction to Data Structures with Applications* (2nd ed.) Tata McGraw-Hill

4. Sara B. Allen, Van, G. (2000) *Computer Algorithms* Galgotia

BCS13002	INTRODUCTION TO OOPS WITH C++ AND JAVA	3 0 0 3

OBJECTIVES:

- ➢ The students will be able to distinguish OOPS features with procedural Oriented and analyze these features to a real world object,
- ➢ To analyze generic data type for the data type independent programming which relate it to reusability.
- ➢ To understand the concepts of Java programs and develop basic networking programs using Java.

UNIT I : BASIC CONCEPTS OF OOPS   **9 Hrs**

Programming methodologies - Object Oriented Concepts – Definition - Data members - Function members - Access specifiers – Constructors - Default constructors - Copy constructors – Destructors - Static members - Control statements - Basics of C++environment

UNIT II : INHERITANCE AND POLYMORPHISM   **9 Hrs**

Overloading Operators – Functions – Friends - Class derivation - Virtual functions - Abstract base classes - Multiple inheritance

UNIT III : TEMPLATES   **9 Hrs**

Class templates - Function templates - Exception handling - Streams

UNIT IV : JAVA PROGRAMMING   **9 Hrs**

Java environment - Classes-Definition - Fields-Methods - Object creation – Constructors - Overloading methods-Static members - This keyword - Nested classes - Extending classes

UNIT V : INHERITANCE AND EXCEPTION IN JAVA   **9 Hrs**

Inheritance - Member accessibility - Overriding methods - Abstract classes – Interfaces - Exceptions And Threads - Exception and errors - Exception classes - Runtime Exception - Uncompact Exception - Finally block – User defined Exceptions - Creating Threads - Controlling Threads

Total No. of Hrs: 45

TEXT BOOKS

1. Stanley, B. Lippman (2012) *The C++ Primer*, (5th ed.), Addison Wesley

2. H.Schildt (2008), *Java 2:The Complete Reference*, (6th ed.), Tata Mc Graw Hill

REFERENCES

1. Deitel and Deitel (2011) *C++ How to Program*, (8th ed.), Prentice Hall

2. Balagurusamy, E (2009) *Programming in java*, (4th ed.), Tata Mc Graw Hill

3. Ken Arnold and James Gosling (Reprint 2009) *The Java Programming Language*, (3rd ed.), Pearson Education

4. Stroustrup, B (2004) *The C++ Programming Language,* (3rd ed.), Pearson Education

5. Balagurusamy, E (2008) *Object Oriented Programming with C++,* (4th ed.), Tata Mcgraw Hill

BMA13007   **DISCRETE MATHEMATICS**   3 1 0 4

OBJECTIVES:

- The aim of this course is to introduce the students the basic concepts.
- To solve problems on Discrete Mathematical structures.

UNIT I : LOGIC   **12 Hrs**

Statements – Truth Table – Connectives – Normal Forms – Predicate Calculus – Inference Theory

UNIT II : COMBINATORICS   **12 Hrs**

Mathematical Induction – Pigeon Hole Principle – Principle of Inclusion and Exclusion – Recurrence Relations – Generating Functions

UNIT III : GROUPS   **12 Hrs**

Basic Concepts – Groups – Subgroups – Homomorphism – Kernel – Cosets – Lagrange's theorem (simple theorems and problems)

UNIT IV : LATTICES   **12 Hrs**

Partial ordering – Posets – Hasse Diagram – Lattices – Properties of lattices – Sub lattices – Special lattices – Boolean Algebra (Definition and Simple Problems)

UNIT V : GRAPHS   **12 Hrs**

Introduction to Graphs – Terminology – Matrix representation of Graphs: Incidence matrix, Adjacency matrix – Graph Isomorphism – Connectivity – Euler and Hamiltonian Paths (simple theorems and problems)

Total No. of Hrs: 60

TEXT BOOKS
1. Veerarajan, T (2006) *Discrete Mathematics*, Tata McGraw Hill Publishing Co
2. Tremblay, J. P.   Manohar, R (2004) *Discrete Mathematical structures with applications to Computer science*, Tata McGraw Hill Publishing Co

REFERENCES
1. Kolman. Busby. Ross (2008) *Discrete Mathematical Structures,* (6th ed.), Pearson
2. Kenneth, Rosen (2007) *Discrete Mathematics and its applications* (SIE), Tata McGraw Hill

BEC13004   **ELECTRICAL AND ELECTRONICS DEVICES**   3 1 0 4

OBJECTIVES:

- The students will be able to understand the theory of semiconductor materials.
- To understand the basic operation and characteristics of semiconductor devices like Diodes, BJTs, FETs,
- To justify the basic applications of electronic devices like rectifier and amplifier,
- To classify different types of feedback amplifiers, oscillators and power amplifiers
- To understand the fundamentals of Analog and digital circuits, differentiate the AC and DC circuits.

UNIT I : DC CIRCUITS   **12 Hrs**

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   **12 Hrs**

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 : SEMICONDUCTOR DEVICES   **12 Hrs**

Semiconductor – Materials - PN-Junction diode – BJT – FET - VI Characteristics – Rectifiers - Zener diode - Voltage regulators

UNIT IV : AMPLIFIERS AND OSCILLATORS   **12 Hrs**

Transistor biasing - CE, CB and CC – Amplifiers - Current gain - Voltage gain - Frequency response - Power amplifiers - Feedback Amplifiers – Oscillators - RC Phaseshift - Wein Bridge – Hartley - Collpit's analysis

UNIT V : ANALOG AND DIGITAL CIRCUITS   **12 Hrs**

Operational amplifier Ideal characteristics – Applications - Current to voltage - Voltage to current converters – Arithmetic circuit – Adder – Subtractor – Multiplier – Differentiator – Integrator - Inverting and Non-inverting amplifiers - Buffer - 555 Timer - Block diagram - Multivibrators

TEXT BOOKS   **Total No. of Hrs: 60**

1. Floyd (2005) *Electronic Device,* (7th ed.), Pearson Education

2. David, A. Bell (2009) *Fundamentals of Electronic Devices and Circuits*, (5th ed.), Oxford University Press

3. Sudhakar, Shyammohan (2010) *Circuits & Networks Analysis & Synthesis,* Tata McGraw Hill(unit 1 & 2)

REFERENCES

1. Milman, Halkias (2010) *Integrated Electronic*, TataMcgraw hill publication

2. Boyle stad Nashelsky (2009) *Electronic Devices and Circuit theory* , (10th ed.), PHI

3. Edminister. J. A. (2011) *Theory And Problems On Electric Circuits,* Pearson Education Publications
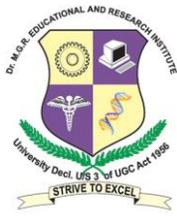
BCS13L02   **DATA STRUCTURE USING C++ LAB**   **0 0 3 1**

OBJECTIVE:
  ➤ To implement the following list of programs.

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 (Infix to postfix conversion & Evaluation of postfix expression)

8. Binary Tree Implementations And Traversals

9. Binary Search Trees

10. Quick Sort , Heap Sort and Merge sort

11. Bubble Sort & Radix Sort.

12. Merge & Selection Sort

13. Linear and Binary Search

14. Implementation of Breadth First Search and Depth First Search

15. Implementation of Graph traversals (BFS and DFS)
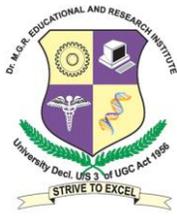
BCS13004   **COMPUTER GRAPHICS & MULTIMEDIA**   3   1   0   4

OBJECTIVES:

- The students will be able to transform geometrical structures
- To apply clipping methods on geometry, analyze a 3D structure, create and evaluate graphic projects.

UNIT I : BASICS   12 Hrs

Overview of graphics system - Video display devices - Raster scan system - Random scan system - Graphics monitor and workstation - Input devices - Hard copied devices - Graphic software

UNIT II : OUTPUT PRIMITIVES   12 Hrs

Output primitives-Line drawing algorithms-Loading the frame buffer-Line function-Circle generation -Ellipse generation curves-Filled area primitives .Attributes of output primitives-Line attributes-Curve attributes-Color and gray scale levels-Area fill attributes-Character attributes-Bundled attributes-Inquiry functions-Antialaising

UNIT III : TWO DIMENSIONAL TRANSFORMATION & VIEWING   12 Hrs

Two dimensional transformation - Basic transformation - Matrix representations - Composite transformations - Other transformations - Affine transformation - Raster method for transformation Viewing pipeline - Coordinate reference frame - Window to view port transformation - Two dimensional viewing functions - Clipping operations - Point clipping - Line clipping – Cohen - Sutherland line Clipping – Liang - Barsky line Clipping - Polygon clipping: Sutherland - Hodgeman – Curve Clipping - Text Clipping - Exterior Clipping

UNIT IV : THREE DIMENSIONAL CONCEPTS AND TRANSFORMATION   12 Hrs

Three dimensional concepts - Three dimensional concepts - Three Dimensional Transformation - Visible Surface Detection Methods - Back Face Detection - Depth Buffer Method - Scan Line Method

UNIT V : MULTIMEDIA SYSTEM   12 Hrs

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

Total No. of Hrs: 60

TEXT BOOKS

1. Donald, D. Hearn. Pauline, Baker, M. Warren, Carithers. (2010) *Computer graphics with Open GL*, (4th ed.)

2. Koegel, Buford, JFK (2007) *Multimedia Systems*, ACM Press
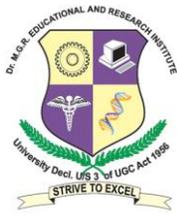
BCS13005   **DATABASE MANAGEMENT SYSTEMS**   **3 0 0 3**

OBJECTIVES:
- **T**he students will be able to Select appropriate technique implemented over disks and files to allocate relations and conclude the best among, Develop a good query evaluation plan for evaluating user query, an access path and produce the tuples satisfying the constraints.
- Examine the generic architecture of Parallel and Distributed database systems , Differentiate the properties for concurrent execution of transactions, Illustrate the concepts of Object Database systems and explore the features of R DBMS and ODBMS.

UNIT I : FUNDAMENTALS OF DATABASE   **9 Hrs**

Introduction - Purpose of database systems – Data Abstraction -Data models – Instances and schemas – Data Independence – DDL – DML – Database user – ER model – Entity sets- keys – ER diagram – relational model – structure – relational algebra- relational calculus- views

UNIT II : SQL   **9 Hrs**

SQL - QBE - level – Basic Structure – various operations – relational database design – problems in the relational data base design – normalization – normalization using functional – Multivalued join dependence

UNIT III : FILE STRUCTURE, INDEXING & HASHING   **9 Hrs**

File and system structure – overall system structure – file transaction – data dictionary – indexing and hashing basic concepts and B+ tree Indices - static and dynamic hash functions

UNIT IV : SYSTEM IMPLEMENTATION TECHNIQUES   **9 Hrs**

Recovery and atomicity - Failures Classification and types – Transaction model and Log based recovery – Schedules - Serial and Non Serial types-Serialization of schedules and views - locks based protocols – time based protocols - Validation techniques

UNIT V : DISTRIBUTED DATABASES   **9 Hrs**

Distributed databases-Structures of distributed data bases –Tradeoffs in distributed the database –design of distributed the database –design of distributed database-Transparency and autonomy- distributed query proceeding-Recovery in distributed system –commit protocols – security and integrity violations –authorization and views security specifications –Encryption- Statistical databases

Total No. of Hrs: 45

TEXT BOOKS
1. Abraham, Silberschatz. Henry, F. K.. Sudharshan, S. (2010) *Database System Concepts* (6th ed.) Tata McGraw Hill, New Delhi

REFERENCES
1. Ramez, E. Shamkant, B. Navathe (2008) *Fundamentals of database systems* (5th ed.), Pearson Education
2. Date, C. J, (2012) *An Introduction to Database Systems* (8th ed.), Pearson Education

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

BEC13007   **DIGITAL ELECTRONICS**   **3 0 0 3**

OBJECTIVES:
- **T**he students will be able to able to analyze, build, and troubleshoot combinatorial circuits.
- To design sequential logic circuits, able to design adders, subtractors, able to design multiplexers
- To demonstrate the basics of programmable logic devices, will be able to analyze, build, and troubleshoot counters

UNIT I : NUMBER SYSTEMS   **9 Hrs**
Review of Binary, Octal And Hexadecimal Number Systems – Conversions - Binary - Arithmetic – Signed Magnitude form - 1's, 2's Complement Representation – Codes – BCD – Excess_3 - Grey Codes - ASCII Codes - Error Detecting Codes (hamming code) - Applications of Error Detecting Codes

UNIT II : BOOLEAN ALGEBRA   **9 Hrs**
Boolean Algebra – De Morgan's Law - Simplifications of Boolean Expression – Sum of Products and Product of Sums – Karnaugh Map(upto 5 variables) – Quince McClusky Method of Simplification (Including Don't care conditions)

