

S Y L L A B U S

BACHELOR OF TECHNOLOGY

COMPUTER SCIENCE & ENGINEERING
(Semester Scheme)

Four Year Degree Course

B.Tech., Second Year Examination, 2010 - 2011

B.Tech., Third Year Examination, 2011 - 2012

B.Tech., Fourth Year Examination, 2012 - 2013



JODHPUR NATIONAL UNIVERSITY
JODHPUR

Jodhpur National University, Jodhpur
Teaching & Examination Scheme
B.Tech II Year (Computer Science)

III SEMESTER

S. No	Code No.	Subject	L	T	Theory			Ex. Hrs
					Internal	End Term	Total	
1.	3CS1	Digital Electronics	3	-	20	80	100	3
2.	3CS2	Electronic Devices & Circuits	3	1	20	80	100	3
3.	3CS3	Data Structure and Algorithms	3	-	20	80	100	3
4.	3CS4	Discrete Mathematical Structures	3	1	20	80	100	3
5.	3CS5	Mathematics III	3	1	20	80	100	3
6.	3CS6.1 3CS6.2 3CS6.3	Internet Technologies Line Communication E-Commerce	3	-	20	80	100	3
7	GE307 A*	Special Mathematics I**	3	1	20*	80*	100*	3
TOTAL			21	3	120	480	600	21

S. No	Code No.	Subject	P	Practical & Sessional		
				Sessional	Practical	Total
1.	3CS7	Digital Electronics Lab	2	60	40	100
2.	3CS8	Electronics Lab	3	60	40	100
3.	3CS9	Data Structure Lab	3	60	40	100
4.	3CS10	Humanities and Social Science	2	50	50	100
5.	3CSD	Co-Curricular Activities		-	-	
TOTAL			10	230	170	400

Jodhpur National University, Jodhpur

Teaching & Examination Scheme

B.Tech II Year (Computer Science)

IV SEMESTER

S. No	Code No.	Subject	L	T	MM			Ex. Hrs
					Internal	End Term	Total	
1.	4CS1	Principles of Programming Languages	3	-	20	80	100	3
2.	4CS2	Microprocessor and Interfaces	3	-	20	80	100	3
3.	4CS3	Object Oriented Programming	3	1	20	80	100	3
4.	4CS4	Computer Architecture	3	-	20	80	100	3
5.	4CS5	Statistics and Probability Theory	3	1	20	80	100	3
6.	4CS6.1 4CS6.2 4CS6.3	Management Information Systems Intellectual Property Rights Open Source Technology	3	-	20	80	100	3
7	GE407 A*	Special Mathematics II**	3	1	20*	80*	100*	3
TOTAL			21	3	120	480	600	21

S. No	Code No.	Subject	P	MM		
				Sessional	Practical	Total
1.	4CS7	Web Programming Lab	2	60	40	100
2.	4CS8	Microprocessor Lab	3	60	40	100
3.	4CS9	Object Oriented Programming Lab	3	60	40	100
4.	4CS10	Computer Architecture Lab	3	60	40	100
5.	4CSD	Co-Curricular Activities	-	-	-	-
TOTAL			11	240	160	400

**** Sessional Exam: marks shall not be counted for awarding division.**

Jodhpur National University

(Faculty of Engineering & Technology)

School of Computer Science

III Year, V Semester Teaching & Examination scheme

V SEMESTER

S. No	Code No.	Subject	L	T	MM			Ex. Hrs
					Internal	End Term	Total	
1.	5CS1	Software Engineering	3	-	20	80	100	3
2.	5CS2	System Software Engg.	3	-	20	80	100	3
3.	5CS3	Database Management Systems	3	-	20	80	100	3
4.	5CS4	Computer Graphics	3	1	20	80	100	3
5.	5CS5	Telecommunication Fundamentals	3	1	20	80	100	3
6.	5CS6.1 5CS6.2 5CS6.3	Logic & Functional Programming Information Theory and Coding Advanced Data Structure	3	-	20	80	100	3
TOTAL			18	2	120	480	600	18

S. No	Code No.	Subject	P	MM		
				Sessional	Practical	Total
1.	5CS7	Software Engineering Lab (Core JAVA)	3	60	40	100
2.	5CS8	System Software Lab	3	60	40	100
3.	5CS9	Database Management Lab	3	60	40	100
4.	5CS10	Computer Graphics Lab	3	60	40	100
5.	5CSD	Co-Curricular Activities	-	-	-	-
TOTAL			12	240	160	400

