

SYLLABUS

BACHELOR OF TECHNOLOGY

INFORMATION TECHNOLOGY

(Semester Scheme)

Four Year Degree Course

B. Tech., Second Year Examination, 2013/2014

B. Tech., Third Year Examination, 2014/2015

B. Tech., Fourth Year Examination, 2015/2016



**Faculty of Engineering & Technology,
JODHPUR NATIONAL UNIVERSITY,
JODHPUR.**

SESSION 2012-16

Jodhpur National University, Jodhpur
Faculty Of Engineering And Technology
Teaching & Examination scheme
B.Tech. Information Technology (Four Year Course)

Year II B.Tech. III Sem

S.No.	Sub Code	Name of Subject	Teaching Periods			Duration of Exams (Hours)	Maximum Marks Allocation				Total Marks
			L	T	P		Internal	End Term	Sessional	Practical	
1	3IT01	Programing in C++	3	1	-	3	20	80	-	-	100
2	3IT02	Digital Electronics	3		-	3	20	80	-	-	100
3	3IT03	Electronic devices and circuits	3		-	3	20	80	-	-	100
4	3IT04	Data Structure & Algorithms	3	1	-	3	20	80	-	-	100
5	3IT05	Mathematics-III	3	1	-	3	20	80	-	-	100
Electives											
6	3IT06.1 3IT06.2 3IT06.3	Principles of Programming Languages Internet Technology Intellectual Property Rights	3		-	3	20	80	-	-	100
7	GE307*	Special Mathematics I	3			3	20*	80*	-	-	100*
Total			21	3		18	120	480			600
1	3IT07	C++ Lab	-	-	3				60	40	100
2	3IT08	Digital-Lab	-	-	3				60	40	100
3	3IT09	EDC-Lab	-	-	3				60	40	100
4	3IT10	DSA-Lab	-	-	3				60	40	100
Total			0		12				240	160	400
Grand Total			21	3	12		120	480	240	160	1000

*** It will be sessional paper only : marks shall not be counted for awarding division.**

Jodhpur National University, Jodhpur
Faculty Of Engineering And Technology
Teaching & Examination scheme
B.Tech. Information Technology (Four Year Course)

Year II B.Tech. IV Sem

S.No.	Sub Code	Name of Subject	Teaching Periods			Duration of Exams (Hours)	Maximum Marks Allocation				Total Marks
			L	T	P		Internal	End Term	Sessional	Practical	
1	4IT01	Computer Architecture	3	-	-	3	20	80	-	-	100
2	4IT02	Programming in JAVA	3	1	-	3	20	80	-	-	100
3	4IT03	Data Base Management System	3	1	-	3	20	80	-	-	100
4	4IT04	Software Engineering	3	-	-	3	20	80	-	-	100
5	4IT05	Discrete Mathematical Structure	3	1	-	3	20	80	-	-	100
Electives											
6	4IT06.1 4IT06.2 4IT06.3	Telecommunication Engg. Funda. Management Information System Analog And Digital Communication	3		-	3	20	80	-	-	100
7	GE407*	Special Mathematics I	3			3	20*	80*	-	-	100*
		Total	21	3		18	120	480			600
1	4IT07	Communication Lab	-	-	3				60	40	100
2	4IT08	Java - Lab	-	-	3				60	40	100
3	4IT09	DBMS-Lab	-	-	3				60	40	100
4	4IT10	SE-Lab	-	-	3				60	40	100
		Total			12				240	160	400
		Grand Total	21	3	12		120	480	240	160	1000

*** It will be sessional paper only : marks shall not be counted for awarding division.**

Jodhpur National University, Jodhpur
Faculty Of Engineering And Technology
Teaching & Examination scheme
B.Tech. Information Technology (Four Year Course)

Year III B.Tech. V Sem

S.No.	Sub Code	Name of Subject	Teaching Periods			Duration of Exams (Hours)	Maximum Marks Allocation				Total Marks
			L	T	P		Internal	End Term	Sessi- onal	Prac- tical	
1	5IT01	Computer Graphics	3	-	-	3	20	80	-	-	100
2	5IT02	Web Technology	3	1	-	3	20	80	-	-	100
3	5IT03	Theory of computation	3	1	-	3	20	80	-	-	100
4	5IT04	Operating System	3	1	-	3	20	80	-	-	100
5	5IT05	Microprocessor and interfaces	3	1	-	3	20	80	-	-	100
Electives											
6	5IT06.1 5IT06.2 5IT06.3	IT for forensic Science Open Source Software Simulation And Modeling	3		-	3	20	80	-	-	100
		Total	18	4		18	120	480			600
1	5IT07	Graphics Lab	-	-	3				60	40	100
2	5IT08	Web Technology-Lab	-	-	3				60	40	100
3	5IT09	OS Lab	-	-	3				60	40	100
4	5IT10	Microprocessor- Lab	-	-	3				60	40	100
		Total			12				240	160	400
		Grand Total	18	4	12		120	480	240	160	1000

Jodhpur National University, Jodhpur
Faculty Of Engineering And Technology
Teaching & Examination scheme
B.Tech. Information Technology (Four Year Course)

Year III B.Tech. VI Sem

S.No.	Sub Code	Name of Subject	Teaching Periods			Duration of Exams (Hours)	Maximum Marks Allocation				Total Marks
			L	T	P		Internal	End Term	Sessi- onal	Prac- tical	
1	6IT01	Object Oriented Software Engineering	3	-	-	3	20	80	-	-	100
2	6IT02	System Programming	3	1	-	3	20	80	-	-	100
3	6IT03	Computer Network	3	1	-	3	20	80	-	-	100
4	6IT04	Multimedia Systems	3	-	-	3	20	80	-	-	100
5	6IT05	Design and Analysis of Algorithm	3	1	-	3	20	80	-	-	100
Electives											
6	6IT06.1 6IT06.2 6IT06.3	Information Theory and Coding Advanced Data Structure Mobile Computing	3		-	3	20	80	-	-	100
		Total	18	3		18	120	480	0	0	600
1	6IT07	UML-Lab	-	-	3				60	40	100
2	6IT08	SSE-Lab	-	-	3				60	40	100
3	6IT09	Network lab	-	-	3				60	40	100
4	6IT10	MM-Lab	-	-	3				60	40	100
		Total			12				240	160	400
Grand Total			18	3	12		120	480	240	160	1000

Jodhpur National University, Jodhpur
Faculty Of Engineering And Technology
Teaching & Examination scheme
B.Tech. Information Technology (Four Year Course)

Year IV B.Tech. VII Sem

S.No.	Sub Code	Name of Subject	Teaching Periods			Duration of Exams (Hours)	Maximum Marks Allocation	End Term	Sessional	Practical	Total Marks
			L	T	P						
1	7IT01	Wireless Communication	3	-	-	3	20	80	-	-	100
2	7IT02	Enterprise Resource Planning	3	1	-	3	20	80	-	-	100
3	7IT03	Web Services and Service oriented architecture	3	1	-	3	20	80	-	-	100
4	7IT04	Electronic Devices Automation	3	1	-	3	20	80	-	-	100
5	7IT05	Storage and Information Management	3	1	-	3	20	80	-	-	100
Electives											
6	7IT06.1 7IT06.2 7IT06.3	ATMN Advanced Computer Architecture IT Infrastructure Management	3		-	3	20	80	-	-	100
		Total	18	4		18	120	480	0	0	600
1	7IT07	Project Stage I	-	-	2				60	40	100
2	7IT08	Practical Training Seminar	-	-	2				60	40	100
3	7IT09	Web Service-Lab	-	-	3				60	40	100
4	7IT10	EDA-Lab	-	-	3				60	40	100
		Total			12				240	160	400
		Grand Total	18	4	12		120	480	240	160	1000

Jodhpur National University, Jodhpur
Faculty Of Engineering And Technology
Teaching & Examination scheme
B.Tech. Information Technology (Four Year Course)

Year IV B.Tech. VIII Sem

S.No.	Sub Code	Name of Subject	Teaching Periods			Duration of Exams (Hours)	Maximum Marks Allocation				Total Marks
			L	T	P		Internal	End Term	Sessi-onal	Prac-tical	
1	8IT01	E-Commerce	3	1	-	3	20	80	-	-	100
2	8IT02	Real time system	3	1	-	3	20	80	-	-	100
3	8IT03	Data Mining and Warehousing	3	1	-	3	20	80	-	-	100
Electives											
4	8IT04.1 8IT04.2 8IT04.3 8IT04.4	Distributed System Artificial Intelligence Bio-Informatics Information & System Securities	3	1	-	3	20	80	-	-	100
		Total	12	4		12	80	320	-	-	400
1	8IT05	Project Stage II	-	-	2				120	80	200
2	8IT06	Topic Seminar	-	-	3				60	40	100
3	8IT07	Industrial Economics and Management-Lab	-	-	2				60	40	100
4	8IT08	Web Programming.-Lab	-	-	3				60	40	100
5	8IT09	Data Mining and Warehousing Lab			3				60	40	100
		Total	0		13				360	240	600
		Grand Total	12	4	13		80	320	360	240	1000

CONTENTS OF SYLLABUS

Unit	Topics	
I	Introduction to Object Oriented Programming:	Basic concepts, Class, Object, Method, Message passing, Inheritance, Encapsulation, Abstraction, Polymorphism. Lecture Required 4
II	Basics of C++ Environment:	Variables; Operators; Functions; user defined, passing by reference, passing an array to the function, inline function, scope, overloading; Pointers: objects and value, arrays and pointers, the new and delete operators, dynamic arrays, arrays of pointers and pointers to arrays, pointers to pointers and functions; Strings: String I/O, character functions in ctype.h, string functions in string.h. Lecture Required 4
III	Object oriented concepts using C++: Classes:	Member functions, Friend functions, Constructors, Access functions, Private member functions, class destructor, static data and function members; Overloading: inline functions, this operator, overloading various types of operators, conversion operators; the String Class; Composition and Inheritance: Hierarchy and types of inheritance, protected class members, private versus protected access, virtual functions and polymorphism, virtual destructors, abstract base classes. Lecture Required 10
IV	Templates and Iterators :	function and class templates, container classes, subclass templates, iterator classes; Libraries: standard C++ library, contents of a standard C headers, string streams, file processing: Files and streams classes, text files, binary files, classification of files, the standard template library. Lecture Required 4
V	Data Structures Using C++:	Linked lists – Singly linked list, Doubly linked lists, Circular lists, Stacks and Queues priority Queues, Stacks, Queues. Lecture Required 10
		Total Lecture Required: 34

Reference Books:

1. **Patrick Naughton, Herbert Schidt – C++ : The complete Reference (Mc Graw-Hill, 3rd Ed.)**
2. **Balaguruswamy – C++ : PHI**

CONTENTS OF SYLLABUS

Unit	Topics	
I	Number systems, Coding Schemes:	BCD, Excess-3, Grey, r's and (r-1)'s complement. Boolean Algebra, Fundamental theorems, Simplifications of Boolean expressions. Logic gates and their truth table. Gate implementation and Truth table of Boolean functions. Lecture Required 6
II	Standard forms of Boolean functions:	Minterm and Maxterm designation of functions. Simplification of functions on Karnaugh maps, Incompletely specified functions. Cubical representation of Boolean functions and determination of prime implicants. Selection of an optimal set of prime implicants. Multiple output circuits and map minimization of multiple output circuits. Tabular determination of multiple output prime implicants. Lecture Required 8
III	Combinational circuits :	Adder, subtractor, encoder, decoder, multiplexer. Design of Combinational circuit using Multiplexers. Lecture Required 4
IV	Flip Flops:	RS, J-K, D, T. Sequential circuits. Clock, pulse and level mode sequential circuits. Analysis and design of sequential circuits. Synthesis of state diagrams, Finite memory circuits, equivalence relations equivalent states and circuits, determination of classes of indistinguishable states and simplification by implicants tables. Mealy and Moore machines, state assignment and memory element input equations, Partitioning and state assignment. Lecture Required 12
V	Switching Devices :	Positive and Negative logic of OR, AND, NOR, NAND, XOR and XNOR gates. Logic Family: RTL, DTL, DCTL, TTL, RCTL, ECL, HTL, MOS and CMOS logic circuit. Speed and delay in logic circuits, integrated circuit logic and noise immunity. Lecture Required 6

Total Lecture Required: 36**Recommended Books:**

1. Sandlege Modern Digital Design, McGraw Hill.
2. Morris Mano: Digital Design, PHI
3. H. Taub, D. Schilling : Digital Integrated Electronics, McGraw Hill
4. Hill & Peterson: Switching Theory and Logic design, John Wiley.
5. Parag K; Lala, Practical digital logic design & testing PHI

3 IT 03 Electronics Device Circuits

Teaching Hrs.
L-3 T-0 P-0

Exam Hrs. 3 Hrs.
Marks Theory Exam-80 Test-20 Total-100

CONTENTS OF SYLLABUS

Unit	Topics	
I	Diode circuits:	Diode as a circuit. Element, load line concept, clipping & clamping circuits, voltages multipliers. Lecture Required 6
II	Devices:	construction, characteristics and working principles of the following devices. Diodes, BJT, JFET, MOSFET, UJT, photo diodes, LEDs, photo transistors. Solar cells. Thermistor, LDR. Lecture Required 6
III	Transistors :	transistor characteristics, current components, current gains. Alpha and beta. Operating point. High frequency model, h- parameter equivalent circuits. Ce, Cb and Cc configuration. Dc and ac analysis of Ce, Cc and Cb amplifiers. Ebers- moll model. Biasing and stabilization techniques. Thermal run away, thermal stability. Equivalent circuits and biasing of JFETs and MOSFETs. Low frequency Cs and Cd JFET amplifiers. FET as a voltage variable resistor. Lecture Required 12
IV	Small signal amplifiers at low frequency:	analysis of BJT and FET, dc and ac coupled amplifiers. Frequency response, midband gain, gains at low and high frequency. Analysis of dc and differential amplifiers, Millers' theorem. Cascading transistor amplifiers, Darlington and cascaded circuits. Emitter and source followers. Lecture Required 6
V	Oscillators:	concept of feedback classification, criterion for oscillation. Tuned collector, Hartley, Colpitts , rc- phase shift , Wein bridge and crystal oscillators, astable, monostable and bistable multivibrators . Schmitt trigger. Lecture Required 6
		Total Lecture Required: 36

Recommended Books:

1. Millman & C.C. Halkias : Integrated Electronics, Tata Mc-Graw Hill.
2. Millman Grable : Microelectronics, Mc-Graw Hill.