UNIT III : COMBINATIONAL LOGIC   **9 Hrs**
Logic gates – AND – OR – NOT – NOR – NAND - EXOR – Combinational Logic - Arithmetic Circuits – Half adder – Full adder - Half Subtractor - Decimal Adder – Excess 3 Adder – Code Converters – Multiplexer – Demultiplexer - Encoder – Decoder – Design of General Combinational Logic Circuit – PAL – PLA - FPGA

UNIT IV : SEQUENTIAL LOGIC DESIGN   **9 Hrs**
Building Blocks Of Sequential Logic – RS - JK, Master-Slave – D - T Flip-Flop - Asynchronous - 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 Hrs**
Characteristics Of RTL – DTL – TTL - Families – Schottky - Clamped TTL – ECL - IIL – Mos Inverters – Complementary Mos Inverters.IC Based Full Adder - IC Based Magnitude Comparator

                                        Total No. of Hrs: 45

TEXT BOOKS
1. Charles H. Roth (2010) *Fundamentals of Logic Design* (6th ed.), Cengage learning
2. Godse. A.P. (2008) *Digital Logic:Application & Design* (1st ed.), Technical Publication

REFERENCES
1. Floyd (2005) *Digital Fundamentals* (8th ed.), Pearson Education Publication
2. Volnei A. P. (2008) *Digital Electronics and Design*, Elsevier Inc.
3. Albert. P., Malvino, Donald, P. L. (2009) *Digital Principles and Applications* (5th ed.) Lencoe Publications

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BMA13012   **PROBABILITY & LINEAR PROGRAMMING**   **3 1 0 4**

OBJECTIVES:
- The students will be able to solve real time problems using Linear Programming
- To understand different testing hypothesis

UNIT I : PROBABILITY AND RANDOM VARIABLE   **12 Hrs**

Axioms of Probability – Conditional probability – Total probability – Baye's Theorem – Random variable – Probability mass function – Probability density function – Properties – Moments (Definition and simple problems)

UNIT II : STANDARD DISTRIBUTIONS   **12 Hrs**

Binomial – Poisson – Geometric –Uniform – Exponential –Normal distributions

UNIT III : TESTING OF HYPOTHESIS   **12 Hrs**

Tests of Significance – Large Sample Tests – Mean – Proportions – Small Sample Tests – t – F – Chi_square Tests - Independence of Attributes - Goodness of Fit

UNIT IV : LINEAR PROGRAMMING   **12 Hrs**

Formulation of Linear Programming Problem – Standard form of LPP- Graphical Method -Simplex Method – Big M Method – Two Phase method

UNIT V : TRANSPORTAION AND ASSIGNMENT   **12 Hrs**

Formulation of Transportation Problem – North West Corner Method – Least Cost Method – Vogel's approximation method – Optimality test – MODI Method – Degeneracy – Assignment problem – Hungarian Method – Travelling Salesman Problem

Total No. of Hrs: 60

TEXT BOOKS
1. Gupta S.C. Kapoor V.K.(2003) *Fundamentals of Mathematical Statistics*, S.Chand & Co
2. Veerarajan, T (2006) *Discrete Mathematics*, Tata McGraw Hill Publishing Co

REFERENCES
1. Singaravelu, (2008), *Probability and Random Processes*, Meenakshi Agency
2. Hamdy A. Taha, (2010) *Operations Research: An Introduction* (9th ed.), Pearson
3. Panneerselvam R. (2011) *Operations Research* (2nd ed.), PHI
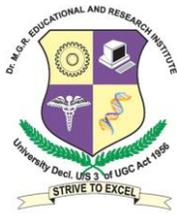
BCS13L03   DBMS LAB   0 0 3 1

OBJECTIVE:
  ➢ To implement the following list of Programs.

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.
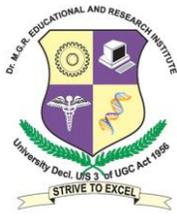
BCS13007 OPERATING SYSTEMS 3 0 0 3

OBJECTIVES:
- The students will be able to analyze the concepts of Operating System and process.
- Illustrate the Scheduling of a processor for a given problem instance, identify the dead lock situation and provide appropriate solution, analyze memory management techniques and implement page replacement Algorithm, understand the implementation of file systems and directories.

UNIT I : OS CONCEPTS 9 Hrs

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-Virtual Machines-System Design and Implementation

UNIT II : PROCESS MANAGEMENT 9 Hrs

Process concept-Process Scheduling-Operation on Process-Cooperating Processes- Inter Process 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 Hrs

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 Hrs

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

UNIT V : FILE AND I/O MANAGEMENT 9 Hrs

Files And Secondary Storage Management: 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

Total No. of Hrs: 45

TEXT BOOKS

1. Silberschatz. Galvin. Gagne (2009) *Operating System Concepts* (8th ed.), John Wiley

REFERENCES

1. D.M.Dhamdhere. D. M. (2008) *Operating Systems*, (2nd ed.), Tata McGraw Hill
2. Charles Crowley (2005) *Operating Systems: A Design Oriented Approach*,Tata McGraw Hill
3. William Stallings (2008) *Operating Systems* (6th ed.) Prentice Hall of India
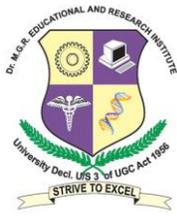
BCS13009   **COMPUTER ARCHITECTURE**   **3 0 0 3**

OBJECTIVES:
- The students will be able to understand the major components of a computer including CPU, memory, I/O and storage, understand the uses for cache memory,
- To understand a wide variety of memory technologies both internal and external,
- To understand the role of the operating system in interfacing with the computer hardware

UNIT I : GENERIC CPU FEATURES   **9 Hrs**

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

UNIT II : ARITHMETIC AND LOGIC UNIT   **9 Hrs**

Fixed point arithmetic operation-addition – subtraction – multiplication - division Floating point arithmetic operation-Design of ALU

UNIT III : PROCESSOR UNIT   **9 Hrs**

Data path implementation-Control unit-hardwired control - micro programmed contro -, nano programming-Concepts of pipelining - Pipeline hazards

UNIT IV : MEMORY SYSTEM   **9 Hrs**

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 Hrs**

Accessing I/O devices – Programmed Input/Output -Interrupts – Direct Memory Access – IO Processor - Buses – Interface circuits – Standard I/O Interfaces (PCI, SCSI, USB) - I/O devices

Total No. of Hrs: 45

TEXT BOOKS

1. Hayes (2004) *Computer Architecture and Organization*, Tata McGraw Hill

REFERENCES

1. Carl Hamacher V. Zvonko G.V. Safwat G. Z. (2002) *Computer organization* (5th ed.),Tata McGraw Hill

2. Morris Mano (2007) *Computer System Architecture* (3rd ed.), Pearson Education

BEC13032   MICROPROCESSOR AND MICRO CONTROLLERS   3 0 0 3

OBJECTIVES:
➢ The students will be able to identify the basic element and functions of microprocessor
➢ To describe the architecture of microprocessor and its peripheral devices
➢ To demonstrate fundamental understanding on the operation between the Microprocessor and its interfacing devices

UNIT I : INTEL 16 BIT MICROPROCESSORS   9 Hrs
Register organization of 8086 – architecture - Min and Max Mode - Addresing Modes - physical memory organization – InstructionSet - I/O addressing Capability - special processor activities - Introduction to stack - stack structure of 808 - Interrupt and Interrupt service routines - Interrupt cycle of 8086 - Assembly level Programming

UNIT II : BASIC PERIPHERALS AND THEIR INTERFACING WITH 8086   9 Hrs
Interfacing I/O ports, programmable Peripheral interface – 8255 - Modes of operation of 8255 - Programmable Interval Timer (8253) - Programmable Interrupt controller (8259) - 8237 DMA Controller - USART -825 - Applications of 8085

UNIT III : MICROCONTROLLER   9 Hrs
8051 Microcontroller hardware –I/O pins - ports and circuits - External memory –Counters and Timers - Serial Data I/O –interrupts

UNIT IV : APPLICATIONS   9 Hrs
8051 Instruction set – Addressing Modes –Assembly Language Programming -8051 interfacing Lcd – ADC-Sensors - Stepper motors - Motors - Traffic light controls - Keyboard and DAC

UNIT V : 32 BIT MICROPROCESSORS   9 Hrs
Architecture of 80386 - addressing modes - Data types of 80386 - Real address mode of 80386 - protected mode of 80386 – Segmentation – Paging - Salient features of PENTIUM - Intel MMX Architecture - MMX data types
Total No. of Hrs: 45

TEXT BOOKS

1. Ray A.K. Bhurchandi K.M. (2011) *Advanced Microprocessors Peripherals, Architecture, Programming and Interface* , Tata McGraw Hill

2. Douglas Hall. Rao S. S. S. P. (2012*) Microprocessor and Interfacing* (3rd ed.), Tata McGraw Hill

REFERENCES

1. Ramesh S Gaoankar, (2000) *Microprocessor Architecture , programming and application with 8085* (4th ed.) Penram international publishing , New Delhi

2. Mohammed ali M. Janice Gillispie M.(2003) *The 8051 Microcontroller and Embedded systems*, Pearson Education Asia ,New Delhi
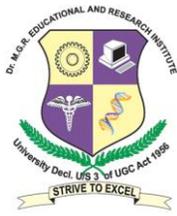
BCS13011   **ARTIFICIAL INTELLIGENCE**   **3 1 0 4**

OBJECTIVES:
- The students will be able to solve problems using AI techniques
- To develop new games using AI techniques
- To guide the process of deducing information in a computational manner.

UNIT I : INTRODUCTION AND PROBLEM SOLVING   **12 Hrs**

Introduction– Intelligent agent – Types of agents – Agent Structure – Problem solving agents – Problem Formulation - Uninformed search strategies – Breadth first search – Uniform cost search – Depth first search – Depth limited search – Bidirectional search – Searching with partial Information

UNIT II : INFORMED SEARCH AND GAME PLAYING   **12 Hrs**

Informed search Strategies – A* Heuristic function – Hill Climbing – Simulated Annealing – Constraint Specification problem - Optimal decisions in games – Pruning - Imperfect decisions –Alpha-Beta pruning

UNIT III : KNOWLEDGE AND REASONING   **12 Hrs**

Knowledge based agent – The Wumpus world environment – First-order logic – Syntax and semantics – Inferences in FOL - Ontology – Forward and backward chaining – Resolution

UNIT IV : STRUCTURED KNOWLEDGE REPRESENTATION AND PLANNING   **12 Hrs**

Structured Knowledge Representation- Semantic nets- slots- Frames- Conceptual dependency- Scripts- 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 : UNCERTAIN KNOWLEDGE REASONING AND LEARNING   **12 Hrs**

Non-monotonic reasoning- Probabilistic reasoning- Use of certainity factors- Fuzzy logic- Concept of Learning- Learning automation- Neural networks- Genetic Algorithms

Total No. of Hrs: 60

TEXT BOOKS
1. Stuart R. Peter N. (2010) *Artificial Intelligence A modern Approach*, Prentice Hall

2. Elaine R. Kevin K. (2008) *Artifical Intelligence* Tata McGraw Hill

REFERENCES
1. Tim Jones M. (2008) *Artificial Intelligence, A System Approach(Computer Science)*

2. Ben Coppin (2004) *Artificial intelligence illuminated*, Jones and Bartlett Learning

BCS13L05   **OPERATING SYSTEMS LAB**   **0 0 3 1**

OBJECTIVE:
  ➢ To implement the following list of Programs.

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. System Calls - Fork, Exec

4. Implementation of Scheduling Algorithms

5. IPC Using Message Queues, Pipes and Signals

6. Shared Memory and Semaphores

7. File Allocation Strategies - Best Fit & Worst Fit

8. Dining Philosopher's Problem

9. Bankers Algorithm

10. Page Replacement Strategies

11. Paging & Segmentation

12. File Systems

Resources Required:

        Unix/LINUX, Telnet, C Compiler
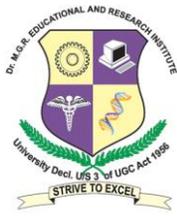
BCS13006	**SOFTWARE ENGINEERING**	3 1 0 4

OBJECTIVES:
- **T**he students will be able to identify and build an appropriate process model for a given project, analyze the principles at various phases of software development, translate a specification into a design.
- Identify the components to build the architecture for a given problem, all using an appropriate software engineering methodology.