Jodhpur National University

(Faculty of Engineering & Technology)

School of Computer Science

III Year, VI Semester Teaching & Examination scheme

VI SEMESTER

S. No	Code No.	Subject	L	T	MM			Ex. Hrs
					Internal	End Term	Total	
1.	6CS1	Operating Systems	3	-	20	80	100	3
2.	6CS2	Computer Networks	3	-	20	80	100	3
3.	6CS3	Design & Analysis of Algorithms	3	1	20	80	100	3
4.	6CS4	Embedded Systems	3	-	20	80	100	3
5.	6CS5	Theory Of Computation	3	1	20	80	100	3
6.	6CS6.1 6CS6.2 6CS6.3	Digital Signal Processing Multimedia Systems Microwave and Satellite Communication	3	1	20	80	100	3
TOTAL			18	3	120	480	600	18

S. No	Code No.	Subject	P	MM		
				Sessional	Practical	Total
1.	6CS7	Shell Programming Lab	2	60	40	100
2.	6CS8	Network lab	2	60	40	100
3.	6CS9	Advanced Prog. Lab (Advanced JAVA)	3	60	40	100
4.	6CS10	Microcontroller lab	3	60	40	100
5.	6CSD	Co-Curricular Activities	-	-	-	-
TOTAL			10	240	160	400

Jodhpur National University

(Faculty of Engineering & Technology)

School of Computer Science

IV Year, VII Semester Teaching & Examination scheme

VII SEMESTER

S. No	Code No.	Subject	L	T	MM			Ex. Hrs
					Internal	End Term	Total	
1.	7CS1	Compiler Construction	3	-	20	80	100	3
2.	7CS2	Data Mining And Ware Housing	3	1	20	80	100	3
3.	7CS3	Advanced Logic System	3	-	20	80	100	3
4.	7CS4	Artificial Intelligence	3	-	20	80	100	3
5.	7CS5	Advanced Software Engineering	3	1	20	80	100	3
6.	7CS6.1 7CS6.2 7CS6.3	Service Oriented Architectures Soft Computing Real Time Systems	3	-	20	80	100	3
TOTAL			18	2	120	480	600	18

S. No	Code No.	Subject	P	MM		
				Sessional	Practical	Total
1.	7CS7	Compiler Design Lab	3	60	40	100
2.	7CS8	Data Mining And Ware Housing Lab	3	60	40	100
3.	7CS9	Advanced Logic System lab	2	30	20	50
4.	7CS10	Project Stage I	2	30	20	50
5.	7CS11	Practical Training Seminar	2	60	40	100
6.	7CSD	Co-Curricular Activities	-	-	-	-
TOTAL			12	240	160	400

Jodhpur National University

(Faculty of Engineering & Technology)

School of Computer Science

IV Year, VIII Semester Teaching & Examination scheme

VIII SEMESTER

S. No	Code No.	Subject	L	T	MM			Ex. Hrs
					Internal	End Term	Total	
1.	8CS1	Information System and Securities	3	1	20	80	100	3
2.	8CS2	CAD FOR VLSI Design	3	1	20	80	100	3
3.	8CS3	Advanced computer Architectures	3	1	20	80	100	3
4.	8CS4.1 8CS4.2 8CS4.3	Distributed Systems Image Processing Natural Language Processing	3	1	20	80	100	3
TOTAL			12	4	80	320	400	12

S. No	Code No.	Subject	P	MM		
				Sessional	Practical	Total
1.	8CS5	Information System and Securities Lab	3	60	40	100
2.	8CS6	VLSI Design Lab	3	60	40	100
3.	8CS7	X-Windows Programming Lab	3	60	40	100
4.	8CS8	Project Stage II	2	120	80	200
5.	8CS9	Seminar Presentation	2	60	40	100
6.	8CSD	Co-Curricular Activities	-	-	-	-
TOTAL			13	360	240	600

JODHPUR NATIONAL UNIVERSITY, JODHPUR

Proposed Syllabus for B.Tech Computer Science & Engineering

3rd Semester

DIGITAL ELECTRONICS (3CS 1)

Teaching Hrs.