CONTENTS OF SYLLABUS

Unit	Topics	
I	Data Structure& Linked Lists :	Definition, Implementation, Operation, Application, Algorithm writing and convention. Analysis of algorithm, Complexity Measures and Notations. Arrays: Representation of arrays (multidimensional), Address calculation using column and row major ordering. Implementation, Doubly linked list, Circular linked list, unrolled linked list, skip-lists, Splices, Sentinel nodes, Application (Sparse Matrix, Associative Array, Functional Programming)
		Lecture Required 10
II	Stacks & Queues :	Definition, Implementation, Application (Tower of Hanoi, Function Call and return, Parentheses Matching, Back-tracking, Expression Evaluation) Definition, deque, enqueue, priority queue, bounded queue, Implementation, Application
		Lecture Required 5
III	Tree:	Definition of elements, Binary trees: Types (Full, Complete, Almost complete), Binary Search Tree, Traversal (Pre, In, Post & Level order), Pruning, Grafting. Application: Arithmetic Expressions Evaluation Variations: Indexed Binary Tree, Threaded Binary Tree, AVL tree, Multi-way trees, B tree, B+ tree, Forest, Trie and Dictionary
		Lecture Required 8
IV	Graphs:	Elementary definition, Representation (Adjacency Matrix, Adjacency Lists) Traversal (BFS, DFS) Application: Spanning Tree (Prim and Kruskal Algorithm), Dijkstra's algorithm, Shortest path algorithms.
		Lecture Required 6
V	Sorting:	Bubble, Selection, Insertion, Quick, Radix, Merge, Bucket, Heap, Searching: Hashing, Symbol Table, Binary Search, Simple String Searching
		Lecture Required 8

Total Lecture Required: 36**Recommended Books:**

- 1 Aho A. V., J.E. Hopcroft, J.D. Ullman: Data Structures and Algorithms. Addison Wesley.
- 2 Brastrad: Algorithms, PHI
- 3 Horowitz and Sahni: Algorithms, design and analysis, CS Press.
- 4 Kruse R;L. : Data Structure and program design, PHI

3 IT 05 Mathematics

Teaching Hrs.
L-3 T-1 P-0

Exam Hrs. 3 Hrs.
Marks Theory Exam-80 Test-20 Total-100

CONTENTS OF SYLLABUS

Unit	Topics	
I	Transform Calculus:	Laplace Transform with its simple properties, applications to the solution of ordinary and partial differential equation having constant coefficients with special reference to the wave and diffusion equation. Fourier transform and solution of particular differential equation with constant coefficient. Lectures Required:8
II	Numerical Methods:	Solution of Algebraic and transcendental equations, interpolation-finite differences, inverse interpolation, numerical differentiation and integration, numeric solution of differential equations and partial differential equations, Lecture Required:10
III	Introduction :	Engineering application of optimization, Statement and classification of optimization problem, single variable and multivariable optimization with and without constraints. Lecture Required:9
IV	Linear Programming:	Formulation of Linear Programming problem, Graphical Approach, General Linear Programming problem, Simplex Method. Duality in Linear Programming and Transportation Problems. Lecture Required:9
V	Project Scheduling:	Project scheduling by PERT and CPM network analysis . Sequencing theory: General Sequencing Problem n-jobs through 2 machines & 3 machines and 2-jobs through m machine. Lecture Required:9
		Total Lecture Required: 45

Recommended Books:

1. Grewal : Mathematics for Engineers
2. Mehta DM, Sharma: Engineering Mathematics III, Vardan Publication
3. Kreyszing E: Advance Engineering Mathematics, John Wiley
4. Gaur, Koul: Higher Engineering Mathematics

3 IT 06.1 PRINCIPLES OF PROGRAMMING LANGUAGE

Teaching Hrs.
L-3 T-0 P-0

Exam Hrs. 3 Hrs.
Marks Theory Exam-80 Test-20 Total-100

CONTENTS OF SYLLABUS

Unit	Topics	
I	Programming Language:	Definition, History, Features. Issue in Language Design: Structure and Operation of computer, Language Paradigms. Efficiency, Regularity. Issues in Language Translation: Syntax, Semantics, Stages analysis and synthesis, Parse Tree, CFG and BNF grammar. Lecture Required 8
II	Elementary and Structured Data Types :	Type equivalence, checking and conversion. Array, List, Structure, Union. Lecture Required 8
III	Sequence control with Expressions :	Conditional Statements, Loops, Exception handling. Subprogram definition and activation, simple and recursive subprogram, subprogram environment. Parameter passing mechanism. Lecture Required 8
IV	Abstract Data type :	information hiding, encapsulation, type definition. Static and Stack-Based Storage management. Fixed and Variable size heap storage management. Garbage Collection Lecture Required 8
V	Parallel Programming:	Introduction, parallel processing and programming language, Threads, semaphore, monitor, message passing. Lecture Required 8

Recommended Books:

Total Lecture Required: 40

- 1 V. Rajaraman- Fundamentals of Computers.
- 2 Ghezzi – Programming Language Concepts, Addison Wesley.
- 3 Kernighan, Ritchie – Programming in C, Pearson Education.
- 4 Stroustrup – Programming in C++, Pearson Education.
- 5 Pratt - Programming Language, Pearson Education.
- 6 Ravi Sethi – Programming Language, Pearson Education

CONTENTS OF SYLLABUS

Unit	Topics	
I	Introduction :	Internet connection concepts- server, client and parts, Domain Name Systems, Telephone,cable and satellite connections- Dialup, ISDN, ADSL and leased line based connection, cable and DSS accounts,Web TV and Intranets, ISP features. Lecture Required 5
II	Intranets:	What is Intranet? – Intranet Vs LANs Components of an Intranet Workstations and client software, Server and Network operating systems, Network Cards, Cabling and Hubs, Steps for creating an Intranet, Maintenance and connecting to Internet, SMTP, HTTP, IMAP, IP protocol. Lecture Required 12
III	E-mail technology:	Features and Concepts- Message headers, Address book, Attachment, Filtering and forwarding mails. Lecture Required 6
IV	Video conferencing and internet telephony:	Voice vs Video conferencing, Video conferencing hardware and features of video conferencing software, digital telephony as ISDN application, H 323 protocols andmulti-point conferencing. Lecture Required 6
V	Web technology:	Elements of the Web- Clients and servers, Languages and protocols Web page and Websites, special kinds of Web sites, Web Resources- Search Engines, Message boards, clubs, News groups andchat, Web page creation concepts- planning, Navigation, Themes and Publishing , Analyzing web traffic- Log file data, analyzing log files and products for analyzing web traffic. Lecture Required 8

Recommended Books:**Total Lecture Required: 37**

1. M.L. Young -Internet: The Complete Reference, Tata McGraw Company.
2. Harley Hahn -The Internet Complete Reference, Tata McGraw Company.
3. Daniel Minoli -Internet & Intranet Engineering, Tata McGraw Hill Company.

CONTENTS OF SYLLABUS

Unit	Topics	
I	Basic Concepts of Intellectual Property:	Introduction to intellectual property rights, Intellectual property laws and the Internet, Trade Related Aspects of Intellectual Property Rights
II	Patents:	Introduction to patent law and conditions for patentability, Procedure for obtaining patents, Rights of a patentee, Patent infringements, Biotechnology patents and patents on computer programs, Patents from an international perspective
III	Trademark and Geographical Indications:	Statutory authorities and registration procedure, Rights conferred by registration, Licensing, assignment and transfer of trademark rights, Trademark infringement, Geographical Indication of Goods & Appellations of Origin
IV	Copyright:	Registration procedure and copyright authorities, Assignment and transfer of copyright, Copyright infringement and exceptions to infringement, Software copyright
V	Designs:	Introduction to the law on Industrial Designs, Registration and piracy, International perspective, Introduction to the law on semiconductor layout design, Registration, commercial exploitation and infringement

Total Lecture Required: 37

GE 307* Special Mathematics** I

(Common for all branches CSE/ECE/IT/ME/CSE/CIVIL for Diploma Holders)

Teaching Hrs.
3L + 0T

Exam Hrs. 3 Hrs.
Total-100

Unit	Topics	
I	Trigonometry	Trigonometric functions, simple identities, range and values of trigonometric functions, inverse functions, De Moivre's theorem, Euler's theorem. Lectures Req : 6
II	Basic Algebra	Binomial theorem for positive and negative index, logarithmic and simple properties, exponential, Logarithmic and trigonometric series. Lectures Req : 6
III	Differential Calculus:	Function, single variable and multivariable function, polynomial, trigonometric, logarithmic and exponential fun's, derivative of a function, elementary formulae. Lectures Req : 6
IV	Differential Calculus:	Derivative of sum and difference of two functions, derivative of product and quotient of two functions, logarithmic differentiation, partial differentiation. Lectures Req : 6
V	Integral Calculus:	Integration of a function standard integrals and properties, integration by substitution, Integration by parts, definite integral and properties. Lectures Req : 6

Total Lectures Req : 30

**** It will be sessional paper: marks shall not be counted for awarding division.**

Laboratories

3IT07: C++ Lab

1. Program for revising control statements, arrays, functions and Structure.
2. Program using class, objects, objects as function parameters.
3. Program using functions and passing reference to a function.
4. Programming using inline function and friend function.
5. Programming using inheritance and virtual base class.
6. Programming using constructor and destructors.
7. Programming using function overloading and operator overloading.
8. Programming using virtual function.
9. Programming using class and function templates.
10. Program for creating and managing (add, delete, print) nodes of a linked list.
11. Program for creating and managing (Create, Pop, Push, Print) stacks and queues.
12. Program using sorting algorithm (Insertion, selection, Quick, Heap, Sort, Bubble).

3 IT 8. DIGITAL ELECTRONICS LAB

LIST OF EXPERIMENT

1. To study and perform the following experiments.
 - (a) Operation of digital multiplexer and demultiplexer.
 - (b) Binary to decimal encoder.
2. To study and perform experiment-Compound logic functions and various combinational circuits based on AND/NAND and OR/NOR Logic blocks.
3. Half Adder & Full Adder.
4. Half Subtractor Full Subtractor.
5. Code Converter.
6. To study and perform experiment – Digital to analog and analog to digital converters.
7. To study and perform experiment – Various types of counters and shift registers.
8. To study and perform experiment – BCD to binary conversion of digital IC trainer.
9. Design 2 bit binary up/down binary counter on bread board.

3IT9-ELECTRONICS DEVICES & CIRCUITS LAB

LIST OF EXPERIMENT

1. Study the following Instrument:
 - (a) Study of analog CRO, measurement of time period, amplitude, frequency & phase angle using Lissajous figures.
 - (b) Function/Signal generators.
 - (c) Digital Multi-meters.
2. (a) To study and draw V-I characteristics of junction diode (Ge, Si)
 - (b) Also calculate cut-in voltage reverse saturation current, static & dynamic resistance.
3. (a) To study and draw reverse characteristics of zener diode
 - (b) Study of zener diode as voltage regulator observe the effect of load changes & load current of voltage regulations.
4. Application of diode as clipper and clamper.
5. To draw i/p and o/p characteristics of common-emitter transistor.
6. To draw i/p and o/p characteristics of common-base transistor.
7. To draw i/p and o/p characteristics of common-collector transistor.
8. To study the rectifier (half wave, full wave and bridge) and filter circuit. Also calculate theoretical & practical ripple factor for all configurations the.
9. To draw characteristics curve of JFET and measure of I_{DSS} & V_p .
10. To draw characteristics curve of MOSFET.
11. (a) To calculate the gain and plot the frequency response of single stage amplifier.
 - (b) To calculate the gain & plot the frequency response of double stage RC coupled amplifier.

3 IT 10. DATA STRUCTURE LAB

1. Program on array searching, sorting (Bubble sort, Quick sort, Merge sort etc.)
2. Program to insert element at desired position, replacing element, deletion in array.
3. Various matrices operations.
4. Various strings programs.
5. Implementation of stack and queue using array
6. Implementation of stack and queue using link lists
7. Implementation of circular queue using link lists.
8. Polynomial addition, multiplication.
9. Two-way link lists programs.
10. Infix to postfix/prefix conversion.
11. BST implementation (addition, deletion, searching).
12. Graph traversal (BFS, DFS).

4 IT 01 Computer Architecture

Teaching Hrs.
L-3 T-0 P-0

Exam Hrs. 3 Hrs.
Marks Theory Exam-80 Test-20 Total-100

CONTENTS OF SYLLABUS

Unit	Topics	
I	Register transfer language :	Data movement around registers. Data movement from/to memory, arithmetic and logic micro operations. Concept of bus and timing in register transfer. Lecture Required 6
II	CPU organization :	Addressing Modes, Instruction Format. CPU organization with large registers, stacks and handling of interrupts & subroutines Instruction pipelining Lecture Required 5
III	Arithmetic algorithm :	Array multiplier, Booth's algorithm. Addition subtraction for signed unsigned numbers and 2's complement numbers. Lecture Required 5
IV	Microprogrammed control unit :	Basic organization of micro-programmed controller, Horizontal & Vertical formats, Address sequencer Lecture Required 2
V	Memory organization :	Concept of RAM/ROM, basic cell of RAM, Associative memory, Cache memory organization, Vertical memory organization. I/O ORGANISATION: Introduction to Peripherals & their interfacing. Strobe based and handshake-based communication, DMA based data transfer, I/O processor. Lecture Required 10

Total Lecture Required: - 28

Recommended Books:

1. J.P. Hayes – Computer Architecture & Organization, McGraw Hill.
2. Heuring – Computer system Design and Architecture, Pearson Education.
3. M. Morrismanno – Computer System Architecture Prentice Hall of India.
4. Bartee – Computer Architecture, Tata McGraw Hill.