UNIT I : IMPORTANCE OF SOFTWARE ENGINEERING   **12 Hrs**

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 : SOFTWARE REQUIREMENTS   **12 Hrs**

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

UNIT III : SOFTWARE DESIGN   **12 Hrs**

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 : SOFTWARE QUALITY   **12 Hrs**

Quality management - Quality assurance and standards - Quality planning-Quality control - Software measurement and metrics - Process measurement - The SEI Process Capability Maturity Model - Process classification. Dependability – Critical systems – Availability and Reliability – Safety – Security

UNIT V SOFTWARE DEVELOPMENT AND TESTING   **12 Hrs**
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

        Total No. of Hrs: 60

TEXT BOOKS
1. Ian Sommerville (2008) *Software Engineering* (8th ed.) Pearson Education Asia

REFERENCES
1. Roger S. Pressman (2010) *Software Engineering: A Practitioner Approach* (7th ed.) McGraw hill Publications
2. Fairley (2001) *Software Engineering Concepts*, McGraw-Hill

BCS13008   **SYSTEM SOFTWARE**   **3 0 0 3**

OBJECTIVES:
- The students will be able to understand the concept of addressing modes in processors
- To understand the functions of loaders, linkers, microprocessors and compilers
- To design assembler, loader and linker

UNIT I : CPU SYSTEM CONCEPTS   **9 Hrs**

Basic concepts-Machine structure- Instruction formats – Addressing modes –Typical Architectures

UNIT II : ASSEMBLERS   **9 Hrs**

Functions – features – Machine dependent – Machine independent - Design options –OnePass – Multipass – Implementation – Examples

UNIT III : LOADERS AND LINKERS   **9 Hrs**

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

UNIT IV : MACROPROCESSORS   **9 Hrs**

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

UNIT V : COMPILERS AND UTILITIES   **9 Hrs**

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

Total No. of Hrs: 45

TEXT BOOKS

1. Beck L. (2008) *System Software, An Introduction to System Programming* (3rd ed.), Pearson

REFERENCES

1. John R. L. (2003) *Linkers & Loaders* Morgan Kauffman
2. Aho A. V. Ravi S. Monica S. J. D. Ullman. (2007) *Compilers Principles, Techniques and Tools* (2nd ed.) Addison Wesley
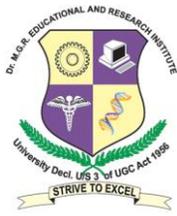
BCS13010 **OBJECT ORIENTED SYSTEM ANALYSIS AND DESIGN** **3 0 0 3**

OBJECTIVES:
- **T**he students can develop the skills to determine which processes and OOAD techniques should be applied to a given project
- To build use case diagrams by identifying use cases, actors and their relationships for a given application, differentiate Sequence & Collaboration diagrams
- To generate interaction overview diagrams working out the exact time constraints for behavior of the system.

UNIT I : OO CONCEPTS **9 Hrs**

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 : METHODOLOGY AND MODELING **9 Hrs**

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

UNIT III : OBJECT ORIENTED ANALYSIS **9 Hrs**

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

UNIT IV : OBJECT ORIENTED DESIGN **9 Hrs**

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

UNIT V : TESTING **9 Hrs**

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

Total No. of Hrs: 45

TEXT BOOKS

1. Ali Bahrami (2008) *Object Oriented System Development* McGraw Hill international

REFERENCES

1. Craig Larman (2005) *Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development* m(3rd ed.), Pearson
2. Grady Booch (2009) *Object oriented Analysis & design* ,Pearson Education India
3. Rambaugh J. Blaha M. P. W., Eddy F. Loresen W.(1997) *Object Oriented Modeling & design*, PHI
4. Joey F. G. Dinesh B. J. Valacich S. Jeffrey A. H. (2006) *OOSAD* (2nd ed.), Pearson
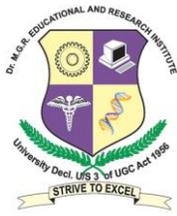
BCS13016	ADVANCED JAVA PROGRAMMING	3 1 0 4

OBJECTIVES:
- ➢ The students will be able to demonstrate the breadth knowledge across Java programming
- ➢ To develop advanced java programs using JDBC connectivity
- ➢ To create projects using java beans, graphics, RMI and struts.

UNIT I : JAVA BASICS REVIEW   12 Hrs
Java Streaming - Components and Events Handling - Threading Concepts –Byte Code Interpretation - Java Native Interfaces - AWT/Swing Programming

UNIT II : ADVANCED NETWORKING AND BEANS   12 Hrs
Networking Features - Client-Server computing – Sockets - secure sockets – custom sockets –UDP datagrams – multicast sockets - URL classes – Reading / Writing Data from the server – writing data -Developing Distributed Applications - RMI - Remote Objects – Object Serialization - Bean Concepts - Events in Bean Box - Bean customization and persistence

UNIT III : JAVA DATABASE PROGRAMMING   12 Hrs
Connecting to Databases - JDBC principles - Databases access - Database Support in Web applications - Using BLOB and CLOB objects – storing Multimedia data into databases – Multimedia streaming applications – Java Media Framework

UNIT IV : WEB BASED JAVA   12 Hrs
Server Side Programming – Servlets – Java Server Pages - Struts – MVC framework, Advanced Java Scripting Techniques

UNIT V : ENTERPRISE APPLICATIONS   12 Hrs
Server Side Component Architecture – Introduction to J2EE – Session Beans – Entity Beans – Persistent Entity Beans – Transactions- JAR File Format and Creation

Total No. of Hrs: 60

TEXT BOOKS
1. Herbert Schildt (2011) *JAVA Complete Reference* (8th ed.) (UNIT I and UNIT II)
2. Herbert Schildt (2007) *J2EE Complete Reference* (UNIT III)
3. McGovern et al (2011) *J2EE 1.4 Bible*, Wiley India(UNIT IV and UNIT V)

REFERENCES
1. Patrick Naughton (2003) *COMPLETE REFERENCE: JAVA2* Tata McGraw-Hill
2. Keogh (2002) *J2EE The Complete Reference*
3. Web reference: http://java.sun.com.
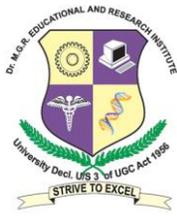
BCS13L07	SOFTWARE SYSTEM DEVELOPMENT LAB	0 0 3 1

OBJECTIVE:

- ➢ To develop a mini-project following the exercises listed below.

1. Develop a problem statement.

2. Develop an IEEE standard SRS document.

3. Identify Use Cases and develop the Use Case model.

4. Identify the business activities and develop an UML Activity diagram.

5. Identity the conceptual classes and develop a domain model with UML Class diagram.

6. Using the identified scenarios find the interaction between objects and represent them using UML Interaction diagrams.

7. Identify the User Interface.

8. Implement the system

EXERCISES

A. Online Railway reservation system

B. Student Mark Analysis system

C. Payroll processing application

D. Inventory system

E. Quiz system

F. Automating the Banking process

G. Course Registration System

H. Library management system

I. Passport Automation System

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, DB2)

Modelling and Design : Rational Rose
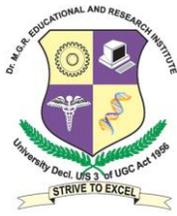
BCS13012	COMPUTER NETWORKS	3 0 0 3

OBJECTIVES:
➢ The students will be able to design a protocol , to solve problems in network
➢ To understand how communication takes place in various mediums
➢ To understand how to construct large scale network

UNIT I : INTRODUCTION 9 Hrs

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 Hrs

Data link layer design issues - Error detection and correction - HDLC –Channel access on links – SDMA – TDMA - FDMA – CDMA -Sliding window protocols - ETHERNET - 802.11, 802.16 - Bridges and Switches-Bluetooth

UNIT III : NETWORK LAYER 9 Hrs

Network layer design issues - Circuit switching – Packet switching – Virtual circuit switching-Routing algorithms – Congestion control algorithms - Internetworking- Network layer in Internet -IPV6

UNIT IV : TRANSPORT LAYER 9 Hrs

Transport layer design issues - Transport protocols - Simple transport protocol - Internet transport protocols UDP, TCP - Flow Control – Congestion control - Congestion avoidance

UNIT V : APPLICATION LAYER 9 Hrs

Domain name system - Electronic mail - World Wide Web - HTTP - SNMP – Telnet – FTP-RTP

Total No. of Hrs: 45

TEXT BOOKS

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

REFERENCES

1. Weiss Mark Allen (2007) *Data Structures and Algorithm Analysis in C*, (3rd ed.), Pearson

2. Horowitz, E. Sahni & Sanguthevar Rajasekaran.(2007) *Fundamentals of Computer Algorithms*, Galgotia Publications

3. Jean-Paul, Tremblay, Paul. G. Sorenson. (2007) *An Introduction to Data Structures with Applications*, (2nd ed.), Tata McGraw Hill Publishing Co

4. Sara, Baase. Allen, Van, Gelder.(2000) *Computer Algorithms*, Galgotia
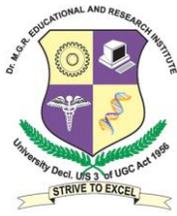
BCS13015   **WEB TECHNOLOGY**   **3 0 0 3**

OBJECTIVES:
- **T**o understand hypertext markup language, specialized commands and tags for WWW documents
- To specify hyperlinks, lists, paragraph and attributes, design web pages for various applications

UNIT I : HTML   **9 Hrs**
Introduction – Network concepts – Web concepts – Internet addresses – Retrieving data with URL – HTML – Multimedia components – Frames – Form and its objects – Image maps – DHTML – Cascading / Style sheets

UNIT II : XML TECHNOLOGY   **9 Hrs**
XML – Benefits – Advantages of XML over HTML – XML based standards – Structuring XML document using DTD – Schemas – XML parsers – DOM – SAX presentation technologies – XSL – XFORMS – XHTML – Transformations – XSLT – XLINK – XPATH – Xquery

UNIT III : CLIENT SIDE SCRIPTING   **9 Hrs**
Java Script – Advantages – Data types – Variables – Operators – Control statements – Functions – Objects and arrays – Windows and frames – Forms.AJAX – XMLHttpRequest (XHR) – Create Object – Request – Response – Ready state. Introduction – jQueryn - E4X

UNIT IV : SERVER SIDE SCRIPTING   **9 Hrs**
ASP – Need for ASP – Introduction to ASP objects – Response – Request – Server – Session – File access – Working with ASP components like Ad rotator – Content linking and Rotator – Displaying browser Capabilities and counters – Sending mails – Accessing database – PHP – Introduction Forms – Sending a mail

UNIT V : WEB APPLICATIONS   **9 Hrs**
Web Applications – Security – Database access and mapping – Web template system – Web services – SOA – SOAP – WSDL – UDDI

                                                                  Total No. of Hrs: 45

TEXT BOOKS
1. Paul, J. Deitel. Harvey, M. Deitel. Abbey, Deitel. (2011) *Internet & World Wide Web: How to Program* (5th ed.), Pearson

REFERENCES
1. Heather Williamson (2008) *The Complete Reference XML*,(11th reprint) Tata McGraw Hill
2. Thomas A. Powell (2001) *HTML: The Complete Reference* (3rd ed.) Osborne/McGraw Hill
3. Thomas Powell. Fritz Schneider. (2008) *The Complete Reference – Java Script* (2nd ed. 8th reprint)
4. Eric Ladd. Jim O'Donnell, (2001) *Using HTML 4,XML and Java*, QUE
5. Leon Shklar, Rich Rosen (2004) *Web Application Architecture: Principles, Protocols, and Practices* (2nd ed.) John Wiley & Sons
6. Russell, Jones, A. (2009) *Masteering Active Server Pages 3*, Wiley India Pvt. Limited
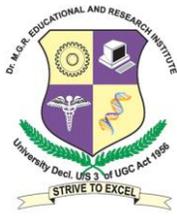
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

BMG13003   **PRINCIPLES OF MANAGEMENT**   3 1 0 4

OBJECTIVES:

➢ The students will have a clear understanding of the managerial functions like planning, organizing, staffing, leading and controlling
➢ To gain some basic knowledge on international aspect of management , Understand and discuss Business case studies and characterization

UNIT I : FOUNDATIONS OF MANAGEMENT   12 Hrs
Definition, Principles of Management – Nature, Scope, Functions of Management, Management – Science /Art/Profession. Managers Vs Entrepreneurs – Managers Vs Leaders, Types of Business Organization, Guidelines for Managerial Excellence and Success

UNIT II : PLANNING   12 Hrs
Management Practice –Steps involved in Planning, Planning Premises, Strategy and Tactics –Implementation - Organizing, Co – ordination, Controlling – Management process, Decision-making

UNIT III : ORGANIZING   12 Hrs
Nature and purpose-Formal and informal organization-Resistance – Standards – Budget – Program – MBO/SWOT – MBE –Organizational Structure and Design – Authority & Responsibility , Relationship – Delegation –Line and Staff authority-Staffing- Selection Process- HRD – Conflicts

UNIT IV : DIRECTING AND CONTROLLING   12 Hrs
Nature of Evaluation, Designs of problems – Appraising Techniques – Compensation plans – Direction – Leadership-Types of Leadership Motivation-Hierarchy of needs-Co-Ordination – Quantitative and Qualitative measures of Control – Feedback of Management. System and process of Controlling - Requirements for effective control - Control of Overall Performance - Direct and Preventive Control – Reporting

UNIT V : CONTEMPORARY MANAGEMENT ISSUES   12 Hrs
The Global Environment - Globalization and Liberalization - International Management and Global theory of Management. Enhanced Technology Management – Social Responsibility – Managing Innovation – Stress Management

Total No. of Hrs: 60

TEXT BOOKS
1.   Harold Kooritz & Heinz Weihrich (2006) *Essentials of Management*, Tata McGraw-Hill
2.   Tripathy PC And Reddy PN (2008) *Principles of Management*,(4th ed.) Tata McGraw-Hill

REFERENCES
1.   Stephen P. R.(2012) *Fundamentals of Management : Essential Concepts and Applications*, (8thed.) Prentice Hall
2.   L. M. Prasad (2008) *Principles and Practice of Management*, Sultan Chand & Sons
3.   Koontz (2004) *Principles of Management*, McGraw Hill Education
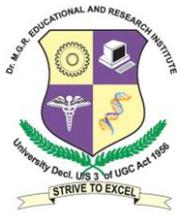
B.Tech - Computer Science and Engineering – 2013 Regulation

BCS13L08   **NETWORK PROGRAMMING LAB**   **0 0 3 1**

OBJECTIVE:

➢ To implement the following list of Programs

1. Socket program for Echo/Ping/Talk commands.

2. Create a Socket (TCP) between two computers and enable file transfer between them.

3. To implement remote command execution (two m/c's can be used).

4. Create a socket (UDP).

5. Port simulating ARP/RARP.

6. Create a socket for HTTP for web page upload and download.

7. File transfer in Client-Server architecture using following methods

    a) Using RS232C

    b) Using TCP/IP

8. 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

10. Demonstration of Network Simulators.
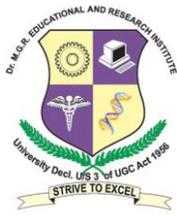
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

BCS13L11   VALUE ADDED TRAINING PROGRAMME / THREE TIER APPLICATION PROJECT   0 0 2 1

OBJECTIVE:

> ➤ The students are expected to take up an application project for any real life scenario

Having acquired the core competency in the Computer science domain over the last 6 semesters, the students are expected to take up an application project for any real life scenario and provide a solution for the same . The implantation is expected to be based on a 3 tier architecture design.