Exam Hrs. - 3

L3- T-0 P-0

Marks Theory Exam- 80 Term Test-20 TOTAL-100

Units	Topics	CONTENTS OF SYLLABUS
I	Number systems	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. Lectures Req :6
II	Standard forms of Boolean functions	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. Lectures Req :9
III	Combinational circ	Combinational circuits – Adder, subtractor, encoder, decoder, multiplexer. Design of Combinational circuit using Multiplexers. Lectures Req :6
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. Lectures Req :9
V	Switching Devices	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. Lectures Req :6

Total Lectures Req: 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

ELECTRONIC DEVICES & CIRCUITS (3CS2)

Teaching Hrs.
L-3 T-1 P-

Exam Hrs.- 3

Marks Theory Exam- 80 Term Test-20 TOTAL-100

Units	Topics	CONTENTS OF SYLLABUS
I	Diode circuits	Diode as a circuit. Element, load line concept, clipping & clamping circuits, voltages multipliers. Lectures Req :6
II	Devices	Devices: construction, characteristics and working principles of the following devices. Diodes, BJT, JFET, MOSFET, UJT, photo diodes, LEDs, photo transistors. Solar cells. Thermistor, LDR. Lectures Req :9
III	Transistors	Transistors: transistor characteristics, current components, current gains. Alpha and beta. Operating point. High bridge 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. Lectures Req :6
IV	Small signal amplifiers	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. Lectures Req :9
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. Lectures Req :6

Total Lectures Req :36

Recommended Books:

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

DATA STRUCTURE AND ALGORITHMS (3CS3)

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

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

Units	Topics	CONTENTS OF SYLLABUS
I	Data structure & Linked List	Data Structure: 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. Linked Lists : Implementation, Doubly linked list, Circular linked list, , skip-lists, Application (Sparse Matrix, Associative Array, Functional Programming) Lectures Req : 10
II	Stacks & Queues	Stacks : Definition, Implementation, Application (Tower of Hanoi, Function Call and return, Parentheses Matching, Expression Evaluation) Queues : Definition, deque, enqueue, priority queue, bounded queue, Implementation, Application Lectures Req : 10
III	Tree	Tree: Definition of elements, Binary trees: Types (Full, Complete, Almost complete), Binary Search Tree, Traversal (Pre, In, Post & Level order), Application: Arithmetic Expressions Evaluation Variations: Indexed Binary Tree, Threaded Binary Tree, AVL tree, Multi-way trees, B tree, B+ tree Lectures Req : 8
IV	Graphs	Graphs: Elementary definition, Representation (Adjacency Matrix, Adjacency Lists) Traversal (BFS, DFS). Application: Spanning Tree (Prim and Kruskal Algorithm), Dijkstra's algorithm, and Shortest path algorithms Lectures Req :6
V	Sorting & Searching	Sorting: Bubble, Selection, Insertion, Quick, Radix, Merge, Bucket and Heap sorts. Searching: Hashing, Binary Search, Simple String Searching Lectures Req : 6

Total Lectures Req :40

Reference Books:

1. Schaum Series : Data Structure Through 'C', TMH
2. Trembly & Sorenson : An Introduction to Data Structures, Mc-Graw Hill International

DISCRETE MATHEMATICAL STRUCTURES (3CS4)

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

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

Units	Topics	CONTENTS OF SYLLABUS
I	Formal Logic	Formal Logic: Statement, Symbolic Representation and Tautologies, Quantifiers, Predicate and validity, Normal form. Propositional Logic, Predicate Logic, Logic Programming and Proof of correctness. <p style="text-align: right;">Lectures Req :6</p>
II	Mathematical Induction & proof	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. <p style="text-align: right;">Lectures Req :9</p>
III	Graph Theory	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. Tree : Introduction, Spanning tree, Planner & non-Planner dual graph <p style="text-align: right;">Lectures Req :9</p>
IV	Sets,Relation & functions	Sets and Functions: Sets, relations, functions, operations, equivalence relations, relation of partial order, partitions, binary relations , Poset, Lattice, Hasse Diagram <p style="text-align: right;">Lectures Req :9</p>
V	Monoids & Groups	Monoids and Groups: Groups, Semigroups and Monoids cyclic semi groups 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. <p style="text-align: right;">Lectures Req :9</p>

Total Lectures Req :42

Reference Books:

1. Kolman b. Busby : DMS for Computer Science
2. Narsingh Deo : Graph Theory, PHI

MATHEMATICS III (3 CS 5)

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

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

Units	Topics	CONTENTS OF SYLLABUS
I	Introduction	Engineering application of optimization, Statement and classification of optimization problem, single variable and multivariable optimization with and without constraints. Lectures Req :6
II	Linear Programming	Formulation of Linear Programming problem, Graphical Approach, General Linear Programming problem, Simple Method. Duality in Linear Programming and Transportation Problems. Lectures Req :9
III	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 Lectures Req :9
IV	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 transforms and solution of particular differential equation with constant coefficient. Lectures Req :9
V	Numerical Methods	Solution of Algebraic and transcendental equations, interpolation- finite differences, inverse interpolation, numerical differentiation and integration, numerical solution of differential equations and partial differential equations, solution of difference equation. Lectures Req :9

Total Lectures Req: 42

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

INTERNET TECHNOLOGY (3CS6.1)

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

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

Units	Topics	CONTENTS OF SYLLABUS
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, Current trends Lectures Req : 7
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 . Lectures Req : 5
III	E-MAIL TECHNOLOGY	Features and Concepts- Message headers, Address book, Attachment, Filtering and forwarding mails, Blogging & newer technologies. Lectures Req : 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 and multi-point conferencing, Recent Developments Lectures Req : 8
V	WEB TECHNOLOGY	Elements of the Web- Clients and servers, Languages and protocols Web page and Web sites, special kinds of Web sites, Web Resources- Search Engines, Message boards, clubs, News groups and chat, Web page creation concepts- planning, Navigation, Themes and Publishing , Analyzing web traffic- Log file data, analyzing log files and products for analyzing web traffic. Lectures Req : 12

Total Lectures Req :38

Reference Books:

1. M.L.Young : The Complete Reference to Internet, TMH
2. Ajeet Singh Poonia: Internet Technology

LINE COMMUNICATION (3 CS 6.2)

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

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

Units	Topics	CONTENTS OF SYLLABUS
I	Transmission Lines	Types of transmission lines. General transmission line equation, line constant. Equivalent circuits, infinite line. Reflection on a line. SWR of line with different type of terminations. Distortion less and dissipation less lines, coaxial cables, transmission lines at audio and radio frequencies, Losses in transmission line, Transmission equalizers. Characteristics of quarter wave, half wave and other lengths. Smith chart and its application. Transmission line applications. Stub matching. Measurement of parameters of transmission line, Measurement of attenuation, insertion loss, reflection coefficient and standing wave ratio. Lectures Req :6
II	Attenuators & Filters	Elements of telephone transmission networks, symmetrical and Asymmetrical two port networks. Different Attenuators, pi-section, T-section filter, m-derived filter sections, Lattices filter section. Lectures Req :9
III	Carrier Telephony	Multi-channel systems; Frequency division and time division multiplexing, power time carrier communication. Lectures Req :6
IV	Telephone Transmission	Telephone Instrument; Rotary dial and Touch tone dial types, two wire/four wire transmission: Echo & singing, Echo suppressors and cancellers. Cross talk. Lectures Req :9
V	Basic Of Automatic Telephony	Trunking concepts. Grade of service, Traffic definition, Introduction to switching networks, classification of switching systems. Electronic Exchange, EPABX and SPC Exchange, principle of STD, ISD. Recent Trends in Telecommunication: Voice frequency telegraphy, Facsimile and telex services. Lectures Req :6

Total Lectures Req: 36

E-COMMERCE (3CS 6.3)