4 IT 02 Programming in JAVA

Teaching Hrs.
L-3 T-1 P-0

Exam Hrs. 3 Hrs.
Marks Theory Exam-80 Test-20 Total-100

CONTENTS OF SYLLABUS

Unit	Topics	
I	Introduction to Java & Program Elements:	Byte code and virtual machine, JIT compiler. Primitive data types, variables, assignment, arithmetic, short circuit logical operator, arrays. Decision and control statements. Lecture Required 6
II	Object and Classes & Inheritance:	Object, constructors, returning and passing objects as parameter. Nested and inner classes. Memory allocation and Garbage Collection in java. Single and multilevel Inheritance, extended classes, Access Control, usage of super and this keyword. Overloading and overriding methods or constructors. Abstract classes, usage of final keyword. Concept of java.lang. Object class. Lecture Required 10
III	Interfaces:	Defining and implementing interfaces. Package: Defining package, concept of CLASS PATH, access protection, importing package. Exception Handling: Exception handling fundamentals, Exception types, Uncaught exceptions, try, catch and multiple catch statements. Usage of throw, throws and finally. Common inbuilt exception. Lecture Required 6
IV	String Handling & Collection API:	String constructors, special string operations, character extraction, searching and comparing strings, string Buffer class, StringBuilder class.(Java SE1.5).String Constant Pool, memory allocation to string, using == with string objects. Collection API: introduction to java.util package, overriding equals and hashCode method, Ordered and Sorted Collection, java.util.Collection interface, using Set, List, Queue collection. Difference with ArrayList and Vector, HashMap Vs Hashtable. Lecture Required 8
V	New Features in JavaSE 1.5 & Applet:	Boxing and UnBoxing, Generics, implementing type safe collection using generics, Assertion mechanism, Applet: Applet fundamentals, creating and embedding applet in a web document, graphical drawing with applets. Lecture Required 10

Total Lecture Required: 40

Reference Books:

3. **Patrick Naughton, Herbert Schidt – JAVA : The complete Reference** (Mc Graw-Hill, 3rd Ed.)
4. **Java Hand Book** : Mc-Graw Hill

4 IT 03 Data Base Management System

Teaching Hrs.
L-3 T-1 P-0

Exam Hrs. 3 Hrs.
Marks Theory Exam-80 Test-20 Total-100

CONTENTS OF SYLLABUS

Unit	Topics
I	Introduction To Database Systems : Overview and History of DBMS. File System vs DBMS Advantage of DBMS Describing and Storing Data in a DBMS. Queries in DBMS. Transaction management and Structure of a DBMS <p style="text-align: right;">Lecture Required 5</p>
II	Entity relationship model: Overview of Data Design Entities, Attributes and Entity Sets, Relationship and Relationship Sets. Features of the ER Model-Key Constraints, Participation Constraints, Weak Entities, Class Hierarchies, Aggregation, Conceptual Data Base, Design with ER Model-Entity vs Attribute, Entity vs Relationship Binary vs Ternary Relationship and Aggregation vs ternary Relationship Conceptual Design for a Large Enterprise. <p style="text-align: right;">Lecture Required 7</p>
III	Relationship algebra and calculus: Relationship Algebra Selection and Projection, Set Operations, Renaming, Joins, Division, Relation Calculus, Expressive Power of Algebra and Calculus. <p style="text-align: right;">Lecture Required 8</p>
IV	Sql queries programming and triggers: The Forms of a Basic SQL Query, Union, Intersection and Except, Nested Queries ,Correlated Nested Queries, Set-Comparison Operations, Aggregate Operators, Null Values and Embedded SQL, Dynamic SQL, ODBC and JDBC, Triggers and Active Databases <p style="text-align: right;">Lecture Required 9</p>
V	Schema refinement and normal forms: Introductions to Schema Refinement, Functional Dependencies, Boyce-Codd Normal Forms, Third Normal Form, Normalization-Decomposition into BCNF Decomposition into 3-NF <p style="text-align: right;">Lecture Required 6</p>

Recommended Books:

Total Lecture Required : 35

1. Raghu Rama Krishnan – Database Management Systems, 2nd ed. Tata McGraw Hill.
2. Elmassari – Fundamentals of Data Base Systems, Pearson Education.
3. Silverschatz Korth and Sudarshan – Database System Concepts, 4th ed. Tata McGraw Hill.
4. Gordon C. Everest – Database Management Objectives, System Functions and Administration Tata McGraw Hill.

4 IT 04 Software Engineering

Teaching Hrs.
L-3 T-0 P-0

Exam Hrs. 3 Hrs.
Marks Theory Exam-80 Test-20 Total-100

CONTENTS OF SYLLABUS

Unit	Topics	
I	System Analysis:	Characteristics, Problems in system Development, System Level project Planning, System Development Life cycle (SDLC), computer system engineering system analysis, modeling the architecture, system specification. Lecture Required 6
II	Software Project Management:	Objectives, Resources and their estimation, LOC and FP estimation, effort estimation, COCOMO estimation model, risk analysis, software project scheduling. Software Development : Life Cycle (SWDLC), SWDLC models software engineering approaches Lecture Required 8
III	Requirement Analysis:	Requirement analysis tasks, Analysis principles. Software prototyping and specification data dictionary finite state machine (FSM) models. Structured Analysis: Data and control flow diagrams, control and process specification behavioral modeling, extension for data intensive applications. Lecture Required 8
IV	Software Design:	Design fundamentals, Effective modular design: Data architectural and procedural design, design documentation. Lecture Required 6
V	Software Testing And Debugging:	Software Testing Fundamentals .Text Case Design, White –Box Testing, Basis Path testing, Control Structure Testing, Black Box Testing and Testing for Specialized Environments, Architectures and Applications. Program Error, Debugging Process (Information Gathering, Fault Isolation, Fault Confirmation, Documentation, Fixing fault, Testing) Debugging Example. Lecture Required 10

Total Lecture Required : 38

Recommended Books:

1. Pressman; software Engineering – A Practitioner’s Approach, Mc Garw Hill International.
2. A. Behfroz and F.J. Hudson: Software Engineering Fundamentals Oxford University Press.

4 IT 05 Discrete Mathematical Structure

Teaching Hrs.
L-3 T-1 P-0

Exam Hrs. 3 Hrs.
Marks Theory Exam-80 Test-20 Total-100

CONTENTS OF SYLLABUS

Unit	Topics	
I	Formal Logic:	Statement, Symbolic Representation and Tautologies, Quantifiers, Predicator and validity, Normal form. Propositional Logic, Predicate Logic, Logic Programming and Proof of correctness. Lecture Required 6
II	Proof, Relation and Analysis of Algorithm Techniques for theorem proving:	Direct Proof, Proof by Contra position, Proof by exhausting cases and proof by contradiction, principle of mathematical induction, principle of complete induction. Recursive definitions, solution methods for linear, first-order recurrence relations with constant coefficients. Lecture Required 7
III	Graph Theory:	Graphs - Directed and Undirected, Eulerian chains and cycles Hamiltonian chains and cycles, Trees, chromatic number, connectivity and other graphical parameters Applications. Polya's Theory of enumeration and its applications. Lecture Required 8
IV	Sets and Functions:	Sets, relations, functions, operations, equivalence relations, relation of partial order, partitions, binary relations. Transforms: Discrete Fourier and Inverse Fourier Transforms in one and two dimensions, discrete Cosine transform. Lecture Required 9
V	Monoids and Groups:	Groups, Semigroups and Monoids cyclic semi graphs and sub monoids, Subgroups and cosets. Congruence relations on semi groups. Morphism, Normal sub groups. Structure off cyclic groups, permutation groups and dihedral groups elementary applications in coding theory. Lecture Required 8

Total Lecture Required : 38

Recommended Books:

1. Kolman B, Busby R: Discrete Mathematical Structures for Computer Science, PHI
2. Knuth, D.E. : The Art of Computer Programming, Vol. 1, Narosa
3. Gibbons, A: Algorithmic Graph Theory, Cambridge University Press.
4. Liu-Introduction to Combinatorics, Mc-Graw Hill.
5. Krishnamurthy: Combinatorics, EWP
6. Deo: Graph Theory, PHI

4 IT 06.1 TELECOMMUNICATION FUNDAMENTALS

Teaching Hrs.
L-3 T-0 P-0

Exam Hrs. 3 Hrs.
Marks Theory Exam-80 Test-20 Total-100

CONTENTS OF SYLLABUS

Unit	Topics	
I	Introduction of TEF	Electromagnetic Spectrum, Frequency Spectrum-Bandwidth-Allocation, Time domain and Frequency domain analysis, Transmission media, Twisted pair, UTP cables, Coaxial and optical fiber cables, wireless, microwave and satellite transmission, Transmission impairments. Serial and parallel transmission, Simplex, half duplex or full duplex transmission mode. Network, LAN, MAN, WAN, Internet, Intranet, Extranet, Network Topology, Protocols, Layered Architecture, OSI and TCP/P protocol Architecture. Lecture Required
II	Physical Layer:	Convention and terminology (bit rate, channel capacity, bandwidth, Signal strength, SNR) Physical transmission media interface (Mechanical, Electrical and Radio interface specification) Modulation (ASK, FSK and PSK, PCM, PAM, Delta Modulations), Line coding (NRZ-L, NRZ-I, Bipolar AMI, Manchester and differential Manchester), Multiplexing (FDM, Synchronous and Statistical TDM) Brief Introduction to Ethernet, SONET/SDH. Lecture Required
III	Data Link Layer:	Channel allocation problem, pure and slotted ALOHA Protocols, Persisted And Non-Persisted CSMA, Collision Free Protocols, Digital Cellular Radio and CDMA. Logical Link Sub Layer, MAC Sub layer. Brief Introduction: Frame Relay, PPP. Lecture Required
IV	Switching Networks:	Circuit switching Networks, Space and Time division switching, Routing circuit switched networks, control signaling packet switching principles, fixed, flooding and adaptive routing strategies, Brief Introduction: Broadband and Narrowband ISDN, ADSL Lecture Required
V	Network Devices:	Gateway, Router, Bridge, Switch, Hub, Repeater, Multilayer Switch, Protocol Converter, Router, Proxy, Firewall, Multiplexer, Network Card, Modem. Network Technology: DSL, GSM, Bluetooth, Infrared. Brief Introduction to Servers : File Server, Print Server, Mail Server, Proxy Server, Remote Access Server (RAS), Application Server, Web Server, Backup Server Lecture Required

Recommended Books:

1. William Stallings – Data and Computer communication (PHI, 5th ED.)
2. James Martin – Telecommunication and the computer (PHI, 3rd ED.)
3. A.S. Tanenbaum – Computer Networks – (PHI, 3rd ED.)

4 IT 06.2 Management Information System

Teaching Hrs.
L-3 T-0 P-0

Exam Hrs. 3 Hrs.
Marks Theory Exam-80 Test-20 Total-100

CONTENTS OF SYLLABUS

Unit	Topics	
I	Introduction:	MIS concept, Definition, role & Impact of MIS, Process of management, organization structure & behavior. Lecture Required 6
II	Basic of Management Information System:	Decision Making, Information concepts, System concepts & control.Types of system handling system complexity System development model. Lecture Required 8
III	Development of Management Information System:	Requirement and implementation of MIS, Choice of information Technology for Management Information System. Lecture Required 8
IV	Application of Management Information system:	Application in manufacturing sector using for personal management, Financial management, Production Management, Material Management, Marketing Management Application in Service Sector. Lecture Required 8
V	Enterprise Resource Planning (ERP):	EMS, ERP, Benefits implementation, EMS & MIS. Case Studies: Application of SAP technologies in manufacturing sector. Lecture Required 8

Total Lecture Required : 38

Recommended Books:

- 1 W.S. Jawadekar – Management Information System, Tata McGraw Hill.
- 2 Loudon & Loudon – Management Information, Pearson Education Asia.

4 IT 06.3 Analog and Digital communication

Teaching Hrs.
L-3 T-0 P-0

Exam Hrs. 3 Hrs.
Marks Theory Exam-80 Test-20 Total-100

CONTENTS OF SYLLABUS

Unit	Topics
------	--------

I	Amplitude Modulation	Frequency translation, Recovery of base band signal, Spectrum & power relations in AM systems. Methods of generation & demodulation of AM-DSB, AM-DSB/SC and AM-SSB signals. Modulation & detector circuits for AM systems. Lecture Required : 6
II	Frequency modulation	Phase & freq. modulation & their relationship, Spectrum & band width of a sinusoidally modulated FM signal, phasor diagram, Narrow band & wide band FM. Generation & demodulation of FM signals. Comparison of AM, FM & PM. Pre emphasis & de-emphasis. Threshold in FM, PLL demodulator. Lecture Required : 8
III	Pulse modulation systems	Sampling theorem, Generation and demodulation methods of PAM, PWM, PPM. Lecture Required : 6
IV	Pcm & delta modulation systems	PCM and delta modulation, Quantization noise in PCM and delta modulation. Signal-to-noise ratio in PCM and delta modulation, Adaptive delta. Modulation. Lecture Required : 6
V	Digital modulation techniques	Orthogonal signal transmission, Various techniques of phase shift, amplitude shift and frequency shift keying, Minimum shift keying, Modulation & Demodulation. Lecture Required :6

Total Lecture Required: - 32

GE 407* Special Mathematics II**
(Common for all branches CSE/ECE/IT/ME/CSE/CIVIL for Diploma Holders)

Teaching Hrs.
3L + 0T

Exam Hrs. 3 Hrs.
Total-100

Unit	Topics	
I	Differential equation of first Order	Definition, order and degree of differential equation, Method of separation of variable, Homogeneous differential equation. Lectures Req : 6
II	Differential equation of first Order	Exact differential equation of first order, Reducible to exact form, Linear form, Reducible to linear form. Lectures Req : 6
III	Differential equation of second Order	Linear differential equation with constant coefficients, complementary function, particular integral Lectures Req : 6
IV	Elementary Complex variable	Complex Numbers, Real and imaginary parts of complex, complex conjugate, modulus and argument of complex number. Euler's theorem and De'moivre's theorem (only statement) polar form of complex number. Lectures Req : 6
V	Matrices and Determinants	Determinants and Matrices of order two and three properties of determinants, Evaluation of Determinants, Addition, Subtraction, Multiplication, Transpose, Adjoint and inverse of Matrix. Lectures Req : 6

Total Lectures Req : 30

**** It will be sessional paper: marks shall not be counted for awarding division.**

Laboratories

4 IT 07. COMMUNICATION LAB

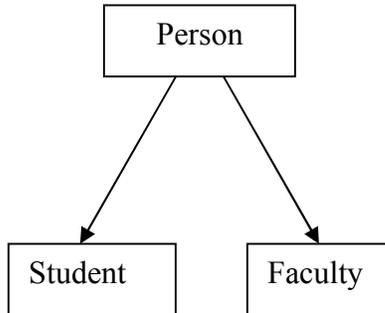
1. Harmonic analysis of a square wave of modulated waveform
2. Observe the amplitude modulated waveform and measures modulation index. Demodulation of the AM signal
3. To modulate a high frequency carrier with sinusoidal signal to obtain FM signal. Demodulation of the FM signal
4. To observe the following in a transmission line demonstrator kit :
 - i. The propagation of pulse in non-reflecting Transmission line.
 - ii. The effect of losses in Transmission line.
 - iii. The resonance characteristics of a half wavelength long transmission line.
5. To study and observe the operation of a super heterodyne receiver
6. To modulate a pulse carrier with sinusoidal signal to obtain PWM signal and demodulate it.
7. To modulate a pulse carrier with sinusoidal signal to obtain PPM signal and demodulate it.
8. To observe pulse amplitude modulated waveform and its demodulation.
9. To observe the operation of a PCM encoder and decoder .To consider reason for using digital signal transmissions of analog signals.
10. Produce ASK signals, with and without carrier suppression, Examine the different processes required for demodulation in the two cases.
11. To observe the FSK wave forms and demodulate the FSK signals based on the properties of (a) tuned circuits (b) on P.I.L.