For the award of the 1 credit the students are expected to demonstrate the project. The evaluation for this credit will be carried out in the first week of 7th Semester so that the students can do detailed work utilizing the end semester holidays of 6th semester.

The allotted faculty can provide guidelines and consultation on a weekly basis.

Any Value adding training Program of Industry Standard can be considered in lieu of project for awarding credits
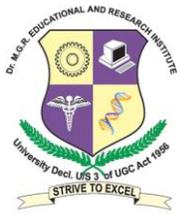
BCS13018   **DATA WAREHOUSING AND DATA MINING**   **3 1 0 4**

OBJECTIVES:
- The students will be able to characterize a data mining system to examine the given database with an architecture
- To improve the data quality by performing data preprocessing routines, conclude patterns, associations and correlations among real world data instances

UNIT I : DATA WAREHOUSING   **12 Hrs**
Introduction to Data Warehousing- Adavntages- What makes Data Warehousing a reality- Data warehousing Components-Building a Data Warehouse-mapping Data Warehouse to a Multiprocessor-Architecture-DBMS Schemas for Design Support

UNIT II : ETL AND BUSINESS TOOLS   **12 Hrs**
Data Extraction-Cleaning and Transferring tools- Meta data. Reporting and Query tools and Application-OLAP-Patterns and Models- Statistics

UNIT III : DATA MINING   **12 Hrs**
Introduction – Data – Types of Data – Data Mining Functionalities – Interestingness of Patterns – Classification of Data Mining Systems – Data Mining Task Primitives – Integration of a Data Mining System with a Data Warehouse – Issues –Data Preprocessing.- Data Cleaning –Missing Values-Noisy Data-Inconsistent Data-Data Integration and Transformation-Data Reduction -Dimensionality Reduction – Evaluation criteria of Various Mining Techniques

UNIT IV : ASSOCIATION RULE MINING AND CLASSIFICATION   **12 Hrs**
Mining Frequent Patterns, Associations and Correlations   – Mining Methods   – Mining Various Kinds of Association Rules – Constraint Based Association Mining   – Classification and Prediction - Decision Tree Induction - Entropy and Classification Algorithms -Bayesian Classification – Rule Based Classification

UNIT V : CLUSTERING TECHNIQUES   **12 Hrs**
Cluster Analysis - Types of Data – Categorization of Major Clustering Methods - Kmeans – Partitioning Methods – Hierarchical Methods - Density-Based Methods –Grid Based Methods – Model-Based Clustering Methods – Clustering High Dimensional Data - Constraint – Based Cluster Analysis – Outlier Analysis –Genetic Algorithm For Mining - Data Mining Applications

                                                                     Total No. of Hrs: 60

TEXT BOOKS
1.   Alex Berson-Stephen. J.Smith, (2006) *Data warehousing-Data Mining & OLAP*, TMH
2.   Jiawei Han and Micheline Kamber (2011) *Data mining concepts and techniques*, Morgan Kaufmann Publishers

REFERENCES
1. Arun K Pujari (2002) *Data Mining Techniques*, Universities Press (India) Ltd.
2. Sam Anahory, Dennis Murry (2004) *Data Warehousing in the real world*, Pearson Eductation
3. Margaret H. Dunham (2006) *Data Mining: Introductory and Advanced Topics*, Pearson
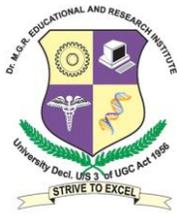
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

BCS13014	PRINCIPLES OF COMPILER DESIGN	3 0 0 3

OBJECTIVES:
- The students will be able to describe the design of a compiler including its phases and components
- To develop a large, complex, but well-structured software system that implements various phases of a compiler such as the scanner, parser, code generator, and optimizer
- To identify the similarities and differences among various parsing techniques and grammar transformation techniques.

UNIT I : COMPILER ORGANISATION   9 Hrs
Compilers-Analysis of source program-Phases of a Compiler- Cousins of Compiler- Grouping of phases-Computer Language Representation—Compiler Construction Tools

UNIT II : LEXICAL ANALYSIS   9 Hrs
The role of the lexical analyzer-Input Buffering-Token Specification-Design of lexical analyzer-Finite Automata-A language for specifying lexical analyzers-Recognition Machine - Error Recovery-Top down Parsing principles

UNIT III : SYNTAX ANALYSIS   9 Hrs
Parsing-Context Free Grammars-Writing a Grammar-Top-down Parsing- Implementation - Bottom-up Parsing - LR Parsers - Parser Generator(YACC)

UNIT IV : INTERMEDIATE CODE GENERATION   9 Hrs
Intermediate Code generation-Intermediate Languages - Declarations - Flow Control Statements -Backpatching-Procedure Calls – Symbol Table

UNIT V : CODE GENERATION   9 Hrs
Introduction to Code Generation-Issues in the design of a code generator-Run Time storage management-The Dag representation of basic blocks-introduction of Code Optimization-Run Time Environments

Total No. of Hrs: 45

TEXT BOOKS

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

REFERENCES

1. Chattopadhyay Santanu, (2007) *Compiler Design* PHI.
2. Allen Holub I. (2007) *Compiler Design in C*, PHI
3. V Raghavan (2009) *Principles of compiler*, Tata Mc Graw Hill
4. Kenneth C Louden (2003) *Compiler Construction Principles & Practice* Thompson learning
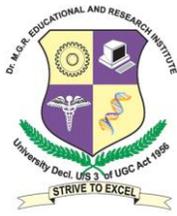
B.Tech - Computer Science and Engineering – 2013 Regulation

BCS13L10   **COMPILER DESIGN LAB**   **0 0 3 1**

OBJECTIVE:

- ➢ To implement the following list of programs

1. Lexical analyzer in "C".
2. Constructing NFA from a regular expression
3. Constructing DFA from a regular expression
4. To eliminate Left Factoring
5. Constructing top down parsing table
6. Shift-reduce parsing algorithm
7. Operator-Precedence parsing algorithm
8. Constructing LR-Parsing table
9. Generate a code for a given intermediate code
10. Generate Machine code.

Software Required: Turbo C

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BMG13004   **ENTREPRENEURSHIP DEVELOPMENT**   3 1 0 4

OBJECTIVES:

- ➢ The students will be able to plan business, financial control, marketing skills, joint ventures
- ➢ To demonstrate an understanding of the functional areas of accounting, marketing, finance, management, and economics
- ➢ To demonstrate an understanding of the legal and social environment of business
- ➢ To demonstrate an understanding of the global environment of business

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

Total No. of Hrs: 60

TEXT BOOKS

1. Robert Hisrich, Michael Peters, Dean Shepherd, (2011) *Entrepreneurshi p*(6th ed.), Tata McGraw-Hill

REFERENCES

1. Donald F. Kuratko, Richard M. Hodgetts (2008) *Entrepreneurship theory, Process and Practice* (8th ed.) Cengage learning
2. Prasana Chandra (2009) *Projects-planning, analysis, selection, implementation and reviews*,(7th ed.)Tata McGraw-Hill

BCS13017   **DOT NET FRAMEWORK**   **3 0 0 3**

OBJECTIVES:
➢ The students will be able to understand, analyze and explain .NET Framework and C#
➢ To use basic C# constructs, delegates and events, use language interfaces, and inheritance, Common Language Runtime (CLR),

UNIT I : DOT NET FRAMEWORK   9 Hrs

.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 Hrs

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 Hrs

Introduction, Windows application, Web application, Building Blocks, programming Fundamentals, Creation of Windows Forms, SDI Vs MDI, Crating run time WindowsControls. File handling, Interaction with other Applications, Creating and using reports, Debugging and Packaging

UNIT IV : ADO.NET   9 Hrs

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 Hrs

Creation of web services, web service with ASP.NET, ASP.NET applications with databases, cookies and session handling

Total No. of Hrs: 45

TEXT BOOKS
1. Kogent Solutions Inc (2009) *C# 2008 Programming: Covers .Net 3.5 Black Book*, (Platinum ed.) Dreamtech Press
2. Balagurusamy, E. (2010) *Programming in C#* (3rd ed.) Tata McGraw-Hill

REFERENCES
1. Thuan L.Thai, Hoang Lam, (2003) *.NET Framework Essentials*, (3rd ed.) O'reilly Media Inc.
2. Kip R Irvine Tony Gaddis (2009) *Starting Out with Visual Basic 2008* (4th ed.) Addison Wesleypublication
3. Evjen, Hanselman, Rader (2005) *Profesional ASP.NET 2.0* , John Wiley & Sons
4. David Sceppa (2013) *Programming Microsoft ADO.NET4*, Amazon.com
5. web reference http://msdn.microsoft.com/en-us/vstudio/default.aspx

BCS13019 **INFORMATION STORAGE MANAGEMENT** **3 0 0 3**

OBJECTIVES:
- The students will be able to understand the overview of Information Storage Systems
- To learn and implements the process of indexing and Information storage
- To learn and implement with various data structures, understand the concepts of term clustering and Information Visualization, acquire knowledge in various storage security systems.

UNIT I : STORAGE SYSTEMS **9 Hrs**

Information Storage - Evolution of Storage Technology and Architecture – Data Centre – Infrastructure – ILM – Components of Storage System Environment – Logical Components of Host RAID: Implementation, levels & comparison – ISS components, Intelligent Storage Array

UNIT II : STORAGE TECHNOLOGIES **9 Hrs**

Storage Networking Technologies & Virtualization DAS – SCSI – SAN – NAS –IPSAN – CAS – Forms of Virtualization

UNIT III : BUSINESS CONTINUITY **9 Hrs**

Information availability – BC Planning Life Cycle failure analysis – Backup & Recovery – Local Replication – Remote Replication

UNIT IV : STORAGE SECURITY **9 Hrs**

Storage Security Framework – Risk Triad – Storage Security Domains – Security Implementation in Storage Networking

UNIT V : MANAGING STORAGE INFRASTRUCTURE **9 Hrs**

Monitoring the Storage Infrastructure – Storage Management Activities and Challenges – Developing an Ideal solution

Total No. of Hrs: 45

TEXT BOOKS

1. EMC Corporation (2010) *Information Storage and Management*, Wiley, India

REFERENCES

1. Robert Spalding (2003) *Storage Networks: The Complete Reference*, Tata McGraw Hill , Osborne

2. Marc Farley (2001) *Building Storage Networks*, Tata McGraw Hill ,Osborne
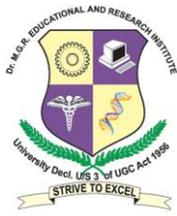
BCS13L13   **DOT NET LAB**   **0 0 3 1**

OBJECTIVE:

> ➢ To implement the following list of programs

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

11. Income tax calculation
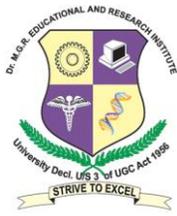
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BCS13L18   **PROJECT**   0 1 3 2

OBJECTIVES:

➢ Able to do main projects in their respective domain

Students are expected to carry out the following

(i)	Identify a Problem.
(ii)	Have the feasibility explored.
(iii)	Freeze the Requirment specification (both user and system).
(iv)	Construct the architectural model(as many as required).
(vi)	Design the solution.
(vii)	Implement the Design using suitable technologies.
(viii)	Generate the test cases.
(ix)	Demonstrate the solution with suitable user interface.
(x)	Prepare a project report consolidating the phase-I and II activities.
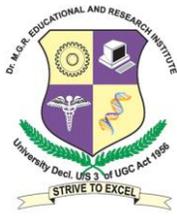
BCS13E01 **DATABASE TUNING** **3 0 0 3**

OBJECTIVES:
- The students will be able to tune the databases for different data base applications
- To develop case studies in data bases, and able to troubleshoot the data bases.