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

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

Units	Topics	CONTENT OF SYLLABUS
I	Business Strategy in an Electronic Age :	Value Chain-supply chains, Porter's value chain, model and Inter- Organizational value chains. Competitive Advantage-Competitive strategy, Porter's Model, First Mover advantage and competitive advantage using e-commerce Business strategy Introduction to Business Strategy, Strategic Implications of IT technology e-commerce Implementation and evaluation. <p style="text-align: right;">Lectures Req : 8</p>
II	Business to Business Electronic Commerce :	Business to Business Electronic Commerce: Inter-organizational Transactions, The credit Transaction Trade cycle.A variety of transactions, Electronic markets-markets and electronic markets, usage of electronic markets,Advantages and disadvantages of electronic markets. <p style="text-align: right;">Lectures Req : 6</p>
III	Electronic Data Interchange (EDI)	Definition and benefits of EDI. EDI technology, standards, communications,implementation, agreements and securities. EDI trading patterns and transactions. <p style="text-align: right;">Lectures Req : 6</p>
IV	Building an E-Commerce Site :	Introduction to object behavior, components, active scripting. Object models,Infrastructure objects, service object and data objects, choosing the objects. Building a scalable application, Addition the configure method, connecting to the database, Accessing and versioning the database. Building the catalog object with example. Creating shopping basket-Holding state, creating the tables for a shopping basket, modifying the object model and making the basket accessible <p style="text-align: right;">Lectures Req : 8</p>
V	J2EE Architecture Overview:	J2EE Architecture Overview: Enterprise components, Information technology in the enterprises, introduction to enterprise objects and enterprise component model. The J2EE model features, J2EE components-container architecture. Enterprises Java and J2EE architecture. <p style="text-align: right;">Lectures Req : 6</p>

Total Lectures Req : 34

Reference Books:

1. David Whiteley : E – Commerce Strategy, TMH
2. Kalakota : Frontiers of Electronic Commerce, Pearson Education

GE 307* Special Mathematics I**

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

Teaching Hrs.
3L + 1T

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.**

3CS7. DIGITAL ELECTRONICS LAB

1. Experimental study of characteristics of CMOS integrated circuits.
2. Interfacing of CMOS to TTL and CMOS.
3. Study of various combinatorial circuits based on: AND/NAND Logic blocks and OR/NOR Logic blocks.
4. Study of following combinatorial circuits: Multiplexer; Demultiplexer and Encoder. Verify truth tables of various logic functions.
5. To study various waveforms at different points of transistor bistable multivibrator and its frequency variation with different parameters.
6. To study transistor astable multivibrator.
7. To design a frequency driver using IC-555/timer.
8. To study Schmitt trigger circuit.
9. To study OP-AMP as Current to voltage and voltage to current converter comparator.
10. BCD to binary conversion on digital/IC trainer.
11. Study various Flip flops and construct Parallel-in-Serial-out register. Testing of digital IC by automatic digital IC trainer.

3CS8. ELECTRONICS LAB

1. Study the following devices:
 - (a) Analog & digital multimeters
 - (b) Function/Signal generators
 - (c) Regulated D.C. power supplies (constant, voltage and constant current operations).
2. Study of analog CRO measurement of time period, amplitude, frequency and phase angle using Lissajous figures.
3. Application of diode as clipper and clamper.
4. Plot V-I characteristic of zener diode & study zener diode as voltage, reverse Saturation current and static & dynamic resistances.
5. Plot V-I characteristic of zener diode & study zener diode as voltage regulator. Observe the effect of load changes and determine load limits of the voltage regulator.
6. Plot frequency response curve for audio amplifier and to determine gain bandwidth product.
7. Plot drain current-drain voltage and drain current-gate bias characteristics of field effect transistor and measurement of I_D & V_{GS} .
8. Plot gain: frequency characteristic of two stages RC coupled amplifier and calculate its bandwidth and compare it with theoretical value.
9. Plot gain: frequency characteristic of two stages RC coupled amplifier and calculate its bandwidth and compare it with theoretical value.
10. Plot input and output characteristics of BJT in CB, CC and CE configurations. Find their h-parameters.
11. Study half wave rectifier and effect of filter network on D.C. voltage output and ripple factor.
12. Study bridge rectifier and measure the effect of filter network on D.C. voltage output and ripple factor.

3CS9. DATA STRUCTURE LAB

1. Program on array searching, sorting (Bubble sort, Quick sort, Merge sort etc.)
2. Program to insert element at desire 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).

3CS10. Humanities and Social Science

1. INDIA: Brief History of Indian Constitution, features, fundamental rights, duties, Directive Principles of state Policy
History of Indian National Movement, Socio economic growth after independence,

2.SOCIETY: Social Groups- concepts and types, Socialization- concept and theory, Social Control; Concept, Social problems in contemporary India Concept and types.

3.THE FUNDAMENTALS OF ECONOMICS : Meaning definition and importance of economics, Central Economic Problems, Positive & Normative approaches, Economic systems, Socialism and Capitalism,

4.MICRO ECONOMICS: Consumer behavior, Law of demand and supply, Utility approach, Indifference curves. Elasticity of Demand & Supply and applications, Consumer surplus. Theory of production, production function, factors of production.