4 IT 08. JAVA LAB

- 1) Write a program to print "Hello World" string.
- 2) Write a program to concatenate to string using '+' operator.
- 3) Write a program to print following two patterns (use switch case for choice menu)

```
1) 1          2) 5
   0 1        4 5
   0 1 0      3 4 5
   1 0 1 0    2 3 4 5
   1 0 1 0 1  1 2 3 4 5
```

- 4) Write a program to input N integer number and perform bubble sorting on them.
- 5) Write a program to input two matrix and perform matrix multiplication on them.
- 6) WAP to create Student class with two constructor (default & argument) and print the details of a student.
- 7) WAP to show uses of super and this keyword.
- 8) WAP to show uses of shift operations.
- 9) WAP to show following inheritance relationship.



- 10) WAP to show following
 - Creating user defined Exception
 - Catching & throwing user defined Exception.
- (11) WAP to show the uses of string class and string Buffer class and its various string utilities methods.
- (12) WAP to show the uses of Wrapper classes and conversion between string and numeric data types.
- (13) WAP to implement producer and consumer problem using Java Thread API.
- (14) WAP to develop following GUI Graphical user interface) using Java Applet.

Simple Applet		X
X =	<input type="text"/>	
Y =	<input type="text"/>	
X+Y =	<input type="text"/>	

4IT 09 DATABASE LAB

Student can use MySQL, SQL, MS-Access or ORACLE at backend and C++, VB or JAVA at front end.

1. Write basic SQL\MySQL queries using following keywords:

SELECT, WHERE, JOIN, GROUP BY, ORDER BY, TOP, LIMIT, AS, SUM, COUNT and LIKE

2. (a) Write a C++ program to store students records (roll no, name, father name) of a class using file handling. (Use C++ and File handling).
(b) Re-write program 1, using any DBMS and any compatible language.(C++/MySQL) (VB and MS-Access)

3. Database creation/ deletion, table creation/ deletion.

(a) Write a program to take a string as input from user. Create a database of same name. Now ask user to input two more string, create two tables of these names in above database.

(b) Write a program, which ask user to enter database name and table name to delete. If database exist and table exist then delete that table.

4. Write a program, which ask user to enter a valid SQL query and display the result of that query.

5. Write a program in C++ to parse the user entered query and check the validity of query.
(Only SELECT query with WHERE clause)

6. Create a database db1, having two tables t1 (id, name, age) and t2 (id, subject, marks).

(a) Write a query to display name and age of given id (id should be asked as input).

(b) Write a query to display average age of all students.

(c) Write a query to display mark-sheet of any student (whose id is given as input).

4 IT 10. SOFTWARE ENGINEERING LAB

In this lab first 8 experiments are to practice software engineering techniques. Use any open source CASE tool. Many of them are available at www.sourceforge.net. You can choose any other CASE tool, as per choice.

• Language : C++ / JAVA

• Design Approach : Object Oriented

These designing can be done on any automation system e.g. library management system, billing system, payroll system, bus reservation system, gas agency management system, book-shop management system, students management system.

1. Do a feasibility study

2. Document all the requirements as specified by customer in Software Requirement Specification

3. Design sequence diagrams for project

4. Design Collaboration diagram

5. Design Data Flow Diagram for the project

6. Design Entity Relation Diagram for the project

7. Design Class diagram

8. Design at least 10 test cases for each module.

9. -10: Code and test the project, which you have designed in last 8 labs.

5 IT 01 COMPUTER GRAPHICS

Teaching Hrs.
L-3 T-0 P-0

Exam Hrs. 3 Hrs.
Marks Theory Exam-80 Test-20 Total-100

CONTENTS OF SYLLABUS

Unit	Topics	
I	Introduction about graphics system :	Introduction to Raster scan displays, Storage tube displays, refreshing, flicking, interlacing, color monitors, display processors resolution, working principle of dot matrix, inkjet laser printers, working principles of keyboard, mouse scanner, digitizing camera, track ball , tablets and joysticks, graphical input techniques, positioning techniques, rubber band techniques, dragging etc. Lecture Required 5
II	Scan conversion & line algo.	Scan conversion techniques, image representation, line drawing, simple DDA, Bresenham's Algorithm, Circle drawing, general method, symmetric DDA, Bresenham's Algorithm, curves, parametric function, Beizier Method, B-sp-line Method. Lecture Required 10
III	2D & 3D System	2D & 3D Co-ordinate system, Translation, Rotation, Scaling, Reflection Inverse transformation, Composite transformation, world coordinate system, screen coordinate system, parallel and perspective projection, Representation of 3D object on 2D screen. Lecture Required 8
IV	Clipping, shading, other process	Point Clipping. Line Clipping Algorithms, Polygon Clipping algorithms, Introduction to Hidden Surface elimination, Basic illumination model, diffuse reflection, specular reflection, phong shading, Gourand shading ray tracing, color models like RGB, YIQ, CMY, HSV etc. Lecture Required 8
V	Multimedia systems	Multimedia components, Multimedia Hardware, SCSI, IDE, MCI, Multimedia data and file formats, RTF, TIFF,MIDI, JPEG, DIB, MPEG, Multimedia Tools, Presentation tools, Authoring tools, presentation. Lecture Required 6

Total Lecture Required: - 37

Recommended Books:

- 1 J. foley, A. Van dam, S. Feiner, J. Hughes, L Computer Graphics – Principles and Practice, Pearson Education, Asua.
- 2 D. Rogers and adams – Mathematical elements of Computer Graphics, Mcgraw Hill.
- 3 D. Heam and Baker – Computer Graphics, PHI.

5 IT 02 Web Technology

Teaching Hrs.
L-3 T-1 P-0

Exam Hrs. 3 Hrs.
Marks Theory Exam-80 Test-20 Total-100

CONTENTS OF SYLLABUS

Unit	Topics	
I	Basics of Web Technology	History, HTTP, HTTP methods, Web Server, Web Client, HTTPS. HTML, XML and Scripting List, Tables, Images, Forms, Frames, CSS Document type definition, XML schemes, Object Models, Presenting XML, Using XML Processors: DOM and SAX Introduction to Java Script, Object in Java Script, Dynamic HTML with Java Script. Java script functions & Java script objects & their implementation. Lecture Required 6
II	Java beans & introduction to servlet	Introduction to Java Beans, Advantage, Java Beans Standard, Java Beans API, Introduction to Servlets, Lifecycle, Servlet API, Servlet Packages: HTTP package, Working with Http request and response, Session Management, Deployment Descriptor, initialization Parameter. Lecture Required 6
III	Java server pages & CSS	Introduction to JSP, JSP processing, JSP Application Design, Tomcat Server, Implicit JSP objects, Conditional Processing, Declaring variables and methods, Error Handling and Debugging, Sharing data between JSP pages- Sharing Session and Application Data. CSS: Its introduction, types & their implementation. Lecture Required 8
IV	Dynamic HTML	Object model and collections: introduction, object reference. All and children Collections, dynamic style, dynamic positioning, using the frames collection, navigator object. Dynamic HTML: even model: Normal and Mouse Events, Error Handling in Events Lecture Required 8
V	Introduction to PHP	Advantages of PHP-Functions-Data types-Arrays-MYSQL-Connecting Database using ODBC-Files-Forms-Image-Imap object-Implementation of Session management & handling of dynamic data in PHP. Lecture Required 8

Total Lecture Required: - 36

Recommended Books:

- 1 **JSP 2.0** : The Complete Reference 2 nd Edition TMH
- 1 **Core Servlet & JSP** : APress Publication

5 IT 03 Theory of computationTeaching Hrs.
L-3 T-1 P-0Exam Hrs. 3 Hrs.
Marks Theory Exam-80 Test-20 Total-100

CONTENTS OF SYLLABUS

Unit	Topics	
I	Mathematical notations and techniques:	Sets Logic, Function, Relations and Languages. Inductive Proofs a Recursive Definitions Lecture Required 3
II	Regular languages and finite automata:	Regular Languages and Regular Expressions, Finite Automata, Kleen's Theorem. Properties of Regular Languages. Pumping Lemma, Non-Determinism I Finite Automata with Output and Decision Problems Lecture Required 5
III	Context-free languages and pushdown automata:	Context-Free Grammars, Union, Concatation of CFG. Derivation Trees, Ambiguity, Simplified and Normal Forms. Pushdown Automata Deterministic PDA, PDA for given CFG and CFG for given PO Pumping Lemma for Context-Free Languages and Decision Problem involving Context-Free Language Lecture Required 8
IV	Turning machines	Definition, Turing Machines as Language Acceptor, Combining Turing Machines, Variations of Turing Machine Nondeterministic Turing Machines. Universal Turing Machine Recursively Enumerable and Recursive languages. Unrestricted Grammers and Turing Machines. Context-Sensitive Grammers Linear-Bounded Automata. The Chomasky Hierarchy Lecture Required 8
V	Computation and recursion :	Introduction and Basic Concepts of Computable & non-computable functions, Primitive Recursion, Recursive & Partial Recursive Functions, Rice Theorem of Undecidability, PCP & Greibach Theorem, Presentation tools, Authoring tools, presentation. Lecture Required 8

Total Lecture Required : 32**Recommended Books:**

- 1) John C. Martin – Introduction of Languages and the Theory of Computation TMH.
- 2) John E. Hopcroft, Rajeev Motwani and Ullman- Introduction to Automata Theory,Languages and Computation, Pearson Education Asia.
- 3) Cohen – Introduction to Computer Theory, Pearson Education Asia

Total Lecture Required: -

5 IT 04 Operating System

Teaching Hrs.
L-3 T-1 P-0

Exam Hrs. 3 Hrs.
Marks Theory Exam-80 Test-20 Total-100

CONTENTS OF SYLLABUS

Unit	Topics	
I	Introduction about Operating System :	Introduction to Operating Systems, Operating system services, multiprogramming, time-sharing system, storage structures, system calls, multiprocessor system. Basic concepts of CPU scheduling, Scheduling criteria, Scheduling algorithms, algorithm evaluation, multiple processor scheduling, real time scheduling I/O devices organization, I/O devices organization, I/O devices organization, I/O buffering. Lecture Required 7
II	Process & Scheduling :	Process concept, process scheduling, operations on processes, threads, inter-process communication, precedence graphs, critical section problem, semaphores, classical problems of synchronization. Deadlock problem, deadlock characterization, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock, Methods for deadlock handling. Lecture Required 8
III	Memory Management :	Concepts of memory management, logical and physical address space, swapping, contiguous and non-contiguous allocation, paging, segmentation, and paging combined with segmentation. Lecture Required 6
IV	Paging Concept :	Concepts of virtual memory, demand paging, page replacement algorithms, allocation of frames, thrashing, demand segmentation. Security threads protection intruders-Viruses-trusted system. Lecture Required 6
V	Disk scheduling & file concepts :	Disk scheduling, file concepts, file access methods, allocation methods, directory systems, file protection, introduction to distributed systems and parallel processing case study. Lecture Required 7

Total Lecture Required: - 34

Recommended Books:

1. A.S. Tanenbaum Modern Operating Systems, Pearson Education Asia.
2. D.M. Dhamdhare Operating Systems-A Concept based approach, Tata McGraw Hills.
3. Achyut Gobble Operating Systems, Tata McGraw Hills.

5 IT 05 Microprocessor and interfaces

Teaching Hrs.
L-3 T-1 P-0

Exam Hrs. 3 Hrs.
Marks Theory Exam-80 Test-20 Total-100

CONTENTS OF SYLLABUS

Unit	Topics	
I	Introduction to Micro Computer Systems:	Microprocessors, microcontroller and microcomputer devices, Machine and assembly language, Bus concept. Architecture & Pinout of 8085A. Lecture Required
II	Assembly Language and Programming in 8085:	Instruction set, Program structures (sequential, conditional, iterative), Macros and subroutines, Stack, Counter and timing delay, interrupt structure and its programming. Lecture Required
III	Peripherals and their interfacing with 8085-I:	Memory Interfacing, Interfacing I/O ports, Data transfer schemes (Synchronous, asynchronous, interrupt driven), Architecture & interfacing of PPI 8255, Data Converters and Timer 8254. Lecture Required
IV	Peripherals and their interfacing with 8085-II:	Architecture & interfacing of- DMA controller 8257, interrupt Controller 8259A, USART 8251, Level Converters MC 1488 and MC 1489, Current loop, RS 232 C and RS 422 A. Lecture Required
V	Structure of 8085 A, 8086 and 8088	Comparative study of 8085 A, 8086 and 8088 (Pinout, internal architecture, timing diagrams), Instruction format and addressing modes – Data and Branch related. Features of Pentium processor, MMX and Dual core processor. Lecture Required

Recommended Books:

1. Gaonkar – 8085 Programming, Penram Press.
2. A.P. Mathur – Intro to Microprocessors – Tata Mc-Graw Hill.
3. Antanakos – Introduction to Intel Family Microprocessors, Pearson and Education.
4. Gilmore – Microprocessors principles and Applications, Tata McGraw Hill.
5. B. Ram – Fundamentals of Microprocessors & Micro Computers Dhanpat Rai Pub.
6. Ray and Bhurchandi – Intel Microprocessors ,Tata Mc-Graw Hill.