UNIT I : FUNDAMENTALS OF TUNING **9 Hrs**

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 : INDEXING AND HASHING **9 Hrs**

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 **9 Hrs**

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 **9 Hrs**

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 Hrs**

Transaction Chopping – Time Series Databases – Understanding Access Plans – Configuration Parameters: Oracle; SQL Server; DB2UDB – Distributed Database – Implementation

Total No. of Hrs: 45

TEXT BOOKS

1. Dennis Shasha and Philippe Bonnet (2005) *Database Tuning, Principles, Experiments, and Troubleshooting Techniques*, Elsevier

2. Thomas Connoly and Carlolyn Begg (2009) *Database Systems, A Practical Approach to Design, Implementation and Management*, (4th ed.) Pearson Education

3. M.Tamer Ozsu, Patrick Valduriez and S.Sridhar (2011) *Principles of Distributed Database Systems* (3rd ed.), Springer.
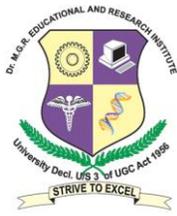
BCS13E02   **ADVANCED KNOWLEDGE MANAGEMENT**   **3 0 0 3**

OBJECTIVES:
- ➢ The students will be able to develop knowledge models and systems
- ➢ To develop a knowledge model and understand the knowledge Engineering basics.

UNIT I : BASICS OF KNOWLEDGE MANAGEMENT   **9 Hrs**

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

UNIT II : KNOWLEDGE MODELS   **9 Hrs**

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

UNIT III : TECHNIQUES OF KNOWLEDGE MANAGEMENT   **9 Hrs**

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

UNIT IV : KNOWLEDGE SYSTEM IMPLEMENTATION   **9 Hrs**

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

UNIT V : KNOWLEDGE MANAGEMENT APPLICATIONS   **9 Hrs**

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

Total No. of Hrs: 45

TEXT BOOKS

1. Guus Schreiber, Hans Akkermans, Anjo Anjewierden, Robert de Hoog, Nigel Shadbolt, Walter Van de Velde and Bob Wielinga (2003) *Knowledge Engineering and Management*, Universities Press
2. Elias M.Awad & Hassan M. Ghaziri (2010) *Knowledge Management* (2ⁿᵈ ed.) PHI Learning

REFERENCES

1. C.W. Holsapple (2003) *Handbooks on Knowledge Management* (vol.1 & 2) International Handbooks on Information Systems, Springer
2. Shelda Debowsks (2007) *Knowledge Management,* Wiley
3. http://www.epistemics.co.uk
4. http://depts.washington.edu/pettt/papers/WIN_poster_text.pdf

BCS13E06	ADVANCED DATABASES	3 0 0 3

OBJECTIVES:
- ➢ The students will be able to create ER model for a given application
- ➢ To understand enhanced data models,understand the special purpose databases.

UNIT I : RELATIONAL DATABASE ISSUES   **9 Hrs**

ER Model – Normalization – Query processing – Query optimization – Advanced Transaction processing – Concurrency control – Recovery – Database tuning

UNIT II : DISTRIBUTED DATABASES   **9 Hrs**

Parallel databases – Inter and intra query parallelism – Distributed database features – Distributed database architecture – Fragmentation – Distributed query processing – Distributed transactions processing – Concurrency control – Recovery – Commit protocols

UNIT III : OBJECT ORIENTED DATABASES   **9 Hrs**

Introduction to object oriented databases – Approaches – Modeling and design – Persistence – Versioning-Query languages – Transaction – Concurrency – Multi version locks – Recovery – ODMG model

UNIT IV : ENHANCED DATA MODELS   **9 Hrs**

Enhanced data models – Client/Server model – Very large databases – Web databases – XML and web databases

UNIT V : SPECIAL PURPOSE DATABASES   **9 Hrs**

Active and deductive databases – Multimedia databases – Multimedia query languages – Mobile databases-Genome databases – Spatial databases- Temporal databases

Total No. of Hrs: 45

TEXT BOOKS

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan (2010) *Database System Concepts*, McGraw Hill

2. M.Tamer Ozsu, Patrick Valduriez (2011) *Principles of Distributed Database Systems* (3rd ed.), Springer

3. R. Elmasri, S.B.Navathe, "Fundamentals of Database Systems", 5/e, Pearson Education, 2008.

REFERENCES

1.Thomas Connolly and Carlolyn Begg, (2008) *Database Systems, A Practical Approach to Design, Implementation and Management* (4th ed.) Pearson Education

2. C.J.Date, A.Kannan, S.Swamynathan (2006) *An Introduction to Database Systems* (8th ed.), Pearson Education
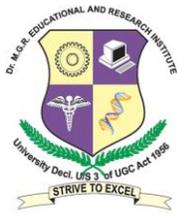
BCS13E07	**MOBILE AND WIRELESS NETWORKS**	**3 0 0 3**

OBJECTIVES:
- ➢ **T**he students will be able to understand working,characteristics and limitations of mobile hardware devices
- ➢ Tounderstand and learn frequency band,spectrum, air interface and channel structure for telecommunication

UNIT I COMMUNICATION FUNDAMENTALS   **9 Hrs**

Introduction - Wireless Transmission - Frequencies for Radio Transmission - Signals - Antennas - Signal propagation - Multiplexing Modulation - Spread spectrum - Cellular systems.

UNIT II MAC AND COMMUNICATION SYSTEMS   **9 Hrs**

Medium access control - Motivation for a specialized MAC-SDMA-FDMA-TDMA-CDMA. Telecommunication systems -GSM-DECT-TETRA-UMTS and IMT-2000, Satellite systems - Broadcast systems - Data Digital Audio Broadcasting - Digital Video Broadcasting.

UNIT III WIRELESS STANDARDS   **9 Hrs**

Wireless LAN - Infrared vs. Radio Transmission - Infra structure and ad hoc Networks - IEEE 802.11 - HIPERLAN - Bluetooth. Wireless ATM - WATM Services - Reference Model - Functions - Radio Access Layer - Handover - Location Management - Addressing - Mobile Quality of Service - Access Point Control Protocol.

UNIT IV MOBILE NETWORK ISSUES   **9 Hrs**

Mobile network layer - Mobile IP - Dynamic host configuration protocol - Ad hoc networks-Routing Algorithm-Mobile transport layer - Traditional TCP - Indirect TCP - Snooping TCP, Mobile TCP - Fast Retransmit /Fast Recovery - Transmission/Timeout Freezing, Selective Retransmission - Transaction Oriented TCP.

UNIT V   MOBILE APPLICATIONS   **9 Hrs**

Support for Mobility - File systems - Consistency - World wide web - Hyper Text Transfer Protocol - Hypertext markup language –Next generation- Wireless Application Protocol.

                                             Total: 45 Hrs

TEXT BOOKS:
1. Jochen Schiller, (2008) *Mobile Communications* (2nd ed.), Pearson Education
2. Blake (2002) *Wireless Communication Technology,*Thomson Learning

REFERENCES:
1. Theodore S.Rappaport (2010*) Wireless Communication: Principles and practice*, Prentice Hall

BCS13E09   **AD-HOC NETWORKS**   **3 0 0 3**

OBJECTIVES:
- The students will be able to design, analyse and implement routing protocols for ad hoc network
- To analyse the transport layer security issues and design a new protocol for wireless ad hoc networks

UNIT I   ADHOC NETWORKS SCENARIO   9 Hrs

Introduction - Issues – various ad-hoc network configurations, Applications-Issues of MAC layer and Routing Protocol-Proactive, Reactive and Hybrid Routing protocols-Hierarchical Routing-Power aware routing

UNIT II   MULTICAST ROUTING AND TRANSPORT LAYER   9 Hrs

Issues-Operation of Multicast- Tree based protocols- Mesh based protocols –Energy Efficient Multicasting- Multicast with Quality of Service Provision-TCP over Ad hoc-Transport protocol-secure routing

UNIT III   QUALITY OF SERVICE   9 Hrs

Real time traffic support – Issues and challenges in providing QoS - Classification of QoSSolutions – MAC layer classifications – QoS Aware Routing Protocols MANET-Applications-Challenges in Mobile environment-Routing protocols in mobile Ad hoc

UNIT IV   ENERGY MANAGEMENT AD HOC NETWORKS   9 Hrs

Need for Energy Management – Classification of Energy Management Schemes – Battery Management and Transmission Power Management Schemes – System power Management schemes

UNIT V   SENSOR NETWORKS   9 Hrs

Introduction – Sensor Network architecture – Data Dissemination – Data Gathering – MAC Protocols for sensor Networks – Location discovery – Quality of Sensor Networks – Evolving Standards – Other Issues – Recent trends in Infrastructure less Networks.

                                        Total: 45 hrs

TEXT BOOK:
1. C. Siva Ram Murthy and B.S.Manoj (2012) *Ad hoc Wireless Networks –Architectures and Protocols* Pearson Education, Fifteen Impressions

REFERENCES:
1. Feng Zhao and Leonidas Guibas (2004), *Wireless Sensor Networks* Morgan Kaufman Publishers
2. C.K.Toh (2002) *Adhoc Mobile Wireless Networks*, Pearson Education

BCS13E11   NETWORK SECURITY AND CRYPTOGRAPHY   3 0 0 3

OBJECTIVES:
➢ The students will be able to design, analyse and implement different network security protocols, identify the major types of threats to Network security and the associated attacks
➢ To develop strategies to protect organization information assets from common attacks, understand how security policies, standards and practices are developed

UNIT I   SYMMETRIC CIPHERS   9 Hrs

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 Hrs

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 Hrs

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

UNIT IV   SYSTEM SECURITY   9 Hrs

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 Hrs

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

                                                        Total: 45 Hrs

TEXT BOOKS:
1. William Stallings (2011) *Cryptography And Network Security – Principles and Practices*, (5th ed.) Pearson Education
2. Stewart S. Miller (2003) *Wi-Fi Security*, McGraw-Hill

REFERENCES:
1. Atul Kahate (2008) *Cryptography and Network Security* Tata McGraw Hill
2. Bruce Schneier (2007) *Applied Cryptography*, John Wiley & Sons Inc.
3. Charles B. Pfleeger, Shari Lawrence Pfleeger (2007) *Security in Computing* (4th ed.), Pearson Education
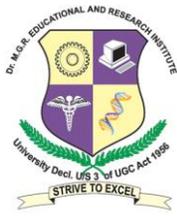
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BCS13E13	UNIX INTERNALS	3 0 0 3

OBJECTIVES:
- The students will be able to implement shell programs,analyse UNIX OS memory management
- To design a new communication methodology for UNIX.

UNIT I UNIX OVERVIEW   **9 Hrs**

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   FILE SYSTEM   **9 Hrs**

Buffers- Structures and Representator – Implementation of System Calls.

UNIT III PROCESS MANAGEMENT   **9 Hrs**

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

UNIT IV MEMORY MANAGEMENT   **9 Hrs**

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

UNIT V   DRIVERS & STEAMS   **9 Hrs**

Drivers – Streams – Implementation of IPC Mechanism.

         Total: 45 Hrs

TEXT BOOK:
1. M.J.Bach (2007) *The Design of the UNIX OS* ,Prentice Hall

REFERENCES:
1. W. Richard Stevens (2008) *UNIX-Network Programming Volume1*,(2nd ed.), Pearson Education
2. Das Sumitabha (2006), *UNIX concepts and Applications*, (4th ed.), TMH
3. W. Richard Stevens (1999/6) *UNIX-Network Programming Volume2* (2nd ed.), Pearson Education,.
4. Kay A, Robbins and Steven Robbins (2009), *Practical UNIX Programming*, PHI
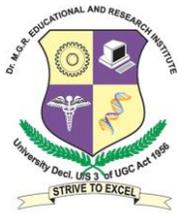
BCS13E14	DISTRIBUTED COMPUTING	3 0 0 3

OBJECTIVES:
➢ The students will be able to understand the design of distributed systems
➢ To understand communication concepts of distributed systems
➢ To apply the memory management design of distributed systems to design a new memory

UNIT I   FUNDAMENTALS: **9 Hrs**
Introduction to distributed computing system, Evolution, Different models, 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   REMOTE PROCEDURE CALL   **9 Hrs**
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, Lightweight RPC.

UNIT III DISTRIBUTED SHARED MEMORY AND SYNCHRONIZATION   **9 Hrs**
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 RESOURCE AND PROCESS MANAGEMENT   **9 Hrs**
Introduction, Desirable features of a good global scheduling algorithm, Task assignment approach, Load-balancing approach, Load sharing approach, Process migration, Threads.

UNIT V   DFS/DCE SECURITY   **9 Hrs**
Desirable features of good DFS, File models, File accessing, models, File sharing semantics, File caching schemes, File replication, Fault tolerance, Atomic Transaction, Design principles, Authentication, Access control, Digital signatures, DCE security service.