5.MACRO ECONOMICS: Concept relating to national product National income and its measurement, Simple Keynesian theory, Simple Multiplier, Money and banking- Meaning, Concept of International Trade, Determination of Exchange Rate, Balance of Payments Characteristics of Indian Economy.

4th Semester

PRINCIPLES OF PROGRAMMING LANGUAGE (4CS 1)

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

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

Units	Topics	CONTENTS OF SYLLABUS
I	PROGRAMMING LANGUAGES :INTRODUCTION	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.. Lectures Req : 9
II	DATA TYPES	Specification and Implementation of Elementary and Structured Data Types. Type equivalence, checking and conversion. Array, List, Structure, Union. Lectures Req : 7
III	SEQUENCE CONTROL	Sequence control with Expressions, Conditional Statements, Loops, Exception handling. Subprogram definition and activation, simple and recursive subprogram, subprogram environment. Parameter passing mechanism. Lectures Req : 6
IV	ABSTRACT DATA TYPES	Abstract Data type & Memory management, information hiding, encapsulation, type definition. Static and Stack-Based Storage management. Fixed and Variable size heap storage management. Garbage Collection Lectures Req : 7
V	PARALLEL PROGRAMMING	Parallel Programming: Introduction, parallel processing and programming language, Threads, semaphore, monitor, message passing. Lectures Req : 8

Total Lectures Req : 37

Reference Books:

1. T. W. Pratt : Programming Languages Design & Complementatation, Pearson Education Asia

MICROPROCESSOR AND INTERFACES (4CS2)

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

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

Units	Topics	CONTENTS OF SYLLABUS
I	Introduction to Micro Computer Systems	Microprocessors, microcontroller and microcomputer devices, Machine and assembly language, Bus concept. Architecture & Pinout of 8085A. <p style="text-align: right;">Lectures Req :6</p>
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. <p style="text-align: right;">Lectures Req :9</p>
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. <p style="text-align: right;">Lectures Req :6</p>
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. <p style="text-align: right;">Lectures Req :9</p>
V	Comparative study 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. <p style="text-align: right;">Lectures Req :6</p>

Total Lectures Req :36

Reference Books:

1. Microprocessor & Interfaces 8085: Ramesh Gaonkar.
2. Microprocessor & Interfaces 8085:B. Ram

OBJECT ORIENTED PROGRAMMING (4CS3)

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

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

Units	Topics	CONTENTS OF SYLLABUS
I	INTRODUCTION TO PROGRAMMING	Introduction to programming paradigm. Aspect-oriented programming, Dynamic programming, Functional Programming, Logic programming, Object-oriented programming, Parallel computing, Event Driven Programming. Lectures Req : 6
II	OVERVIEW OF C++ (A):	Overview of C++ Abstraction, Polymorphism, Inheritance, Classes, Objects, Methods. Constructor, destructor Lectures Req : 6
III	OVERVIEW OF C++ (B)	:Overloading (function and operator), references, friend function, overriding, virtual function, virtual classes, templates, Namespace, Nested and inner classes, Exception handling, Run time type casting, STL Lectures Req : 10
IV	OVERVIEW OF JAVA (A)	: Java Byte code and virtual machine, data types, operators, arrays, Objects, constructors, returning and passing objects as parameter, Single and Multilevel inheritance, Extended Classes, Access Control, Usage of super, overloading and overriding methods, Abstract classes, Using final with inheritance. Lectures Req : 10
V	OVERVIEW OF JAVA (B)	Overview of Java (B): Package and interfaces, String Handling, String constructors, special string operations, character extraction searching and comparing strings, string Buffer class. Applet Fundamentals, Using paint Method and drawing polygons. Lectures Req : 8

Total Lectures Req : 40

Reference Books:

1. E. Balagurusamy : C++
2. JAVA, Complete Reference : Herbert Shield

COMPUTER ARCHITECTURE (4 CS 4)