Teaching Hrs.
L-3 T-0 P-0Exam Hrs.3Hrs.
Marks Theory Exam-80 Test-20 Total-100

CONTENTS OF SYLLABUS

Unit	Topics	
I	Overview of Biometrics, Authentication and Biometrics:	Biometric Identification, Biometric Verification, Biometric Enrollment, Biometric, System Security. Secure Authentication Protocols, Access Control Security Services, Authentication Methods, Authentication Protocols, Matching Biometric Samples, Verification by humans. Common biometrics: Finger Print Recognition, Face Recognition, Speaker Recognition, Iris Recognition, Hand Geometry, Signature Verification, Positive and Negative of Biometrics. Matching: Two kinds of errors, Score distribution, Estimating Errors from Data, Error Rate of Match Engines, Definition of FAR and FRR.
II	Introduction to Information Hiding:	Technical Steganography, Linguistic Steganography, Copy Right Enforcement, Wisdom from Cryptography Principles of Steganography: Framework for Secret Communication, Security of Steganography System, Information Hiding in Noisy Data , Adaptive versus non-Adaptive Algorithms, Active and Malicious Attackers, Information hiding in Written Text.
III	A Survey of Steganographic Techniques:	Substitution systems and Bit Plane Tools, Transform Domain Techniques: - Spread Spectrum and Information hiding, Statistical Steganography, Distortion Techniques, Cover Generation Techniques. Steganalysis: Looking for Signatures: - Extracting hidden Information, Disabling Hidden Information.
IV	Watermarking and Copyright Protection:	Basic Watermarking, Watermarking Applications, Requirements and Algorithmic Design Issues, Evaluation and Benchmarking of Watermarking system.
V	Transform Methods:	Fourier Transformation, Fast Fourier Transformation, Discrete Cosine Transformation, Mellin- Fourier Transformation, Wavelets, Split Images in Perceptual Bands. Applications of Transformation in Steganography.

Total Lecture Required : 38

5 IT 06.2 Open Source Software

Teaching Hrs.
L-3 T-0 P-0

Exam Hrs. 3 Hrs.
Marks Theory Exam-80 Test-20 Total-100

CONTENTS OF SYLLABUS

Unit	Topics	
I	OST overview :	Evolution & development of OST and contemporary technologies, Factors leading to its growth. Open Source Initiative (OSI), Free Software Foundation and the GNU Project, principle and methodologies. Contexts of OST (India & international). Applications of open source (open source teaching and open source media) Risk Factors. Myths regarding open source. Lecture Required 8
II	Philosophy of Software Freedom :	Free Software, OSS, Closed software, Public Domain Software, Shared software, Shared source. Detail of few OSS like Open Audio, Video, 2d & 3d graphics software, system tools, office tools, Networking & internet, Security, Educational tools and Games. Lecture Required 6
III	Open Source Development Model :	Open Source Development Model, Starting and Maintaining an Open Source Project, Open Source Hardware, Open Source Design, Ongoing OS Projects (i.e. examples of few good upcoming software projects.) Case Study: - Linux, Wikipedia. Lecture Required 10
IV	Licenses and Patents :	What Is A License, How to create your own Licenses? Important FOSS Licenses (Apache, BSD, GPL, LGPL), copyrights and copylefts, Patents Lecture Required 8
V	Other Factor of OST :	Social and Financial impacts of open source technology, Economics of FOSS: Zero Marginal Cost, Income generation opportunities, Problems with traditional commercial software, Internationalization, Open Source as a Business Strategy. Lecture Required 8
		Total Lecture Required: - 40

Recommended Books:

1. Open Source Technology & policy : Fadi P. Deek , James A.M. Mchugh Cambridge Univ.
2. Open Source Software : An Introduction : Ravi Kumar Jain (ICFAI Univ.)

5 IT 06.3 Simulation And Modeling

Teaching Hrs.
L-3 T-0 P-0

Exam Hrs. 3 Hrs.
Marks Theory Exam-80 Test-20 Total-100

CONTENTS OF SYLLABUS

Unit	Topics
I	System definition and components, Stochastic activities, continuous and discrete systems, System modeling, types of models, static and dynamic physical models, static and dynamic mathematical models, full corporate model, types of system study.
II	System simulation, why to simulate and when to simulate, basic nature of simulation, technique of simulation, comparison of simulation and analytical methods, types of system simulation, real time simulation, hybrid simulation, simulation of pure-pursuit problem single-server queuing system and an inventory problem, Monte- Carlo simulation, Distributed Lag models, Cobweb model.
III	Simulation of continuous systems, analog vs. digital simulation, simulation of water reservoir system, simulation of servo system, simulation of an autopilot. Discrete system simulation, fixed time-step vs. event-to-event model, generation of random numbers, test of randomness, generalization of non-uniformly distributed random numbers, Monte-Carlo computation vs. stochastic simulation.
IV	System Dynamics, exponential growth models, exponential decay models, modified exponential growth models, logistic curves, generalization of growth models, system dynamics diagrams, feedback in socio-economic systems and world models.
V	Simulation of PERT networks, critical path simulation, uncertainties in activity duration, resource allocation and consideration. Simulation software, simulation languages, continuous and discrete simulation languages, expression based languages, object-oriented simulation, general-purpose vs. application-oriented simulation packages, CSMP-III and MODSIM-III.

Total Lecture Required: - 40

Laboratories

5IT 07. COMPUTER GRAPHICS LAB

1. Implementation of line generation using slope's method, DDA and Bresenham's algorithms.
2. Implementation of circle generation using Mid-point method and Bresenham's algorithm.
3. Implementation of ellipse generation using Mid-point method.
4. Implementation of polygon filling using Flood-fill, Boundary-fill and Scan-line algorithms.
5. Implementation of 2D transformation: Translation, Scaling, Rotation, Mirror Reflection and Shearing (write a menu driven program).
6. Implementation of Line Clipping using Cohen-Sutherland algorithm and Bisection Method.
7. Implementation of Polygon Clipping using Sutherland-Hodgman algorithm.
8. Implementation of 3D geometric transformations: Translation, Scalind and rotation.
9. Implementation of Curve generation using Interpolation methods.
10. Implementation of Curve generation using B-spline and Bezier curves.

5IT08 WEB TECHNOLOGY LAB

1) Development of static pages using HTML of an online Departmental Store. The website should be user friendly and should have the following pages:

- Home page
- Registration and user login
- User profile page
- Items catalog
- Shopping cart
- Payment by credit card
- Order confirmation

Add validations to the above static pages of registration, user login, user profile and payment by credit card using Java Script.

2) Creation of a XML document of 20 students. Add their roll numbers, marks obtained in 5 subjects, total and percentage and save this XML document at the server. Write a program that takes students' roll number as an input and returns the students marks, total and percentage by taking the students' information from the XML document.

3) Installation of TOMCAT web server. Convert the static web pages of assignments 2 into dynamic web pages using servlets and cookies.

4) Convert Shopping cart application given in assignment 1 into dynamic web application using servlets.

5) Development of Guest book application using JSP and standard action library.

6) Development of Resume Builder Application using Servlet, JSP and tag library. Use JDBC for accessing database.

5IT 09 :Operating System Lab

Operating System:

1. Write a program to find out the process id and child id.
2. Write a program to implement the fork() function.
3. Write a program to implement wait() function.
4. Write a program to perform FCFS scheduling.
5. Write a program to perform Round Robin Scheduling.
6. Write a program to perform Shortest Job First scheduling.

Shell Programming :

1,2 Write a shell script to create a file in directory.

Follow the instructions:

- (I) Input a page profile to yourself, copy it into other existing file;
- (II) Start printing line at 5;
- (III) Print all difference between two file, copy the two files into file;
- (IV) Print line matching the word pattern;

3 Write a shell script to print the greetings according to time.

4. Write a shell script to find the last modification time of a file.

5. write a shell script to count the no. of lines and words in a file.

6. Write a shell script to count how many users are currently logged in.

7. Write a shell script to find the execution time of a file.

5IT 10 MICROPROCESSORS LAB

LIST OF EXPERIMENT

1. To add true 8 bit nos & result may be (a) 7 bit (b) 16 bit.
2. To find largest of 2 nos. 3 nos. & from array.
3. To find smallest of 2 nos. 3 nos. & from array.
4. To transfer block of bytes from one set of memory location to another set of memory location (a) in same order (b) in reverse order.
5. To perform multibyte addition.
6. To perform multibyte subtraction.
7. To perform multibyte decimal addition.
8. To generate 10 terms for Fibonacci series.
9. To arrange gain data array in ascending order.
10. To arrange gain data array in descending order.

CONTENTS OF SYLLABUS

Unit	Topics	
I	Review of OOSE :	Review of object orientation: classes & objects, polymorphism, inheritance, advanced classes & relationship, interfaces. Lecture Required 4
II	Types of Language :	Unified Modeling Language, Basic structures and modeling classes, common modeling techniques, relationships, common mechanism, class diagrams Lecture Required 8
III	Modeling :	Advanced structured modeling, advanced classes and relationships, interfaces, types and roles, instances and object diagram. Basic idea of behavioral modeling- Activity Diagram, Use case modeling, sequence diagram, state diagram. Lecture Required 10
IV	Object – oriented testing :	Object – oriented testing – testing OOA and OOD models. The object – oriented testing strategies. Unit testing, Inter class testing. Lecture Required 6
V	O-O systems	Technical metrics for O-O systems. Class oriented metrics and metrics for O-O projects. Advanced topics in software engineering. Component based software engineering and development. Classifying and retrieving components. Lecture Required 8
		Total Lecture Required: - 36

Recommended Books:

- 1 Object Oriented Software Engineering : Jacobson
- 2 Software Engineering : Roger S. Pressman

CONTENTS OF SYLLABUS

Unit	Topics
I	<p>Overview: Comparison of machine language, assembly language and high level languages, External and internal representation of instructions and data. Data allocation structures, search structures and addressing modes. Activities and system software for program generation, translation and execution. Editors for source code and object code/executable code files.</p> <p style="text-align: right;">Lecture Required 6</p>
II	<p>Assemblers: Assembly language specification. Machine dependent and independent features of assembler. Classification of assemblers. Pass structure of assemblers (problem and associated for IBM-PC).</p> <p style="text-align: right;">Lecture Required 7</p>
III	<p>Linker & Loader: Functions and classification. Machine dependent and independent features of loaders, Design of bootstrap, absolute and relocatable loaders, Design of linker. Case study of MS-DOS linker.</p> <p style="text-align: right;">Lecture Required 8</p>
IV	<p>Macros: call and expansion. Macro processor algorithm and data structure. Machine independent features (parameters, unique labels, conditional expansion, nesting and recursion). Pass structure and design of microprocessor and macro assembler, Case study of MASM macro processor.</p> <p style="text-align: right;">Lecture Required 6</p>
V	<p>High level language processor: HLL specification: Grammars and parse trees, expression and precedence. Lexical analysis: Classification of tokens, scanning methods, character recognition, lexical ambiguity. Syntactic analysis: Operator precedence parsing, recursive descent parsing. Symbol Table Management: Data structure for symbol table, basing functions for symbols, overflow technique, block structure in symbol table.</p> <p style="text-align: right;">Lecture Required 8</p>

Total Lecture Required: - 37

Recommended Books:

- 1 D.M. Dhamdhare – System Programming & Operating system. Tata Mc Graw Hill.
- 2 L.L. Beck System Software, person, Education.
- 3 J.J. Donovan – System Programming , Tata Mc Graw Hill.

CONTENTS OF SYLLABUS

Unit	Topics	
I	Introduction about Networks	Network, Network Protocols, Edge, Access Networks and Physical Media, Protocol Layers and their services models, Internet Backbones, NAP's and ISPs. Lecture Required 3
II	Application Layer:	Protocol and Service Provided by application layer, transport protocols. The world wide web. HTTP Message formats, User Server Interaction and Web caches. FTP commands and replies. Electronic Mail, SMTP, Mail Message Formats and MIME and Mail Access Protocols DNS The internet's directory service DNS records and Message. Lecture Required 6
III	Transport Layer:	Transport Layer Service and Principles, Multiplexing and Demultiplexing applications, connectionless Transport. UDP Segment structure and UDP Checksum. Principles of Reliable Data Transfer-Go back to N and Selective Repeat. Connection Oriented Transport TCP Connection and Segment Structure, Sequence Numbers and acknowledgement numbers, Telnet, Round trip time and timeout. TCP connection management. Lecture Required 6
IV	Network Layer and Routing:	Network service model, Routing principles. Link State routing Algorithm, A distant Vector routing & OSPF algorithm. Router Components; Input Prot, Switching fabric and output port. IPV6 Packet format. Point To Point Protocol (PPP), transition States, PPP Layers-Physical Layer and Data Link Layer, Link Control Protocols. LCP Packets and options. Authentication PAP and CHAP, Network Control Protocol (NCP). Lecture Required 8
V	Sonet/SDH:	Synchronous Transport Signals. Physical configuration-SONET Devices, Sections, Lines and Paths. SONET Layers-Photonic Layer, section layer, line layer, path layer and device layer relationship. Sonnet Frame format. Section overhead, Line overhead and path overhead. Virtual Tributaries and types of VTs. Lecture Required 5

Total Lecture Required: - 28**Recommended Books:**

- 1 J.F. Kurose and K.W. Ross – Computer Networking Pearson Education Asia.
- 2 B.A. Frouzan – Datga Communications and Networking, Tata Mc Graw Hill.
- 3 Garcia and Widjaja – Communications Networking, Tata Mc Graw Hill.