                                                          Total: 45 Hrs

TEXT BOOK:
1. Pradeep K. Sinha (2012 Reprint) , *Distributed Operating System Concepts and Design* PHI

REFERENCES:
1. Andrew S. Tenenbaum (2012), *Modern Operating System* (3rd ed.) PHI
2. Ajay D. Kshemkalyani , Mukesh Singhal (2008), *Distributed computing : principles, algorithms and systems* – Cambridge University Press
3. Andrew S. Tenenbaum &Maatren Vansteen (2012) *Distributed systems: Principles & Paradigms* (2nd ed.), PHI
4. Hagit Attiya And Jennifer Welch (2004) *Distributed computing fundamentals, simulations and Advanced Topics* (Digitized in 2007) (2nd ed.), Wiley
5. Jean Dollimore, Tim Kindberg, And George Coulouris (2005) *Distributed Systems: Concepts and Design* (4th ed.) Pearson Education
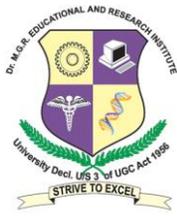
BCS13E15	REALTIME SYSTEM DESIGN	3 0 0 3

OBJECTIVES:
➢ The students will be able to understand the design of real time system with task management
➢ To understand the scheduling tools for real time systems
➢ To understand the reliability and synchronization concepts in real time systems.

UNIT I   RTS OVERVIEW   9 Hrs

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

UNIT II   TASK ASSIGNMENT AND SCHEDULING   9 Hrs

Uniprocessor scheduling-IRIS tasks-task assignment mode changes -fault tolerance Scheduling

UNIT III   PROGRAMMING LANGUAGES AND TOOLS   9 Hrs

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.

UNIT IV   REAL TIME DATABASES   9 Hrs

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

UNIT V   FAULT TOLERANCE, RELIABILITY AND SYNCHRONIZATION   9 Hrs

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

Total: 45 Hrs

TEXT BOOK:

1. C.M.Krishna, Kang.G.Shin (1997), *Realtime Systems*, McGraw Hill

REFERENCES:

1. Raymond j.a. Buhr (1999) *An Introduction To Real Time Systems From Design To Networking C And C++*, Prentice Hall

2. Albert .m.k.cheng (2002) *Real Time Systems- Scheduling, Analysis And Verification*. wiley interscience

3. Jane.W.S.Liu (2006) *Real-Time System* Prentice Hall

4. Philip.a.laplante, (2004)" *real-time system design and analysis*", Wiley-ieee press

5. Alan burns and andy wellings, (2009)"Real time systems and prog. Languages", (4th ed.),pearson

BCS13E19   **DESIGN OF ALGORITHMS**   **3 0 0 3**

OBJECTIVES:
- ➢ The students will be able to understand the design of advanced algorithms
- ➢ Create problems by applying Greedy methods and understand the dynamic programming
- ➢ Apply the graph coloring techniques to solve the real time problems.

UNIT I: BASIC ALGORITHMS   **9 Hrs**

Introduction- Fundamental characteristics of an algorithm. Basic algorithm analysis –Asymptotic analysis of complexity bounds – best, average and worst-case behaviour, standard notations for expressing algorithmic complexity. Empirical measurements of performance, time and space trade-offs in algorithms. Using recurrence relations to analyze recursive algorithms – illustrations using recursive algorithms.

UNIT II: FUNDAMENTAL ALGORITHMIC STRATEGIES: **9 Hrs**

Fundamental Algorithmic Strategies: Brute-Force, Greedy, Branch-and-Bound, Backtracking and Dynamic Programming methodologies as techniques for design of algorithms – Illustrations of these techniques for Problem-Solving. Heuristics – characteristics and their domains of applicability. Design of algorithms for String / Text matching problems, Huffman Code and Data compression problems, Subset-sum and Knapsack problems.

UNIT III: GRAPH AND TREE ALGORITHMS   **9 Hrs**

Graph and Tree Algorithms: Depth- and Breadth- First traversals. Shortest path algorithms, Transitive closure, Minimum Spanning Tree, Topological sort, Network Flow problems.

UNIT IV: TRACTABLE AND INTRACTABLE PROBLEMS: **9 Hrs**

Tractable and Intractable Problems: Computability.The Halting problem. Computability classes –P, NP, NP - complete and NP-hard. Cook's theorem. Standard NP complete problems Reduction techniques.

UNIT V: ADVANCED TOPICS: **9 Hrs**

Advanced Topics: Approximation algorithms, Randomized algorithms, Class of problems beyond NP – PSPACE.   **Total : 45 hrs**

TEXT BOOKS:
1. T.H. Corman et. al , (2009) *Introduction to Algorithms* Mit Press
2. Jon Kleinberg and Eva Tardos (2006) *Algorithm Design*, Pearson Education India

REFERENCES:
1. E. Horowitz et al (2008) *Fundamentals of Algorithms* –., **Prentice Hall of India**
2. Anany Levitin,(2003) "Introduction to the Design and Analysis of Algorithm", Pearson Education Asia

3 0 0 3

BCS13E20   **THEORY OF COMPUTATION**

OBJECTIVES:
- ➢ The students will be able to design a Turing machine, generate regular expressions,
- ➢ Derive NFA and DFA from the given regular expression, Design own lemma for automata.

Unit I   REGULAR LANGUAGE   9 Hrs

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

Unit II   CONTEXT FREE LANGUAGES   9 Hrs

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 Hrs

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

Unit IV TURING MACHINES   9 Hrs

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 Hrs

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

Total: 45 Hrs

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

References:
1. J.C Mortin (2002), "*Introduction to Language and Theory of Computation*", McGrawHill
2. John. E. Hopcroft, Rajeev Motwani, J. D. Ullman(2008) , *Introduction To Automata Theory, Languages, And Computation*, (3rd ed.), Pearson Education India
3. Krithivasan Kamala(2009), *Introduction To Formal Languages, Automata Theory And Computation*, Pearson

BCS13E23   **NATURAL LANGUAGE PROCESSING**   **3 0 0 3**

OBJECTIVES:
 ➢ The students will be able to apply the NLP to real time problems,
 ➢ To create a parser for any language,Generate an own natural language system.

UNIT I: UNDERSTANDING NLP   **9 Hrs**

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

UNIT II: PARSING   **9 Hrs**

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

UNIT III: SEMANTIC INTERPRETATION   **9 Hrs**

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

UNIT IV: DISCOURSE INTERPRETATION   **9 Hrs**

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

UNIT V: NATURAL LANGUAGE GENERATION SYSTEMS   **9 Hrs**

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.

                                                          Total : 45 hrs

Text Book:
        1. James Allen Benjamin Cummings (2007), "*Natural language understanding*", Pearson Education.
References:
        1. Grosz, Jones & Webber 2005, *Readings in Natural Language Processing*, Morgan Kanfamann Publishers
        2. Daniel Jurafsky and James H. Martin 2008, *Speech-Language-Processing* PHI,.
        3., Tanveer Siddiqui (2008) *Natural Language Processing and Information Retrieval*, Oxford
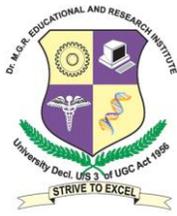
BEC13E31   **VLSI TECHNOLOGY**   **3 0 0 3**

OBJECTIVES:

➤ The students will be able to design and develop VLSI circuits
➤ To understand the testability of integrated systems-VLSI f o r Fuzzy logic systems,
➤ Able to design Adder circuit using VLSI technique.

Unit I   VLSI DESIGN FLOW   **9 Hrs**

Design hierarchy concepts of regularity, modularity & locality VLSI Design styles – CMOS fabrication Technology- Fabrication Process flow- basic steps, CMOS n-well process, Advanced CMOS fabrication technologies, layout design rules- 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 Parasitic Extraction & Performance Estimation from Physical Structure   **9 Hrs**

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

Unit III CLOCK SIGNALS & SYSTEM TIMING   **9 Hrs**

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   TESTABILITY OF INTEGRATED SYSTEMS-VLSI FOR FUZZY LOGIC SYSTEMS   **9 Hrs**

Design constraints – Testing – The rule of ten – terminology – Failures in CMOS – Combinational Logic Testing – Practical Ad-Hoc DFT guidelines –Scan design techniques- Integrated i m p l ementations 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 ARITHMETIC FOR DIGITAL SYSTEMS   **9 Hrs**

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 Hrs

Text Books:
1. CY Cheng., S.M SZE., (1996). Digi 2007 "*ULSI Technology*"., McGraw-Hill International Editions,.
2. Douglas A. Pucknell and Kamran Eshraghian (1994), "*Basic VLSI Design Systems and circuits*", (3rd ed.) Prentice Hall of India Pvt Ltd.
3. Randall .L.Geiger and P.E.Allen (2010 Reprint), VLSI Design *Techniques for Analog and Digital Circuits*, McGraw Hill.
4. Horspool., Gorman. (2001), Digitized in 2007, "*The Asic Handbook*" Prentice Hall.

BEC13E32   **SYSTEM MODELING USING HARDWARE DESCRIPTION**   **3   0   0   3**
LANGUAGES

OBJECTIVES:

- ➢ The students will be able to design and develop RTL and VERILOG codes,
- ➢ Able to use test benches for RTL verilog language,
- ➢ Able to design synchronous receivers and NAND latches.

UNIT I: HARDWARE DEFINITION LANGUAGES   **9 Hrs**

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

UNIT II : OPERATORS & STATEMENTS   **9 Hrs**

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

UNIT III: IMPLEMENTATION   **9 Hrs**

Implementation of combinational and sequential circuit using VHDL package.

UNIT IV: VERILOG DESIGN   **9 Hrs**

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

UNIT V: TESTING & CASE STUDIES   **9 Hrs**

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 Hrs

REFERENCE BOOKS:
1. Mohammed Ismail. 1998, Digitised in 2007, "*Analog VLSI Integrated Circuits*", PHI.,
2. Peter J.Ashenden (2010), "*The Designer's guide to VHDL*", (3rd ed.) Morgan Kaufmann
3. Grey, Hurst Luwis, Mayer (2009)., "*Analysis and Design of Analog Integrated Circuits*", (5th ed.), John Willey
4. J.Bhaskar 2004, "*A VHDL Primer*",(3rd ed.), PHI
5. Charles.H,Roth (2005), "*Digital system design using VHDL*",(2nd ed.), PWS Publishing Co.

BEC13E33   **VLSI DESIGN**   **3 0 0 3**

OBJECTIVES:

- The students will be able to design and develop VLSI circuits,
- Demonstrate a clear understanding of important concepts in CMOS technology and fabrication ,
- Design a gate of any given arbitrary logic function at the transistor-level,
- Layout a gate in CMOS VLSI technology,
- design a network of complex gates with the ideal number of stages

Unit I   **MOS TECHNOLOGY AND CIRCUITS**   **9 Hrs**

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 Hrs**

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

Unit III   **ANALOG VLSI AND HIGH SPEED VLSI**   **9 Hrs**

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 Hrs**

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

Unit V   **VLSI DESIGN**   **9 Hrs**

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

                                                          Total: 45 Hrs

TEXT BOOKS:
1. Wayne Wolf, Modern VLSI Design (2009): *IP-Based Design*, (4th ed.), Prentice Hall
2. Randall .L.Geiger and P.E.Allen (1990, Digitized in 2007), *VLSI Design Techniques for Analog and Digital Circuits*, McGraw Hill

REFERENCES:
1. Douglas A. Pucknell and Kamran Eshraghian, (1994, Digitized in 2007) *Basic VLSI Design*, (3rd ed.) Prentice Hall of India Pvt Ltd.,

BBT13E31	**BIO INFORMATICS**	3 0 0 3

OBJECTIVES:
- ➢ The students will be able to design and develop protein structures
- ➢ Ability to understand human genomes.

Unit I   **Basics**   **9 Hrs**

Life in Space and Time – Dogmas – Data Archives – WWW – Computers – Biological Classification – Use of Sequences – Protein Structure – Clinical Implications.

Unit II   **Genome Organization**   **9 Hrs**

Genomics and Proteomics – Eavesdropping on transmission of genetic information – Genomes of Prokaryotes – Genomes of Prokaryotes – Genomes of Eukaryotes – Human Genome – SNPs, Genetic Diversity – Evolution of Genomes.

Unit III   **Archives and Information Retrieval**   **9 Hrs**

Introduction – The archives – Gateways to Archives

Unit IV   **Alignments and Phylogenetic Trees**   **9 Hrs**

Introduction to Sequence Alignment – The dotplot – Dotplots and Sequence Alignments – Measures of sequence similarity – Computing the Alignment – The dynamic programming algorithm – Significance of alignments – Multiple sequence alignment – Applications, Phylogeny – Phylogenetic trees.

Unit V   **Protein Structure and Drug Discovery**   **9 Hrs**

Protein Stability and Folding – Applications of Hydrophobicity – Superposition of structures – DALI, Evolution of Protein Structures – Classification of Protein Structures – Protein Structure prediction and modeling – Assignment of protein structures to genomes – Prediction of protein function – Drug discovery and development.