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

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

Units	Topics	CONTENTS OF SYLLABUS
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. Lectures Req : 7
II	CPU ORGANISATION:	Addressing Modes, Instruction Format. CPU organization with large registers, stacks and handling of interrupts & subroutines Instruction pipelining Lectures Req : 6
III	ARITHMETIC ALGORITHM:	Array multiplier, Booth's algorithm. Addition subtraction for signed unsigned numbers and 2's complement numbers Lectures Req : 6
IV	MICROPROGRAMMED CONTROL UNIT :	Basic organization of micro-programmed controller, Horizontal & Vertical formats, Address sequencer Lectures Req : 8
V	MEMORY ORGANISATION:	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. Lectures Req : 10

Total Lectures Req :37

Reference Books:

1. M. Morris Manno : Computer Systems Architecture, PHI

STATISTICS AND PROBABILITY THEORY (4 CS 5)

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

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

CONTENTS OF SYLLABUS

Units	Topics	
I	Probability Theory	Events, algebra of events, simple and compound events, mutually exclusive events, independent and dependent events, Probability: definition, addition theorem, multiplication theorem, conditional Probability, Bayes theorem, Bernoulli Trial. Lectures Req : 8
II	Random Variables	Discrete and continuous random variable, probability mass function and probability density function, discrete and continuous distribution function, probability generating function, expectation and moment generating functions; mean time to failure cumulants, cumulant generating function, relation between moments and cumulants. Lectures Req : 12
III	Discrete Distribution Function	Discrete distribution function: Binomial and Bernoulli Distribution, Poisson Distribution their definition, mean, variance, moments, coefficients of kurtosis, continuous distribution function: Rectangular, Normal and Exponential Distribution, their definition, mean, variance, moments, coefficients of kurtosis, memory less property Lectures Req : 10
IV	Queuing Theory	Introduction, basic concepts, definitions and notations, pure birth process, pure death process, birth-death process, <i>M/M/1</i> : oo/FCFS, <i>M/M/N</i> : DO/FCFS, <i>M/M/1</i> : N/FCFS, <i>M/M/N</i> : N/FCFS Queues Lectures Req : 10
V	Discrete Parameter Markov Chains	Markovian property, transition probability matrix. markov chains, discrete parameter birth death process, M/O/1 queuing model. correlation and regression; correlation coefficient, rank correlation, linear regression, regression coefficient, relation between coefficient and regression coefficient, method of least squares, normal regression and correlation analysis Lectures Req : 10

Total Lectures Req: 50

Reference:

- 1: Statistics and Probability Theory: Jain & Rawat
- 2: Statistics and Probability Theory: Gokhroo & others.
- 3: Fundamentals of Statistics: Gupta & Kapoor
- 4: Statistics and Probability theory: Mehta, Sharma, Vardanpublisher
- 5: Kapoor & Saxena: Statistics & Probability
- 6: J.E. Freund & R.E. Walpole: Mathematical statistics
- 7: Probability Theory: Shanums Outline series.

MANAGEMENT INFORMATION SYSTEM (4 CS 6.1)

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

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

Units	Topics	CONTENTS OF SYLLABUS
I	Introduction:	MIS concept, Definition, role & Impact of MIS, Process of management, organization structure & behavior. Lectures Req : 7
II	Basic of Management Information System	Decision Making, Information concepts, System concepts & control Types of system handling system complexity System development model. Lectures Req : 10
III	Development of Management Information System:	Requirement and implementation of MIS, Choice of information Technology for Management Information System. Lectures Req : 6
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. Lectures Req : 8
V	Enterprise Resource Planning (ERP):	EMS, ERP, Benefits implementation, EMS & MIS. Case Studies: Application of SAP technologies in manufacturing sector. Lectures Req : 9

Total Lectures Req :40

Reference Books:

1. W.S. Jawadekar : Management Information System, TMH

INTELLECTUAL PROPERTY RIGHTS (4CS6.2)

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

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

Units	Topics	CONTENTS OF SYLLABUS
I	Basic Concepts of Intellectual Property:	Introduction to intellectual property rights, Intellectual property laws and the Internet, Trade Related Aspects of Intellectual Property Rights Lectures Req : 6
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 Lectures Req : 8
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 Lectures Req : 7
IV	Copyright:	Registration procedure and copyright authorities, Assignment and transfer of copyright, Copyright infringement and exceptions to infringement, Software copyright Lectures Req : 7
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 Lectures Req : 8

Total Lectures Req :36

OPEN SOURCE TECHNOLOGY (4CS6.3)