CONTENTS OF SYLLABUS

Unit	Topics	
I	Introduction to Multimedia :	Introduction to Multimedia, Multimedia Information, Multimedia Objects, Multimedia in business and work. Convergence of Computer, Communication and Entertainment products and Stages of Multimedia Projects, Multimedia hardware, Memory & storage devices, Communication devices, Multimedia software's, presentation tools, tools for object generations, video, sound, image capturing, authoring tools, card and page based authoring tools. Lecture Required 4
II	Multimedia Blocks & MIDI	Multimedia Building Blocks Text, Sound MIDI, Digital Audio, audio file formats, MIDI under windows environment Audio & Video Capture. Lecture Required 7
III	Data Compression	Data Compression Huffman Coding, Shannon Fano Algorithm, Huffman Algorithms, Adaptive Coding, Arithmetic Coding Higher Order Modeling. Finite Context Modeling, Dictionary based Compression, Sliding Window Compression, LZ77, LZW compression, Compression, Compression ratio loss less & lossy compression. Lecture Required 8
IV	Speech Compression & Synthesis :	Speech Compression & Synthesis Digital Audio concepts, Sampling Variables, Loss less compression of sound, loss compression & silence compression. Lecture Required 5
V	Images:	Images: Multiple monitors, bitmaps, Vector drawing, lossy graphic compression, image file formatic animations Images standards, JPEG Compression, Zig Zag Coding, Multimedia Database. Content based retrieval for text and images, Video: Video representation, Colors, Video Compression, MPEG standards, MHEG Standard Video Streaming on net, Video Conferencing, Multimedia Broadcast Services, Indexing and retrieval of Video Database, recent development in Multimedia Lecture Required 8

Total Lecture Required: - 32**Recommended Book:**

- 1 Ralf & Klara -Multimedia: computing, Communication, & Applications, Pearson Education Asia.
- 2 Prabhat K. Andleigh -Multimedia System Design, Prentic Hall, Kiran Thakrar.

CONTENTS OF SYLLABUS

Unit	Topics	
I	Background:	Review of Algorithm Complexity and Order Notations and Sorting Methods. DIVIDE AND CONQUER METHOD: Binary Search, Merge Sort, Quick sort and strassen's matrix multiplication algorithms. GREEDY METHOD: Knapsack Problem, Job Sequencing, Optimal Merge Patterns and Minimal Spanning Trees. Lecture Required 7
II	Dynamic programming:	Matrix Chain Multiplication. Longest Common Subsequence and 0/1 Knapsack Problem. BRANCH AND BOUND: Traveling Salesman Problem and Lower Bound Theory. Backtracking Algorithms and queens problem. Lecture Required 7
III	Pattern matching algorithms:	Naïve and Rabin Karp string matching algorithms, KMP Matcher and Boyer Moore Algorithms. ASSIGNMENT PROBLEMS: Formulation of Assignment and Quadratic Assignment Problem. Lecture Required 8
IV	Randomized algorithms.	Las Vegas algorithms, Monte Carlo algorithms, randomized algorithm for Min-Cut, randomized algorithm for 2-SAT. Problem definition of Multicommodity flow, Flow shop scheduling and Network capacity assignment problems. Lecture Required 8
V	Problem classes np, np-hard and np-complete:	Definitions of P, NP-Hard and NP-Complete Problems. Decision Problems. Cook's Theorem. Proving NP-Complete Problems - Satisfiability problem and Vertex Cover Problem. Approximation Algorithms for Vertex Cover and Set Cover Problem. Lecture Required 7

Total Lecture Required: - 37**Recommended Books:**

- 1 Aho A. V., J.E. Hopcroft, J.D. Ullman: Design and Analysis of Algorithms, Pearson Education.
- 2 Rivest and Cormen, Introduction to Algorithms, Prentice Hall of India.
- 3 Baase.- Computer Algorithms Pearson Education.
- 4 Brassard- Algorithms Prentice Hall.
- 5 Bazaraa,- Linear Programme & Network Flows, John Wiley & Sons.

CONTENTS OF SYLLABUS

Unit	Topics	
I	Elements Of Information Theory:	Measure of information, average information, entropy, information rate. Communication channel, discrete and continuous channel Lecture Required 8
II	Shannon-Hartley theorem and its implications.	Shannon-Hartley theorem and its implications. Channel capacity, Gaussian channel and bandwidth-S/N tradeoff. Lecture Required 6
III	Introduction of Coding:	Types of errors, types of codes, error control coding, methods of controlling errors Lecture Required 4
IV	Linear Block and Binary Cyclic Codes:	Matrix decryption of linear block codes, error detection and error correction capabilities of linear block codes. Hamming codes, structure of cyclic codes, encoding using an (n-k) bit shift register syndrome calculation, its error detection & correction, special classes of cyclic codes bch. Lecture Required 10
V	Burst and Convolution Codes:	Burst and random error correcting codes, encoders for convolution codes. Decoders for convolution codes Lecture Required 6
		Total Lecture Required: - 34

Recommended Books:

1. K. Sam Shanmugam – “Digital and Analog Communication System”, John Wiley Sons.
2. Herbert Taub, Donald L. Schilling – “Principal of Communication system”, Tata McGraw Hill.

6 IT 06.2 Advance Data Structure

Teaching Hrs.
L-3 T-0 P-0

Exam Hrs. 3 Hrs.
Marks Theory Exam-80 Test-20 Total-100

CONTENTS OF SYLLABUS

Unit	Topics	
I	Advanced trees:	Definitions Operations on Weight Balanced Trees (Huffman Trees), 2-3 Trees and Red- Black Trees. Augmenting Red-Black Trees to Dynamic Order Statistics and Interval Tree Applications. Operations on Disjoint sets and its union-find problem Implementing Sets. Dictionaries, Priority Queues and Concatenable Queues using 2-3 Trees. Lecture Required 8
II	Mergeable heaps:	Mergeable Heap Operations, Binomial Trees Implementing Binomial Heaps and its Operations, 2-3-4. Trees and 2-3-4 Heaps. Amortization analysis and Potential Function of Fibonacci Heap Implementing Fibonacci Heap. SORTING NETWORK: Comparison network, zero-one principle, bitonic sorting and merging network sorter. Lecture Required 8
III	Graph theory definitions:	Definitions of Isomorphic Components. Circuits, Fundamental Circuits, Cut-sets. Cut-Vertices Planer and Dual graphs, Spanning Trees, Kuratovski's two Graphs. Lecture Required 4
IV	Graph theory algorithms:	Algorithms for Connectedness, Finding all Spanning Trees in a Weighted Graph and Planarity Testing, Breadth First and Depth First Search, Topological Sort, Strongly Connected Components and Articulation Point. Single Min-Cut Max-Flow theorem of Network Flows. Ford-Fulkerson Max Flow Algorithms Lecture Required 10
V	Number theoretic algorithm:	Number theoretic notation, Division theorem, GCD recursion, Modular arithmetic, Solving Linear equation, Chinese remainder theorem, power of an element, RSA public key Crypto system, primality Testing and Integer Factorization. Lecture Required 6
		Total Lecture Required: - 36

Recommended Books:

- 1 Aho A. V., J.E. Hopcroft, J.D. Ullman: Design and Analysis of Algorithms, Pearson Education.
- 2 Rivest and Cormen, Introduction to Algorithms, Prentice Hall of India.

CONTENTS OF SYLLABUS

Unit	Topics	
I	Introduction	issues in mobile computing, overview of wireless telephony: cellular concept, GSM: air-interface, channel structure, location management: HLR-VLR, hierarchical, handoffs, channel allocation in cellular systems, CDMA, GPRS.
II	Wireless Networking	Wireless LAN Overview: MAC issues, IEEE 802.11, Blue Tooth, Wireless multiple access protocols, TCP over wireless, Wireless applications, data broadcasting, Mobile IP, WAP: Architecture, protocol stack, application environment, applications.
III	Data management issues	data replication for mobile computers, adaptive clustering for mobile wireless networks, File system, Disconnected operations.
IV	Mobile Agents computing	security and fault tolerance, transaction processing in mobile computing environment.
V	Ad Hoc networks	localization, MAC issues, Routing protocols, global state routing (GSR), Destination sequenced distance vector routing (DSDV), Dynamic source routing (DSR), Ad Hoc on demand distance vector routing (AODV), Temporary ordered routing algorithm (TORA), QoS in Ad Hoc Networks, applications.

Total Lecture Required: - 36

Laboratories**6 T 07 UML LAB**

Students are required to prepare various UML diagrams for any case study like Microwave Oven operation.

Following diagrams should be prepared:

1. Use case static structure diagram
2. Object and Class diagram
3. Sequence Diagram
4. Collaboration Diagram
5. State Chart Diagram
6. Activity Diagram
- 7 - 8. Component Diagram
- 9 -10. Deployment Diagram

6 T 08 SSE LAB

All programs have to be written in C++/C.

1. Write a class for file handling having functions to open/read/write/close/reset.
2. Write a program to copy the contents of one file to another file.
3. Write a program to print lines of codes and print signature of all function
4. write a program to count the keywords in file.
5. write a program to print number of variables in every function.
6. Write a program to generate a new file without the comments. (`/* */ & //`)
7. Write a program to process all #define.
8. Write a program to perform radix sort and heap sort.
9. Write a program to perform hashing.
10. Write a program to create a symbol table.

6 IT 9. NETWORK LAB

The lab is to be conducted in Perl programming language, Perl works on all platforms (including windows)

1. Write few basic programs of Perl.
 - a. A Hello World Program
 - b. Write a program to add to 10 numbers.
 - c. Write a program of reading input from the keyboard and displaying them on monitor.
 - d. Write a program to take two strings as input and compare them
2. To understand advance constructs of Perl
 - a. Write a program to create a list of your course (all theory courses in current semester) using array and print them.
 - b. Write a program to accept ten number, store it into a hash table (Perl have itself) and when asked by user tell him that number exists or not. (do not store duplicate numbers)
 - c. Write a program to compute the number of lines in a file.
3. Find the IP address of a host or turn an IP address into a name.
4. Connect to an FTP server and get or put files. Automate the one-time transfer of many files to download the file everyday, which have changed since yesterday. (use Net:FTP)
5. Write a program to send mail. The programs should monitor system resources like disk space and notify admin by mail when disk space becomes dangerously low. (use Net:mail)
6. Fetch mail from a POP3 server (use Net:pop3)
7. Find out who owns a domain (use Net:whois , Whois is a service provided by domain name registration authorities to identify owners of domain names)
8. Test whether a machine is alive. Machine can be specified using IP address or domain name of machine.
9. Write a program to fetch content of a URL from a perl script, convert it to ASCII text (by stripping html tags) and display it.
10. Write program for TCP Server, TCP Client and create a sample code to show server-client communication over TCP.

6 IT 10. MULTIMEDIA LAB

1. Play two audio files. One is having English spoken digits and another having Hindi spoken digits .These files are played on a single system after sound robin mixing digits
2. Program a presentation of circle and rectangle with audio description i.e. size, color of boundary and interior etc. played synchronously one after another
3. An animation sequence is mixed with audio words. Every action is synchronized with pronunciation of the current action .(Note : A bat can be displayed as hit/miss sequence of ball played
4. Present a Video file on 2 independent systems communicating through network without participation of server system of the network
5. To analyze a file having diagram .Compress it in some format . Transfer the file to other system through floppy . Decompress and display the original diagram: (Note: - Use bitmap format).
6. Make musical notes displayed on screen. That can be played with depressing the notes by mouse click.One by one.
7. Make a spelling checker in which PC speaks a word user enters this word through keyboard .On correct spelling PC gives applause , On wrong spelling it asks to retype the work, after 8-failures PC shows correct spelling
8. Make a math driller for primary school in which PC presents two or more numbers (Max. 10 nos). ask to perform addition, subtraction , multiplication ,division , searching max or minimum etc. User perform said operation and enters result through keyboard .On correct answer PC applauds else it asks to retry .After 8 failure PC gives correct answer

7 IT 01 Wireless Communication

Teaching Hrs.
L-3 T-0 P-0

Exam Hrs. 3 Hrs.
Marks Theory Exam-80 Term Test-20 Total 100

Content of Syllabus

Unit	Topics	
I	Introduction:	Cellular revolution, Global Cellular Network, Broad band and troubles with wireless. Principles of Cellular networks, First generation analog Second generation TDMA and Third generation systems.
II	Cordless Systems And Wireless Local Loops	Cordless systems, Wireless local loop and IEEE 802. 16 Fixed Broadband Wireless Access standards. Mobile IP, Wireless Application Protocol, Internet Control Message Protocol and Message Authentication.
III	Satellite Systems:	Application Basics-GEO, LEO and MEO Introduction to Mobile Satcom. Routing, Localization and Handover
IV	Broad Cast Systems:	Overview, Cyclic repetition of data, Digital audio broadcasting-mobile object transfer protocol. Digital video broadcasting.
V	Wireless LAN:	Infrared vs radio transmission, Infrastructure and ad hoc networks, IEEE 802. 11-System architecture, protocol architecture, Physical layer, Medium access control layer and MAC management. HIPER LAN-protocol architecture, physical layer channel access control sub layer, information bases and networking. Bluetooth-User scenarios, Physical layer, MAC Layer, Networking, Security and Link Management

7 IT 02 ERP Systems

Teaching Hrs.
L-3 T-0 P-0

Exam Hrs. 3 Hrs.

Marks Theory Exam-80 Term Test-20 Total 100

Content of Syllabus

Unit	Topics	
I	ERP Overview	ERP Overview, Benefit, Business Process Reengineering, Data ware Housing, Data Mining, LAP, Supply chain Management.
II	ERP -A Manufacturing Perspective	ERP -A Manufacturing Perspective, ERP Module, ERP Market, ERP implementation life cycle, Options of various paradigms, Identification of suitable platforms, Role of SDLC/SSAD, Object oriented architecture.
III	ERP Implementation:	ERP Implementation: introduction, pre evaluation screening, package evaluation, project planning phase. Gap analysis. Hidden costs, Vendors, Consultant Employees, Human Resource
IV	ERP & E-Commerce	ERP & E-Commerce, Future Directives- in ERP, ERP and Internet, Critical Factors guiding selection and evaluation, Strategies for successful implementation, Impediments and initiatives to achieve success, Critical success and failure factors, Integrating ERP into organizational culture.
V	Using ERP tool:	Using ERP tool: either SAP or ORACLE format to case study with example in any system.

7 IT 03 Web Services and Service oriented architecture

Teaching Hrs.
L-3 T-1 P-0

Exam Hrs. 3 Hrs.

Marks Theory Exam-80 Term Test-20 Total 100

Content of Syllabus

Unit	Topics	
I	SOA Fundamentals :	Defining SOA, Business Value of SOA, Evolution of SOA, SOA characteristics, concept of a service in SOA, misperceptions about SOA, Basic SOA architecture, infrastructure services, Enterprise Service Bus (ESB), SOA Enterprise Software models, IBM On Demand operating environment
II	XML technologies :	XML, DTD, XSD, XSLT, XQuery, XPath
III	Web services technologies :	Web services and SOA, WSDL, SOAP, UDDI WS Standards (WS-*).
IV	Web services technologies & Other Technology :	Web services and Service oriented enterprise (SOE), WS-Coordination and WS-Transaction, Business Process Execution Language for Web Services (BPEL4WS)
V	REST :	what is it, how different is it from SOAP and WS-*. Case Studies on REST Services – Amazon, google etc.