Total : 45hrs

Text Book:
   1. Arthur M Lesk (2008), "*Introduction to Bioinformatics*", Oxford University Press, India
Reference:
   1. Attwood T K and Parry – Smith D J (2001), "*Introduction to Bioinformatics*", Pearson Education India, New Delhi,.

BBT13E32   BIOLOGICAL DATABASE AND DATA ANALYSIS   3 0 0 3

OBJECTIVES:
> The students will be able to design and develop Biological Databases.
> Ability to understand Protein Sequence Databases
> Able to understand exploring and querying the biological database.

Unit I   Introduction to Bioinformatics   9 Hrs
        Nature of biological data - 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 Overview/concepts in sequence analysis   9 Hrs
        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 Multiple sequence alignment :   9 Hrs
        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   Exploring & querying the Database   9 Hrs
        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   Study & Visualisation of Databases   9 Hrs
        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 Hrs

Text Book:
1. Andreas D. Baxevanis, B. F. Francis Ouellette (2005), *Bioinformatics: A Practical Guide to the analysis of Genes and Proteins* (2nd ed.), New York, published by John Wiley & Sons, Inc. Publications

References:
1. Attwood, T.K. & Parry-Smith, D.J. Delhi (1999), *Introduction to Bioinformatics*, Pearson Education Ptd.Ltd.,
2. David W.Mount (2004), Bioinformatics*: Sequence and Genome Analysis*,(2nd ed.) New York, Cold Spring Harbor Laboratory Press
3. Baxevanis, A.D., Davison, D.B., Page, R. D. M. & Petsko, G.A. (2003), *Current Protocols in Bioinformatics*, New York, by John Wiley & Sons Inc.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

BCS13E25   **PROGRAMMING IN PERL**   **3 0 0 3**

OBJECTIVES:

- The students will be able to develop open source programs, to identify and exploit regular expressions, formats and process management for Open source programs
- To design and implement advanced data base procedures.

Unit I   Introduction   **9 Hrs**

PERL, Perl in Bioinformatics, History of Perl, Availability, Support, Basic Concepts- Scalar Data, Scalar Operators, Scalar Variables, Scalar Operators and Functions - Arrays and List Data, Literal Representation, Variables, Array Operators and Functions, Scalar and List Context- Control Structures: Statement Blocks – Hashes, Hash Variables, Literal Representation of a Hash, Hash Functions, Hash Slices - BasicI/O

Unit II   Regular Expressions   **6 Hrs**

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, 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 Formats   **6 Hrs**

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 Process Management   **6 Hrs**

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   Database Manipulation   **9 Hrs**

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 Hrs

Text Books:
1. James Tisdall, O-Reilly (2007) *Beginning Perl for Bioinformatics*

Reference Books:
2. Cynthia Gibas, Per Jambeck, O-Reilly (2001) *Developing Bioinformatics Computer Skills*
3. Randal L. Schwartz, Tom Phoenix, O-Reilly (2011)
4. Larry Wall, Tom Christiansen, Jon Orwant, O-Reilly, (2012) *Programming Perl*
5. Alligator Descartes, Tim Bunce, O-Reilly, (2011) *Programming the Perl DBI: Database programming with Perl*
6. Sriram Srinivasan (1997) *Advanced Perl Programming: Foundations and techniques for Perl*

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

BCS13E26	DIGITAL IMAGE PROCESSING	3 0 0 3

OBJECTIVES:
- ➢ The students will be able to process, transform, compress and represent images, develop an image enhancement technique
- ➢ To identify and exploit the analogies between the mathematical tools for image processing

Unit I   Fundamentals   9 Hrs

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 quantization -Some basic relationship between pixels-Imaging geometry -Photographic film.

Unit II   Image Transforms   9 Hrs

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

Unit III   Image Enhancement: **9 Hrs**

Background -Enhancement by point Processing -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 spatial domain-Geometric transformation.

Unit IV   Image compression   9 Hrs

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

Unit V   Representation and Description   9 Hrs

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

Total : 45hrs

Text Book:
   1. RAFAEL C.GONZALEZ and RICHARD E.WOODS , 2008 *Digital Image Processing* , Prentice Hall.
References :
   1. Sreedhar, , (2011) *Digital Image Processing*,OUP India
   2. M.A.SID AHMED, (1995, Digitized in 2009) *Image Processing Theory, Algorithm and Architecture* - McGraw Hill,
   3. DONALD EDWIN PEARSON, (1991, Digitized in 2007*) Image Processing*, McGraw Hill

BCS13E27	PATTERN RECOGNITION AND NEURAL NETWORKS	3 0 0 3

OBJECTIVES:

➢ The students will be able to describe the relation between real brains and simple artificial neural network models

➢ To evaluate the practical considerations in applying neural networks to real classification and regression problems

Unit I BASICS OF PATTERN RECOGNITION   **9 Hrs**

Introduction to pattern recognition – Features, Feature Vectors and Classifiers - Supervised versus Unsupervised Pattern Recognition - Classifiers Based on Bayes Decision Theory

Unit II - LINEAR CLASSIFIERS AND NON LINEAR CLASSIFIERS   **9 Hrs**

Linear Discriminant Functions and Decision Hyperplanes - The Perceptron Algorithm - Least Squares Methods - Sum of Error Squares Estimation - The XOR Problem - Three Layer Perceptrons - The Backpropagation Algorithm - Networks with Weight Sharing

Unit III FEATURE SELECTION AND TEMPLATE MATCHING   **9 Hrs**

Preprocessing - Feature Selection Based on Statistical Hypothesis Testing - Class Separability Measures - Feature Subset selection - Similarity Measures Based on Optimal Path Searching Techniques - Measures Based on Correlations

Unit IV NEURAL NETWORKS   **9 Hrs**

Artificial neurons, Neural networks and architectures – Supervised Learning I – Supervised Learning II

Unit V ANN:PATTERN RECOGNITION PERSPECTIVE   **9 Hrs**

Neural Networks: A Statistical Pattern Recognition Perspective – Support Vector Machines and Radial Basis Function Networks.

        Total : 45Hrs

Text Books:

1. Sergios theodoridis, Konstantinos koutroumbas 2008, *Pattern Recognition*, (4th ed.), Academic Press,.

Reference Books:

2. B.Yegnanarayana2004**,** *Artificial Neural Networks*, PHI Learning Pvt. Ltd.,

3. Sathish Kumar, 2008, *Neural Networks – A Class Room Approach*, Tata McGraw Hill

BCS13E33	GEOGRAPHICAL INFORMATION SYTEMS	3 0 0 3

OBJECTIVES:
- The students will be able to design, explore, interpolate and analyze GIS models
- To create a new geo coding technique and apply the learnt GIS modeling for a real time case study.

Unit I   Basic Concepts   **9 Hrs**

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

Unit II Data Acquistion & Manipulation   **9 Hrs**

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

Unit III Data Analysis   **9 Hrs**

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

Unit IV Interpolation & Applications   **9 Hrs**

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

Unit V Modeling   **9 Hrs**

GIS Model and Modeling

Total : 45 hrs

Text Book:
1. Kang-tsung Chang (2008), *Introduction to Geographic Information Systems*, (5th ed.), Mcgrawhill
References:
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

BCS13E35 **KNOWLEDGE ENGINEERING** 3 0 0 3

OBJECTIVE:
➢ The students will be able to design and develop hybrid knowledge based systems and have the ability to understand types of knowledge based system.

UNIT I BASICS OF KNOWLEDGE ENGINEERING **3 Hrs**

An Introduction To Knowledge Engineering - Data Information And Knowledge - Skills Of A Knowledge Engineer -An Introduction To Knowledge based Systems

UNIT II TYPES OF KNOWLEDGE BASED SYSTEMS **9 Hrs**

Expert Systems , Neural Networks , Casebased Reasoning, Genetic Algorithms, Intelligent Agents, Data Mining.

UNIT III KNOWLEDGE PROCESSING **12 Hrs**

Knowledge Acquisition , Representation and Reasoning- Using Knowledge, Logic Rules and Representation, Developing Rule based Systems, Semantic Networks, Frames, Development Environment

UNIT IV KNOWLEDGE SYSTEMS DEVELOPMENT **9 Hrs**

Expert System Shells, Expert System Development Environments , Use of AI Languages - The Need For Methodologies, Blackboard Architectures, Problem solving Methods, Knowledge Acquisition Design System KADS, The Hybrid Methodology HYM,

UNIT V UNCERTAIN REASONING **9 Hrs**

Uncertainty and Expert Systems, Confidence Factors, Probabilistic Reasoning, Fuzzy Logic, Hybrid Knowledge Based Systems

Total: 45 Hrs

Text Book
1. S. Simon l. Kendal, Malcolm Creen, *An Introduction To Knowledge Engineering*, Springer, 2007

References:
1. Hojjat Adeli*, Knowledge Engineering Fundamentals*, McGraw-Hill, 1990, Digitized in Jan 2007

BCS13E36	PARALLEL ALGORITHMS	3	0	0	3

OBJECTIVES:
- ➢ The students will be able to analyze and design parallel algorithms
- ➢ To understand the advanced architectural models
- ➢ To design and develop a new parallel architecture model.

Unit I   Parallel Random Access Machines   **9 Hrs**

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   Parallel Processing Models   **9 Hrs**

Classifying MIMD Algorithms – Hypercube SIMD Model – Shuffle Exchange SIMD Model – 2D Mesh SIMD Model – UMA Multiprocessor Model – Broadcase – Prefix Sums.

Unit III Parallel Sorting methods   **9 Hrs**

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 Parallel Search Methods   **9 Hrs**

P-Depth Search – Breadth Depth Search – Breadth First Search – Connected Components – All pair Shortest Path – Single Source Shortest Path – Minimum Cost Spanning Tree.

Unit V Algorithms for Parallel Architecture   **9 Hrs**

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

                                                                                Total: 45 Hrs

Text Books:
1. Michael Quinn (2002), *Parallel Computing : Theory & Practice*,Tata McGraw Hill Edition
2. Anath Grama,Anshul Gupta, George Karpis, Vipin Kumar, (2009) *Introduction to Parallel Computing, Design and analysis of Algorithms*,(2nd ed.) Pearson

References:
1. Henri Casanova, Arnaud Legrand, Yves Robert, *Parallel algorithms*, CRC Press, 2009 Digitized

| BCS13E38 | SOFT COMPUTING | 3 | 0 | 0 | 3 |

OBJECTIVE:
➢ The students will be able to design and develop neuro fuzzy modeling and will have the ability to understand Neural Network.

Unit I   Neuro – Fuzzy and Soft Computing Fuzzy Systems   9 Hrs

Introduction to Fuzzy Sets – Fuzzy Rules and -   - Fuzzy Reasoning and - Inference- Fuzzy Inference Systems - Compositional Rules of Inference in Fuzzy System – Defuzzification Strategies , Fuzzy Models– System Identification – Several Least Square Methods – Optimization Techniques- Derivative-based Optimization, Derivative and Free Optimization.

Unit II   Regression and Optimization   9 Hrs

System Identification – Several Least Square Methods – Optimization Techniques- Derivative-based Optimization, Derivative and Free Optimization.

Unit III   Neural Network   9 Hrs

Neural Network Architecture -Network Inputs and Outputs – Feed back Inter Connections and Network Stability – Feed Forward Networks –Back Propagation Networks- Learning Methods- Adaptive Networks – Supervised Learning Neural Networks –RBFN – Unsupervised Learning Networks - Self Organizing maps, Adaptive Resonance Architectures, Radial Basis Networks- LVQM , Principle Component Anlaysis.

Unit IV   Neuro Fuzzy Modelling   9 Hrs

Neural Component of a Fuzzy System – Fuzzy neural Network Controllers – Adaptive Neuro Fuzzy Inference System(ANFIS) – CANFIS – Neural Networks based Fuzzy Inference System - Classification and Regression Tests – date Clustering Techniques and Algorithms – Rule base Structure Identification

Unit V   Artificial Neural networks hardware   9 Hrs

Implementation Issues – Evaluation of Neural network Architectures – Hardware Realization – VLSI approach – Optical techniques.

Total: 45 Hrs

Text Book:
1. Jyh-shing roger Jang, Chnesy-tasi sur, Eiji Miziltazui,“ *Neuro and Soft Computing: A Computational Approach to Learning and machine Intelligence*”, Pearson Education 2004, Digitized in 2007
References:
1. Timothy J.rass (2011), “ *Fuzzy Logic with Engineering Application*”, (3rd ed.)Wiley India,
2. S.Rajasekaran , G.A.Vijayalakshmi Pai , *Neural N/Ws, Fuzzy Logic and Genetic Algorithm Sysnthesis and Applications*, PHI (2004)

BCS13E40   **ADVANCED COMPUTER ARCHITECTURE**   **3 0 0 3**

OBJECTIVES:
➢ The students will be able to design and develop simple pipeline processor
➢ To understand Multiprocessor Issues, and able to understand embedded systems.