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

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

Units	Topics	CONTENTS OF SYLLABUS
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 Lectures Req : 7
II	Software Freedom	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. Lectures Req : 8
III	Open Source Development	OS 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. Lectures Req : 7
IV	Licenses and Patents:	What Is A License, How to create your own Licenses? Important FOSS Licenses (Apache, BSD, GPL, LGPL), copyrights and copyleft, Patents Lectures Req : 6
V	Impact On Other Areas	Social and Financial impacts of open source technology, Economics of FOSS: Zero Marginal Cost, Incomegeneration opportunities, Problems with traditional commercial software, Internationalization, Open Source as a Business Strategy. Lectures Req : 10

Total Lectures Req :38

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

Teaching Hrs.
3L + 1T

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.**

4 CS 7. WEB PROGRAMING LAB

1. Develop a static html page using style sheet to show your own profile.
 - Add a page to show 5 photos.
 - Add a page to show your academics in a table
 - Add a page containing 5 links to your favorite website
 - Add navigational links to all above pages (add menu).
2. Update your homepage, by creating few html file (e.g. header, footer, left-sidebar, right), in these file you will put all html code to be shown on every page.
3. Use Cascading Style Sheets to format your all pages in a common format.
4. Basic Php programs:
5. Write a simple "hello word" program using php.
6. Write a program to accept two strings (name and age) from user. Print welcome statement e.g. " Hi Ram, your age is 24."
7. Write a program to create a calculator, which can support add, subtraction and multiply and division operation.
8. Write a program to take input parameters for a table (no. of rows and no. of columns), and create the desired table.
9. Create a "Contact Me" page -
 - Ask user to enter his name, email ID,
 - Use Java-Script to verify entered email address.
 - Store submitted value in a MySql database.
10. Display latest 5 submitted records in contact me page.

11. Display above record with navigation support. e.g. (next, previous, first, last).

4CS8. MICROPROCESSORS LAB

1. Study of hardware, functions, memory, and operations of 8085 kit.
2. Program to perform integer addition (two and three numbers 8 bit)
3. Program to perform multiplication (two 8 bit numbers).
4. Program to perform division (two 8 bit numbers).
5. Transfer of a block data in memory to another place in memory in forward and reverse order.
6. Swapping of two block data in memory.
7. Addition of 10 numbers using array.
8. Searching a number in an array.
9. Sorting of array (ascending, descending order).
10. Print Fibonacci sequence. (15 elements)
11. To insert a number at correct place in a sorted array.
12. Interfacing seven segment display using 8255.

4CS9. OBJECT ORIENTED PROGRAMMING LAB

C++ Programs

1. Programs based on inheritance property.
2. Programs of operator overloading (complex number arithmetic, polar coordinates).
3. Programs using friend functions.
4. Programs on various matrix operations.
5. Stack operations using OOPs concepts.
6. To implement Tower of Hanoi problem.

JAVA Programs:-

7. To implement spell checker using dictionary.
8. To implement color selector from a given set of colors.
9. To implement shape selector from a given set of shapes.
10. To implement a calculator with its functionality.
11. To show movement of a car.

4 CS 10. COMPUTER ARCHITECTURE LAB

This lab will be based on assembly programming on of RISC processor simulator SPIM. SPIM simulator is available at site <http://pages.cs.wisc.edu/~larus/spim.html>.

SPIM exercises

1. Read an integer from the keyboard and print it out if $(n \Rightarrow n_min \text{ AND } n \leq n_max)$.
2. Read an integer from the keyboard and print out the following as per switch-case statement

Switch (n)

{ n <= 10 print "not a lot"

```
n == 12 print "a dozen"  
n == 13 print "a baker's dozen"  
n == 20 print "a score"  
n >= 100 print "lots and lots"  
n != 42 print "integer"  
otherwise print "you have the answer!"}
```

3. Read a string from the keyboard and count the number of letters. Use the equivalent of following for loop to count number of chars.

```
for (s1=0; str[s1] != '\n'; ++s1)
```

4. Print out a line of characters using simple procedure call.
5. Print out a triangle of characters using recursive procedure call.
6. Print factorial of a number using recursion.
7. Print reverse string after reading from keyboard.
8. Print a string after swapping case of each letter.
9. Print an integer in binary and hex.
10. Implement bubble sort algorithm.
11. Print Pascal Triangle of base size 12.
12. Evaluate and print Ackerman function.