7 IT 04 Electronic device automationTeaching Hrs.
L-3 T-1 P-0

Exam Hrs. 3 Hrs.

Marks Theory Exam-80 Term Test-20 Total 100

Content of Syllabus

Unit	Topics	Content of Syllabus
I	Introduction to VLSI,	Introduction to VLSI, circuits Asics and Moore's Law. Microelectronic Design, Styles, four phases in creating Microelectronics chips computer Aided Synthesis and Optimization. Algorithms Review of Graph Definitions and Notations Decision and Optimization Problems, Shortest and Longest Path Problems, Vertex Cover, Graph, Coloring, Clique covering and partitioning Algorithms Boolean Algebra and Representation of Boolean Functions, binary Decision diagrams. Satisfiability and cover problems.
II	Hardware Modeling:	Hardware Modeling: Introduction to Hardware Modeling Language, State Diagrams. Data flow and Sequencing Graphs. Compilation and Behavioral Optimization Techniques. Circuits Specifications for Architectural Synthesis Resources and constraints. Fundamental Architectural Synthesis Problems Temporal Domain Scheduling Spatial Domain Binding Hierarchical Models and Synchronization Problem. Area and performance estimation-Resource Dominated circuits and General Circuits.
III	Scheduling Algorithms:	Scheduling Algorithms: Model for Scheduling Problems, Scheduling without Resource, Constraints-Unconstrained Scheduling ASAP Scheduling Algorithms Latency. Constrained Scheduling. ALAP scheduling. Under Timing Constraints and Relative Scheduling with Resource Constraints Integer Linear Programming Model, Multiprocessor Scheduling, Heuristic Scheduling Algorithms (List Scheduling). Force Directed Scheduling.
IV	Two Level Combination Logic Optimization	Two Level Combination Logic Optimization: Logic Optimization Principles-Definitions, Exact Logic Minimization, Heuristic, Logic Minimization, and Testability Properties Operations on Two level logic Cover-positional Cube Notation, Functions with Multivolume inputs and list oriented manipulation. Algorithms for logic minimization.
V	Introduction to VHDL:	Introduction to VHDL: VHDL History and capabilities program Structure of VHDL Entity, Architecture and package Declarations. Basic Language Elements, Identifier, Data objects, Data Types and Operator Behavioral Modeling process variable Assignment, Signal Assignment and Wait Statements. Assertion Loop, if, case and next Statement Block and concurrent Assertion statements structural specifications of Hardware-inverter, Nand Gate Models, Comparator and Test Bench Modeling.

7 IT 05 STORAGE AND INFORMATION MANAGEMENT

Teaching Hrs.
L-3 T-0 P-0

Exam Hrs. 3 Hrs.
Marks Theory Exam-80 Term Test-20 Total 100

CONTENT OF SYLLABUS

Unit	Topics
I	<p>Introduction to Storage Technology: Data proliferation and the varying value of data with time & usage, Sources of data and states of data creation, Data center requirements and evolution to accommodate storage needs, Overview of basic storage management skills and activities, The five pillars of technology, Overview of storage infrastructure components, Evolution of storage, Information Lifecycle Management concept, Data categorization within an enterprise, Storage and Regulations.</p> <p>Lecture Required:10</p>
II	<p>Storage Systems Architecture: Intelligent disk subsystems overview, Contrast of integrated vs. modular arrays, Component architecture of intelligent disk subsystems, Disk physical structure components, properties, performance, and specifications, Logical partitioning of disks, RAID & parity algorithms, hot sparing, Physical vs. logical disk organization, protection, and back end management, Array caching properties and algorithms, Front end connectivity and queuing properties, Front end to host storage provisioning, mapping, and operation, Interaction of file systems with storage, Storage system connectivity protocols.</p> <p>Lecture Required:8</p>
III	<p>Introduction to Networked Storage: JBOD, DAS, SAN, NAS, & CAS evolution, Direct Attached Storage (DAS) environments: elements, connectivity, & management, Storage Area Networks (SAN): elements & connectivity, Fibre Channel principles, standards, & network management principles, SAN management principles, Network Attached Storage (NAS): elements, connectivity options, connectivity protocols (NFS, CIFS, ftp), & management principles, IP SAN elements, standards (SCSI, FCIP, FCP), connectivity principles, security, and management principles, Content Addressable Storage (CAS): elements, connectivity options, standards, and management principles, Hybrid Storage solutions overview including technologies like virtualization & appliances.</p> <p>Lecture Required:10</p>
IV	<p>Introduction to Information Availability Business Continuity and Disaster Recovery Basics, Local business continuity techniques, Remote business continuity techniques, Disaster Recovery principles & techniques.</p> <p>Lecture Required:6</p>
V	<p>Managing & Monitoring: Management philosophies (holistic vs. system & component), Industry management standards (SNMP, SMI-S, CIM), Standard framework applications, Key management metrics (thresholds, availability, capacity, security, performance), Metric analysis methodologies & trend analysis, Reactive and proactive management best practices, Provisioning & configuration change planning, Problem reporting, prioritization, and handling techniques, Management tools overview.</p> <p>Lecture Required 8</p>

Total Lecture Required : 38

Recommended Books:

7 IT 06.1 ATM N/W

Teaching Hrs.
L-3 T-0 P-0

Exam Hrs. 3 Hrs.

Marks Theory Exam-80 Term Test-20 Total 100

Content of Syllabus

Unit	Topics	
I	Introduction:	An overview of communication networks protocol layering, multiplexing, Precursor Technologies -X.25, Frame Relay and ISDN. Broad Band- ISDN (B-ISDN) -configuration, Interfaces, reference model and services.
II	Transfer Modes	Introduction, Circuit Switching, Routing, Virtual Circuit switching, Comparison of transfer modes, definitions of ATM, Basic principles of ATM
III	ATM Protocol Stack:	ATM reference model, Physical layer- transmission convergence sub layer functions, physical medium dependent sub layer and physical layer standards for ATM. ATM layer-ATM cell header structure. ATM layer functions. ATM adaptation layer- ALL 1 to AAL 5
IV	Traffic Management:	Concept of Traffic and service. Traffic and service characteristics of voice and video data. ATM Traffic descriptors and QOS parameters. Factors affecting QOS parameters and service categories QOS classes. Elements of ATM Traffic management – Traffic contracting. Policing and shaping.
V	Switching in ATM:	Performance measures and Architectural issues in switch design. ATM switching Architecture layer standards for ATM. ATM layer-ATM cell header structure. ATM layer functions. ATM adaptation layer- ALL 1 to AAL 5.

Recommended Books:

1. Sunil Kasera- ATM Networks concepts and protocols, Tata McGraw Hills.
2. Rainer Handel- ATM Networks 2nd Edition, person Education Asia.
3. Stallings –BLSN & ATM with frame Relay Person

Content of Syllabus

Unit	Topics	
I	Introduction:	Parallel Computing, Parallel Computer Model, Program and Network Properties, Parallel Architectural Classification Schemes, Flynn's & Feng's Classification, Performance Metrics and Measures, Speedup Performance Laws: Multiprocessor System and Interconnection Networks; IEEE POSIX Threads: Creating and Exiting Threads, Simultaneous Execution of Threads, Thread Synchronization using Semaphore and Mutex, Canceling the Threads.
II	Pipelining and memory hierarchy:	Basic and Intermediate Concepts, Instruction Set Principle; ILP: Basics, Exploiting ILP, Limits on ILP; Linear and Nonlinear Pipeline Processors; Super Scalar and Super Pipeline Design; Memory Hierarchy Design: Advanced Optimization of Cache Performance, Memory Technology and Optimization, Cache Coherence and Synchronization Mechanisms.
III	Thread and process level parallel architecture:	Introduction to MIMD Architecture, Multithreaded Architectures, Distributed Memory MIMD Architectures, Shared Memory MIMD Architecture, Clustering, Instruction Level Data Parallel Architecture, SIMD Architecture, Fine Grained and Coarse Grained SIMD Architecture, Associative and Neural Architecture, Data Parallel Pipelined and Systolic Architectures, Vector Architectures.
IV	Parallel algorithms:	PRAM Algorithms: Parallel Reduction, Prefix Sums, Preorder Tree Traversal, Merging two Sorted lists; Matrix Multiplication: Row Column Oriented Algorithms, Block Oriented Algorithms; Parallel Quicksort, Hyper Quick sort; Solving Linear Systems: Gaussian Elimination, Jacobi Algorithm; Parallel Algorithm Design Strategies.
V	Storage and security management:	Introduction Security, Identity management, Single sign-on, Access Management, Basics of network security, LDAP fundamentals, Intrusion detection, firewall, security information management. Introduction to Storage, Backup & Restore, Archive & Retrieve, Space Management, SAN & NAS, Disaster Recovery, Hierarchical space management, Database & Application protection, Bare machine recovery, Data retention.

Recommended Books:

- 1 Hawang & Briggs – Computer Architecture & parallel Processing, McGraw Hill.
- 2 Subrata das Advanced Computer Architecture, Vol.I & II.
- 3 Hayes – Advanced Computer Architecture, Tata McGraw Hill.

		Content of Syllabus
Unit	Topics	
I	Infrastructure management overview:	Definitions, Infrastructure management activities, Evolutions of Systems since 1960s (Mainframes-to-Midrange-to-PCs-to-Client-server computing-to-New age systems) and their management, growth of internet, current business demands and IT systems issues, complexity of today's computing environment, Total cost of complexity issues, Value of Systems management for business.
II	Preparing for infrastructure management:	Factors to consider in designing IT organizations and IT infrastructure, Determining customer's Requirements, Identifying System Components to manage, Exist Processes, Data, applications, Tools and their integration, Patterns for IT systems management, Introduction to the design process for information systems, Models, Information Technology Infrastructure Library (ITIL).
III	Service delivery processes:	Service-level management, financial management and costing, IT services continuity management, Capacity management, Availability management.
IV	Service support processes:	Configuration Management, Service desk, Incident management, Problem management, Change management, Release management.
V	Storage and security management:	Introduction Security, Identity management, Single sign-on, Access Management, Basics of network security, LDAP fundamentals, Intrusion detection, firewall, security information management. Introduction to Storage, Backup & Restore, Archive & Retrieve, Space Management, SAN & NAS, Disaster Recovery, Hierarchical space management, Database & Application protection, Bare machine recovery, Data retention.

Laboratories:**7 IT 09. Web Services Lab:**

1. Write a simple SOAP Server using Apache Axis API to implement add method to add two floating number.
2. Write a simple SOAP to consume web services created in assignment no 1.
3. Write a RESTful web service to consume amazon ECS web service.
4. Build a SOAP web service to accept SQL query and executed them on Oracle Database Server.(XML Web Service interface to Oracle Database).
5. Build a RESTful web service to retrieve Friend List from your Yahoo!Mail Account.
6. Build a web service to retrieve weather report from Weather Web Server.

7 IT 10. ELECTRONIC DESIGN AUTOMATION LAB

1. Write a program which reads simple digital circuit (of size up to 10 gates) in blif/ Boolean equation and display schematic in graphics format.
2. Write a program to convert Blif format into Boolean equation.
3. Write a program that estimate area of circuit (specified as Blif or Boolean equation) using library binding technique of simple circuit (up to 10 gates).
4. Write a program to implement state machine up to 5 states.
5. Write a program to count 4-input lookup table in a simple circuit (up to 10 gates specified as Blif or Boolean equation).
6. Write a program to obtain sequencing graph for a given set of arithmetic expression (up to 10 nodes)
7. Write VHDL Codes for all gates with all Modeling.
8. Write VHDL Codes & Test bench for half adder and full adder.

8 IT 01 E commerce

Teaching Hrs.
L-3 T-1 P-0

Exam Hrs. 3 Hrs.
Marks Theory Exam-80 Term Test-20 Total 100

Content of Syllabus

Unit	Topics	
I	Introduction:	Motivation, Forces behind E-Commerce Industry Framework, Brief history of ECommerce, Inter Organizational E-Commerce Intra Organizational E-Commerce, and Consumer to Business Electronic Commerce, Architectural framework, Network Infrastructure for E-Commerce Network Infrastructure for ECommerce, Market forces behind I Way, Component of I way Access Equipment, Global Information Distribution Network, Broad band Telecommunication.
II	Mobile Commerce:	Introduction to Mobile Commerce, Mobile Computing Application, Wireless Application Protocols, WAP Technology, Mobile Information Devices, Web Security, Introduction to Web security, Firewalls & Transaction Security, Client Server Network, Emerging Client Server Security Threats, firewalls & Network Security.
III	Encryption:	World Wide Web & Security, Encryption, Transaction security, Secret Key Encryption, Public Key Encryption, Virtual Private Network (VPM), Implementation Management Issues.
IV	Electronic Payments:	Overview of Electronics payments, Digital Token based Electronics payment System, Smart Cards, Credit Card I Debit Card based EPS, Emerging financial Instruments, Home Banking, Online Banking.
V	Net Commerce:	EDA, EDI Application in Business, Legal requirement in E - Commerce, Introduction to supply Chain Management, CRM, issues in Customer Relationship Management.