Unit I   RISC ARCHITECTURE   **9 Hrs**

Basis and Principles of RISC Design, RISC Architecture, Instruction Format , Instruction set, Addressin g Modes, Efficiency of RISC CPU, Simplicity of Datapath and Control Unit Design

Unit II Trends in Parallel processing   **9 Hrs**

Parallelism in uni processor systems, parallel computer structures, architectural classification schemes, parallel processing applications, memory hierarchy in parallel processing systems, addressing schemes.Pipeline concept, linear pipelining and space time diagram, classification of pipeline processors, nonlinear pipeline and reservation table, interleaved memory organization, arithmetic pipelines, principles of designing pipeline processors, vector processing.

Unit III SIMD   **9 Hrs**

SIMD array processors, organization, masking and routing mechanisms, inter PE communications, SIMD inter connection networks, single stage and multi stage networks, mesh connected Illiac networks, parallel shifter, shuffle exchange and omega networks, parallel algorithms for array processors, matrix multiplication, polynomial evaluation, parallel sorting , fast fourier transform computation, associative array processor.

Unit IV Multiprocessor Issues   **9 Hrs**

Multiprocessor architecture, loosely coupled and tightly coupled multiprocessor systems, processor characteristics, inter connection networks crossbar switch and multi port memories, multi stage networks, banyan and delta networks parallel memory organization, multiprocessing operating systems, classification and requirements, software requirements for MPS, language features to exploit parallelism, multi processor scheduling strategies, parallel algorithms.

Unit V Data flow & VLSI   **9 Hrs**

Data flow computers, control flow versus data flow, data flow computer architectures, data flow graphs, data flow languages, Dennis and Irvine machines, dataflow design alternatives, dependence driven and multi level event driven approaches, VLSI computing structures, systolic array architecture, VLSI matrix arithmetic processor.

Total: 45 Hrs

Text Books:
1. Wang K. Briggs F.A "*Computer Architecture and parallel processing*", McGrawHill, 1984, Digitized in 2007.
2. ,Hesham EL- Riwini ,John Wiley and sons, (2005)*Advance Computer Architecture and Parallel Processing*
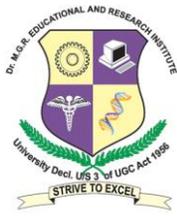
BCS13E41   **ROBOTICS**   3 0 0 3

OBJECTIVES:
  ➢ The students will be able to design different types of robots for different kinds of applications, program different types of ROBOTs
  ➢ To understand the concept of industrial robots thoroughly.

Unit I   ROBOTICS Concepts   **9 Hrs**
      Robotics and programmable automation, Historical background, Laws of Robotics , Robot definitions – Robotics system and Robot anatomy – Specifications of Robots, robot configuration, degrees of freedom, Work Volume – Precision of Movement – Safety measures in Robotics.

Unit II   Robot drives, actuators and control   **9 Hrs**
      – Functions of drive systems – Hydraulic systems – Pneumatic systems – Electrical drives –Open loop and Closed loop control system- pick and place control- point to point control, continuous path control system . Robot end effectors – Classification – Drive system for grippers – Mechanical grippers – Magnetic grippers – Vacuum grippers – Adhesive grippers – Gripper force analysis and gripper design.

Unit III Sensors   **9 Hrs**
      Need for sensing systems – Sensory device – Types of sensors – Tactile sensor, Proximity Sensors, Range sensors, Navigation sensors, Vision sensors, Miscellaneous sensors, Robot vision systems – Low level vision and high level vision.

Unit IV   Robot language and programming   **9 Hrs**
      Methods, Robot language – Classification of Robot languages – Computer control and robot software – VAL system and language. Application of Robots: Capabilities of Robots – Robotics applications – Obstacle avoidance.

Unit V   Artificial intelligence and automated manufacturing   **9 Hrs**
      – AI and robotics Robot intelligence and task planning – State space search problem reduction – Use of predicate logic – Means and Ends analysis – Problem solving – Robot learning – Robot task planning – Basic problems in task planning.
                                                                          Total: 45 hrs

Text Books:
      1. Deb, "*Robotics Technology and Flexible Automation*", Tata McGraw,Hill, New Delhi, 2010.
      2. Mikell P.Groover (2008), "*Automation Production System and Computer IntegratedManufacturing*" Prentice Hall of India, New Delhi,
      3. Mikell P. Groover, M. Weiss, R. N. Nagal, N. G. Odrey (2008), *Industrial Robotics*, McGraw Hill International,
References:
      1. K. S. Fu,Ralph Gonzalez,C.S.G. Lee "*Robotics : Control Sensing. Vision and Intelligence*", Tata Mc Graw,Hill, New Delhi, 2008.
      2. S K Saha, "*Introduction to Robotics*", 1/e,Tata Mc Graw,Hill, 2008

BCS13E42   **MULTI CORE ARCHITECTURE AND PROGRAMMING**   **3 0 0 3**

OBJECTIVES:
➢ The students will have a systematic understanding of modern multi-core processor micro-architectures and interconnect technologies
➢ To explain their evolution and be able to critically evaluate their design decisions,understand the memory hierarchy

Unit I   Introduction   9 Hrs

Evolution of Computer Architecture - Trends; Fundamentals of Parallel Computers; Need for multi-core architectures

Unit II   Parallel Programming   9 Hrs

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 Software Optimization & Performance Analysis   9 Hrs

Processor Architecture basics, Need for software optimization, Algorithms analysis, Performance analysis - Hot spots, Branching, Memory, Loops

Unit IV Benchmarking multi-core architecture   9 Hrs

Bench marking of processors. Comparison of processor performance for specific application domains

Unit V Case Studies & Lab Experiments   9 Hrs

will be the content for asking questions in the SEE

Total Hours : 45hrs

Text Books:
1. Gerber, Aart J.C. Bik, Kevin B. Smith and Xinmin Tian, *The Software Optimization Cookbook*; Richard ,Intel Press, 2002
2. Shameem Akhter and Jason Roberts*, Multi-Core Programming: Increasing Performance Through Software Multithreading,* Intel Press, 2006

References:
1. OpenMP Spec 3.0 handbook available on the Web

BMG13E01   **DISASTER MANAGEMENT**   3 0 0 3

OBJECTIVES:
- The students will be able to design and develop Disaster risk reduction Techniques
- To understand about Disasters and able to understand the factors leads to disaster.

Unit I   Basic Concepts   3 Hrs

Concepts and definitions: disaster, hazard, vulnerability, risk, capacity, impact, prevention, mitigation.

Unit II   Disasters   12 Hrs

Disasters classification; natural disasters (floods, draught, cyclones, volcanoes, earthquakes, tsunami, landslides, coastal erosion, soil erosion, forest fires etc.); manmade disasters (industrial pollution, artificial flooding in urban areas, nuclear radiation, chemical spills etc); hazard and vulnerability profile of India, mountain and coastal areas, ecological fragility.

Unit III   Disaster Impacts   7 Hrs

Disaster impacts (environmental, physical, social, ecological, economical, political, etc.); health, psycho-social issues; demographic aspects (gender, age, special needs); hazard locations; global and national disaster trends; climate change and urban disasters.

Unit IV   Disaster Risk Reduction (DRR)   15 Hrs

Disaster management cycle – its phases; prevention, mitigation, preparedness, relief and recovery; structural and nonstructural measures; risk analysis, vulnerability and capacity assessment; early warning systems, Post-disaster environmental response (water, sanitation, food safety, waste management, disease control); Roles and responsibilities of government, community, local institutions, NGOs and other stakeholders; Policies and legislation for disaster risk reduction, DRR programmes in India and the activities of National Disaster Management Authority.

Unit V   Disasters, Environment and Development   8 Hrs

Factors affecting vulnerability such as impact of developmental projects and environmental modifications (including of dams, land-use changes, urbanization etc.), sustainable and environmental friendly recovery; reconstruction and development methods.- Case Studies

Total : 45 hrs

Text / Reference Books:
1. http://ndma.gov.in/ (Home page of National Disaster Management Authority).
2. http://www.ndmindia.nic.in/ (National Disaster management in India, Ministry of Home Affairs).
3. Pradeep Sahni,(2004), *Disaster Risk Reduction in South Asia*, Prentice Hall.
4. Singh B.K., (2008), *Handbook of Disaster Management: techniques & Guidelines*, Rajat Publication.
5. Ghosh G.K., (2006), *Disaster Management* ,APH Publishing Corporation.

BMG13E02   **PROFESSIONAL ETHICS**   **3 0 0 3**

OBJECTIVES:
➤ The students will be able to design and develop pollution Control Charts,
➤ To understand environmental ethics and able to understand ethics in IT industry.

Unit I   ENGINEERING ETHICS   **9 Hrs**

Senses of 'Engineering Ethics' - Variety of moral issues - Types of inquiry - Moral dilemmas - Moral autonomy - Kohlberg's theory -Gilligan's theory - Consensus and controversy - Professions and professionalism – Professional ideals and virtues - Theories about right action - Self-interest-Customs and religion - Uses of ethical theories

Unit II   ENVIRONMENTAL ETHICS   **9 Hrs**

Environmental Preservation – Role of stakeholders – International issues – Sustainable Development – Industrial pollution – Environment Requtation – Environment performance – Engineering Management in India – Pollution control charts.

Unit III RESPONSIBILITIES AND RIGHTS   **9 Hrs**

Collegiality and loyalty - Respect for authority - Collective bargaining - Confidentiality – Conflicts of interest - Occupational crime - Professional rights - Employee rights – Intellectual Property Rights (IPR)-Discrimination.

Unit IV GLOBAL ISSUES   **9 Hrs**

Multinational corporations - Environmental ethics-Computer ethics-Weapons development-Engineers as managers-Consulting engineers-Engineers as expert witnesses and advisors-Moral leadership-Sample codes of conduct- Case study's with reference to Indian scenario.

Unit V   ETHICS In IT INDUSTRY   **9 Hrs**

Structure of IT – ITES industry, Unique characteristics, Ethical perspective, Case studies – Credit Card Fraud, Cyber crime.

                                                                          Total   : 45 hrs

Text Books:
1. Mike Martin and Roland Schinzinger (2009), "*Introduction to Engineering Ethics*", McGraw Hill
2. A.C. Fernando, "*Business Ethics : An Indian Perspective*", pearson 2009 (II – V)

References:
1. Charles D.Fleddermann, "*Engineering Ethics*", (4th ed.) prentice Hall, 2011,
2. David Ermanu and Michale S Shauf, (2003), "*Computers, Ethics and Society*", (3rd ed.) Oxford University, Press.

B.Tech - Computer Science and Engineering – 2013 Regulation

BMG13E05   **HUMAN VALUES AND HUMAN RIGHTS**   3 0 0 3

OBJECTIVES:
- The students will be able to improve the confidence, Concentration and Professional behavior
- To understand Human Rights.

UNIT I: VALUE EDUCATION   **9 Hrs**
Values and Self Development-Social values and individual attitudes, Work ethics, Indian vision of humanism, Moral and non moral valuation, Standards and principles, Value judgments. Importance of cultivation of values, Sense of duty, Devotion, Self reliance, Confidence, Concentration, Truthfulness, Cleanliness, Honesty, Humanity, Power of faith, National unity, Patriotism, Love for nature, Discipline.

UNIT II: SELF DEVELOPMENT & PERSONALITY DEVELOPMENT   **9 Hrs**
Self Leadership & Self Managemnt -3P's – Perseverance – Personality Theories – Stages of Personality Development – Emotional Stress – Handling of Conflicts – Personality for Face value –Positive attitude – Aware of self destructive habits, Association and cooperation,.

UNIT III: BEHAVIOR DEVELOPMENT   **9 Hrs**
Meaning of Professionalism – Guiding Ethics – Developmental Framework –Professional Behaviors: Dependability, Initiative ,Empathy, Clinical Reasoning, Verbal & Write Communication, Developing Professionalism in the next generation.

UNIT IV: HUMAN RIGHTS   **9 Hrs**
The United Nations - The International Bill of Human Rights - Regional protection of human rights- Europe - American States- The right to liberty of person - Equality before the law - the right to a fair trial - The right to selfdetermination - Freedom of expression - The right to work - The right to education and human rights education - Equality and nondiscrimination - The right to life

UNIT V: CONSTITUTION OF INDIA   **9 Hrs**
Framing of Constitution –Features of Constitution – Federal System – Formation of States – Citizenship – Fundamental Rights – Fundamental Duties – Union Legislature – State Legislature – Judiciary – Courts – Public Service Commission – Elections – Amendments of the Constitutions – Natural Justice.

       Total : 45Hrs

Reference Books:
1. R.S. Naagarazan, (2007) Textbook *on Professional Ethics and Human Values*, New Age International, (Unit 1)
2. R.C.Bhatia, Ane Books Pvt Ltd, (2010) "*Personality Development* ", (unit 2)
3. Jack Kasar, E.Nelson Clark "*Developing Professional Behaviors*", , Slack Incorporated Copyright, 2000. (Unit 3)
4. Rhona K. M. Smith (2007), *Textbook on International Human Rights*, (3rd ed.), Oxford Univ Press.(Unit 4)
5. Brij Krishore Sharma (2007), "*Introduction to Constitution of India*" (4th ed.) ,PHI.(Unit 5).