8IT02 REAL TIME SYSTEMS

Teaching Hrs.
L-3 T-1 P-0

Exam Hrs. 3 Hrs.
Marks Theory Exam-80 Term Test-20 Total 100

CONTENT OF SYLLABUS

Unit	Topics	
I	Introduction :	Definition, Typical Real Time Applications: Digital Control, High Level Controls, Signal Processing etc., Release Times, Deadlines, and Timing Constraints, Hard Real Time Systems and Soft Real Time Systems, Reference Models for Real Time Systems: Processors and Resources, Temporal Parameters of Real Time Workload, Periodic Task Model, Precedence Constraints and Data Dependency. Lecture Required 8
II	Real Time Scheduling :	Common Approaches to Real Time Scheduling: Clock Driven Approach, Weighted Round Robin Approach, Priority Driven Approach, Dynamic Versus Static Systems, Optimality of Effective-Deadline-First (EDF) and Least-Slack-Time-First (LST) Algorithms, Offline Versus Online Scheduling, Scheduling Aperiodic and Sporadic jobs in Priority Driven and Clock Driven Systems. Lecture Required 6
III	Resources Access Control :	Effect of Resource Contention and Resource Access Control (RAC), Non-pre-emptive Critical Sections, Basic Priority-Inheritance and Priority-Ceiling Protocols, Stack Based Priority-Ceiling Protocol, Use of Priority-Ceiling Protocol in Dynamic Priority Systems, Preemption Ceiling Protocol, Access Control in Multiple-Unit Resources, Controlling Concurrent Accesses to Data Objects. Lecture Required 8
IV	Multiprocessor System Environment :	Multiprocessor and Distributed System Model, Multiprocessor Priority-Ceiling Protocol, Schedulability of Fixed-Priority End-to-End Periodic Tasks, Scheduling Algorithms for End-to-End Periodic Tasks, End-to-End Tasks in Heterogeneous Systems, Predictability and Validation of Dynamic Multiprocessor Systems, Scheduling of Tasks with Temporal Distance Constraints. Lecture Required 8
V	Real Time Communication:	Model of Real Time Communication, Priority-Based Service and Weighted Round- Robin Service Disciplines for Switched Networks, Medium Access Control Protocols for Broadcast Networks, Internet and Resource Reservation Protocols, Real Time Protocols, Communication in Multicomputer System, An Overview of Real Time Operating Systems. Lecture Required 8

Total Lecture Required : 38

Recommended Books:

1. W. S. Liu – Real – Time systems, Pearson Education Asia.
2. Raymond A. buhr – Introduction to Real – Time Systems, Pearson Education Asia.
3. Alan Burns – Real – Time and Programming Languages, Pearson Education

CONTENT OF SYLLABUS

Unit	Topics
I	<p>Overview :</p> <p>Motivation(for Data Mining),Data Mining-Definition & Functionalities, Data Processing, Form of Data Preprocessing, Data Cleaning: Missing Values, Noisy Data,(Binning, Clustering, Regression, Computer and Human inspection), Inconsistent Data, Data Integration and Transformation. Data Reduction:-Data Cube Aggregation, Dimensionality reduction, Data Compression, Numerosity Reduction, Clustering, Discretization and Concept hierarchy generation.</p> <p style="text-align: right;">Lecture Required: 6</p>
II	<p>Concept Description:</p> <p>Definition, Data Generalization, Analytical Characterization, Analysis of attribute relevance, Mining Class comparisons, Statistical measures in large Databases. Measuring Central Tendency, Measuring Dispersion of Data, Graph Displays of Basic Statistical class Description, Mining Association Rules in Large Databases, Association rule mining, mining Single-Dimensional Boolean Association rules from Transactional Databases– Apriori Algorithm, Mining Multilevel Association rules from Transaction Databases and Mining Multi-Dimensional Association rules from Relational Databases.</p> <p style="text-align: right;">Lecture Required: 7</p>
III	<p>Classification & Prediction:</p> <p>What is Classification & Prediction, Issues regarding Classification and prediction, Decision tree, Bayesian Classification, Classification by Back propagation, Multilayer feed-forward Neural Network, Back propagation Algorithm, Classification methods Knearest neighbor classifiers, Genetic Algorithm.Cluster Analysis: Data types in cluster analysis, Categories of clustering methods, Partitioning methods. Hierarchical Clustering- CURE and Chameleon. Density Based Methods-DBSCAN, OPTICS. Grid Based Methods- STING, CLIQUE. Model Based Method –Statistical Approach, Neural Network approach, Outlier Analysis</p> <p style="text-align: right;">Lecture Required: 8</p>
IV	<p>Data Warehousing</p> <p>Overview, Definition, Delivery Process, Difference between Database System and Data Warehouse, Multi Dimensional Data Model, Data Cubes, Stars, Snow Flakes, Fact Constellations, Concept hierarchy, Process Architecture, 3 Tier Architecture, Data Marting.</p> <p style="text-align: right;">Lecture Required: 7</p>
V	<p>Real Time Communication:</p> <p>Aggregation, Historical information, Query Facility, OLAP function and Tools. OLAP Servers, ROLAP, MOLAP, HOLAP, Data Mining interface, Security, Backup and Recovery, Tuning Data Warehouse, Testing Data Warehouse.</p> <p style="text-align: right;">Lecture Required: 7</p>

Total Lecture Required: 35**Recommended Book:**

- 1 Rob Mattison – Web Warehousing and Knowledge Management, Tata Mc Graw Hill.
- 2 Shelley Powers – Dynamic Web Publishing, Techmedia.

CONTENT OF SYLLABUS

Unit	Topics	
I	Characterization of distributed systems:	Introduction, Examples of distributed Systems, Resource sharing and the Web Challenges. System Models: Architectural models, Fundamental Models Theoretical Foundation for Distributed System: Limitation of Distributed system, absence of global clock, shared memory, Logical clocks, Lamport's & vectors logical clocks, Causal ordering of messages, global state, termination detection. Distributed Mutual Exclusion: Classification of distributed mutual exclusion, requirement of mutual exclusion theorem, Token based and non token based algorithms, performance metric for distributed mutual Exclusion algorithms. Lecture Required:8
II	Distributed deadlock detection	System model, resource Vs communication deadlocks, deadlock prevention, avoidance, detection & resolution, centralized dead lock detection, distributed dead lock detection, path pushing algorithms, edge chasing algorithms. Agreement Protocols: Introduction, System models, classification of Agreement Problem, Byzantine agreement problem, Consensus problem, Interactive consistency Problem, Solution to Byzantine Agreement problem, Application of Agreement problem, Atomic Commit in Distributed Database system. Lecture Required:8
III	Distributed objects and remote invocation, security, distributed file systems:	Communication between distributed objects, Remote procedure call, Events and notifications, Java RMI case study. Overview of security techniques, Cryptographic algorithms, Digital signatures Cryptography pragmatics, Case studies: Needham Schroeder, Kerberos, SSL & Millicent. File service architecture, Sun Network File System, The Andrew File System, Recent advances. Lecture Required:10
IV	Transactions and concurrency control, distributed transactions,	Transactions, Nested transactions, Locks, Optimistic Concurrency control, Timestamp ordering, Comparison of methods for concurrency control. Flat and nested distributed transactions, Atomic Commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery. Replication: System model and group communication, Fault - tolerant services, highly available services, Transactions with replicated data. Lecture Required:8
V	Distributed Algorithms	Introduction to communication protocols, Balanced sliding window protocol, Routing algorithms, Destination based routing, APP problem, Deadlock free Packet switching, Introduction to Wave & traversal algorithms, Election algorithm. CORBA CASE STUDY: CORBA RMI, CORBA services. Lecture Required:8

Total Lecture Required : 42**Recommended Books:**

- 1 George Coulouris – Distributed Systems Concepts and Design, 3rd ed, Pearson Education Asia.
- 2 A.S. Tanenbaum – Distributed Systems Principles and Paradigms, Prentice Hall of India.
- 3 Darrel Inca – Developing Distributed and E – Commerce Applications, Addison Wesley

8IT 04.2 ARTIFICIAL INTELLIGENCE

Teaching Hrs.
L-3 T-1 P-0

Exam Hrs. 3 Hrs.
Marks Theory Exam-80 Term Test-20 Total 100

CONTENT OF SYLLABUS

Unit	Topics	
I	Introduction of AI	Meaning and definition of artificial intelligence, Various types of production systems, Characteristics of production systems, Study and comparison of breadth first search and depth first search. Techniques, other Search Techniques like hill Climbing, Best first Search. A* algorithm, AO* algorithms etc, and various types of control strategies Lecture Required:
II	Knowledge Representation	Knowledge Representation, Problems in representing knowledge, knowledge representation using propositional and predicate logic, comparison of propositional and predicate logic, Resolution, refutation, deduction, theorem proving, inferencing, monotonic and nonmonotonic reasoning. Lecture Required:
III	Probabilistic reasoning	Probabilistic reasoning, Baye's theorem, semantic networks scripts schemas, frames, conceptual dependency and fuzzy logic, forward and backward reasoning. Lecture Required:
IV	Game playing techniques	Game playing techniques like minimax procedure, alpha-beta cut-offs etc, planning, Study of the block world problem in robotics, Introduction to understanding and natural languages processing. Lecture Required:
V	Expert Systems	Introduction to learning, Various techniques used in learning, introduction to neural networks, applications of neural networks, common sense, reasoning, some example of expert systems. Lecture Required: Total Lecture Required:

Total Lecture Required :

Recommended Books:

1. E. Rich, K. Knight- Artificial Intelligence, TMM.
2. S. russel, P. Norving – Artificial Intelligence – A Modern Approach, Pearson Education Asia.
3. Thomas Eean, Artificial Intelligence – Theory & Practice, Pearson Education Asia.
4. Alison Caursev – The Essence of Artificial Intelligence, Pearson Education Asia.

CONTENT OF SYLLABUS

Unit	Topics	
I	Introduction: Molecular biology and bioinformatics	Bioinformatics objectives and overviews, Interdisciplinary nature of Bioinformatics, Data integration, Data analysis, Major Bioinformatics databases and tools. Metadata: Summary & reference systems, finding new type of data online. Systems approach in biology, Central dogma of molecular biology, problems in molecular approach and the bioinformatics approach, Overview of the bioinformatics applications.
II	The information molecules and information flow:	Basic chemistry of nucleic acids, Structure of DNA, Structure of RNA, DNA Replication, -Transcription, - Translation, Genes- the functional elements in DNA, Analyzing DNA, DNA sequencing. Proteins: Amino acids, Protein structure, Secondary, Tertiary and Quaternary structure, Protein folding and function, Nucleic acid-Protein interaction.
III	Perl:	Perl Basics, Perl applications for bioinformatics- Bioperl, Linux Operating System, Understanding and Using Biological Databases, Java clients, CORBA, Introduction to biostatistics.
IV	Nucleotide sequence data:	Genome, Genomic sequencing, expressed sequence tags, gene expression, transcription factor binding sites and single nucleotide polymorphism. Computational representations of molecular biological data storage techniques: databases (flat, relational and object oriented), and controlled vocabularies, general data retrieval techniques: indices, Boolean search, fuzzy search and neighboring, application to biological data warehouses.
V	Biological data types and their special requirements:	sequences, macromolecular structures, chemical compounds, generic variability and its connection to clinical data. Representation of patterns and relationships: alignments, regular expressions, hierarchies and graphical models.

8IT 04.4 Information & System Securities

Teaching Hrs.
L-3 T-1 P-0

Exam Hrs. 3 Hrs.
Marks Theory Exam-80 Term Test-20 Total 100

Unit

CONTENT OF SYLLABUS

- I** Introduction to security attacks, services and mechanism, introduction to cryptography, Conventional Encryption: Conventional encryption mode, classical encryption techniques-substitution ciphers and transposition ciphers cryptanalysis, stenography, stream and block cipher. Modern Block Cipher: Block ciphers principals, Shannon's theory of confusion and diffusion, fiestal structure, data encryption standard (DES), strength of DES differential and linear crypt analysisit of DES, block cipher modes of operations, triple DES, IDEA encryption and decryption strength of IDEA confidentiality using conventional encryption, traffic confidentially, key distribution random number generation.
- II** Introduction to graph ring and field, prime and relative prime numbers modular arithmetic Fermat's and Euler theorem, primality testing, Eculid's Algorithm Chinese Remainder theorem discrete logarithms Principals of public key crypto system RSA algorithm security of RSA key management Diffle Hellman key exchange algorithm introductory idea of Elliptic curve cryptography Elganel encryption.
- III** Message Authentication and Hand function: Authentication requirements, authentication functions message authentication code, hash functions birthday attacks, security of hash functions and MACS, MD5 message digest algorithm. Secure has algorithm (SHA).Digital Signatures: Digital Signatures authentication protocols digital signature standards (DSS) proof of Digital signature algorithm.
- IV** Authentication Application: Kerberos and X.509, directory authentication service, electronic mail security-preety good privacy (PGP), S/MIME
- V** IT Security: Architecture Authentication header, Encapsulating security payloads, combining security associations, key management. Web Security: Secure socket layer and transport layer security, Secure Electronic Transaction (SET) System Security Intruders, Viruses and related threads, firewall design principal trusted systems.

Laboratories:

8 IT 07 INDUSTRIAL ECONOMICS AND MANAGEMENT LAB

Industrial Economics:

1. Introduction: Nature and significance of Economics. Meaning of Science, Engineering and Technology and their relationship with economic development.

2. Basic Concept: The concept of demand and supply. Elasticity of Demand and Supply. Indifference Curve Analysis, Price Effect, Income Effect and Substitution Effect.

3. Money and Banking: Functions of Money, Value of Money, Inflation and measures to control it. Brief idea of functions of banking system, viz., Commercial and central banking, Business fluctuations.

Management:

4. Introduction: Definition, Nature and Significance of Management,. Evaluation of Management thought, Contributions of Max Weber, Taylor and Fayol.

5. Human Behavior: Factors of Individual Behavior, Perception, Learning and Personality Development, Interpersonal Relationship and Group Behavior.

8 IT 08 WEB PROGRAMMING LAB

1. Create web pages to understand the various server controls.

2. Create web pages to understand and use to validate user inputs.

3. Create web pages to learn how to navigate between web pages and servers.

4. Programming to learn data binding.

5. Create login form and validate it username/password stored in database.

6. Create student record and perform following operations:

Add record, delete, and edit, search record, navigation between records.

7. A web application display product names and price in tabular formats. Each row containing product detail should display Know More button. When the button is clicked the description for the selected item should be displayed.

8 IT09. DATA MINING AND WAREHOUSING LAB

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

1. Gain insight for running pre- defined decision trees and explore results using MS OLAP Analytics.

2. Using IBM OLAP Miner – Understand the use of data mining for evaluating the content of multidimensional cubes.

3. Using Teradata Warehouse Miner – Create mining models that are executed in SQL.

(Portal work : The objective of this lab exercises is to integrate pre-built reports into a portal application)

4. Publish and analyze a business intelligence portal.

Metadata & ETL Lab: The objective of this lab exercises is to implement metadata import agents to pull metadata from leading business intelligence tools and populate a metadata repository. To understand ETL processes

5. Import metadata from specific business intelligence tools and populate a meta data repository.

6. Publish metadata stored in the repository.

7. Load data from heterogeneous sources including text files into a pre-defined warehouse schema.

Case study

1. Design a data mart from scratch to store the credit history of customers of a bank. Use this credit profiling to process future loan applications.

2. Design and build a Data Warehouse using bottom up approach titled 'Citizen Information System'.