VEER NARMAD SOUTH GUJARAT UNIVERSITY

B.E.- II (Computer Emgg.)
Semester – III

SCHEME FOR TEACHING & EXAMINATION

B.E.II (CO) 3rd Semester		Teaching Scheme			Examination Scheme						
					Theory Exam		Practical/Quiz/Viva/T.W. etc.				
					University Exam.		University Exam.		Tutorial	Cont. Evaluation	Total Marks
Course	Course No.	L Hrs.	T Hrs.	P Hrs.	Duration Hrs.	Marks	Duration Hrs.	Marks			
Electrical Circuit Theory	ELE 301 CO	3	1	0	3	100	-	-	25	-	25
Electrical Machines	ELE 302 EC/CO	3	1	2	3	100	3	30	25	20	75
Discrete Mathematics	ASH 303 CO	3	1	0	3	100	-	-	25	-	25
Strength of Materials	AM 304 EC/CO	2	0	2	2	75	3	30	0	20	50
Linear Electronics-I	EC 305 CO	3	1	2	3	100	3	30	25	20	75
Data Structure & Programming Methodology	EC 306 CO	3	1	2	3	100	3	30	25	20	75
	TOTAL:	**18**	**4**	**8**	-	**575**	-	**120**	**125**	**80**	**325**
Total Contact Hours: 30										**Total Marks : 900**	

VEER NARMAD SOUTH GUJARAT UNIVERSITY

B.E.- II (Computer Emgg.)

Semester – III

ELECTRICAL CIRCUIT THEORY : ELE 301 CO

	Lecture	Tutorial	Practical
Teaching Hours	3	1	0
Examination Scheme Marks	100	25	Cont. Evaluation : 00 Examination : 00

1. Network Concepts : Network element symbols and conventions; Active element conventions; current and voltage conventions; loops and meshes; Nodes; coupled circuits and Dot conventions.
2. Mesh current and node voltage network analysis : Definitions of mesh currents and nodal voltages; Choice of mesh currents or nodal voltages for setting up operating equations necessary for network analysis. Self and mutual inductances. Setting up network equations by inspection in impedance or admittance matrix forms. Use of Cramer's rule and analysis of linear networks using matrices.
3. Network Theorems : Linearity and superposition; Independent and dependent sources and their transformations; Thevenin's, Norton's, Millman's, Tellengen's and maximum power transfer theorems. Use of these theorems in circuit analysis; Duality and dual of a planner network.
4. Circuit Transients : Review of Laplace Transform, R-L, R-C and R-L-C, D.C. and A.C. transients, two mesh transients analysis using Laplace transform method; Initial and Final value theorems and their applications for s-domain circuits.
5. Topics in Time-domain and frequency domain : The unit step function; other unit functions, the impulse, ramp and doublet; the laplace transforms for shifted and singular functions; the convolution integral.

   Wave form analysis by Fourier Series; Trigonometrical and complex exponential forms; the frequency spectra of periodic wave forms; the fourier Integral and continuous frequency spectra; Fourier transforms and their relationships to Laplace transforms.
6. Network Functions and Two port parameters : Poles and zeros of a function, physical and analytical concepts,Terminal and terminal pairs, Driving point immitances, transfer functions, Restriction of locations of poles and zeros in S-plane. Definitions, calculations and interrelationship of impedance, admittance, hybride and transmission line parameters for four terminal networks. Image impedance and its calculations for symmetrical and unsymmetrical π, T and Ladder Networks.

References :

1. Soni and Gupta : Course in Circuit Analysis, Dhanpat Rai and Sons.
2. Van Valkenberg : Network Analysis, Asia Publishing House.
3. Edminister : Electrical Circuits:, McGraw Hills
4. Hayt And Kimmerly : Engineering Circuit Analysis,. McGraw Hills.

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VEER NARMAD SOUTH GUJARAT UNIVERSITY

B.E.- II (Computer Emgg.)

Semester – III

ELECTRICAL MACHINE : ELE 302 EC/CO
B.E.II (EC/CO)

	Lecture	Tutorial	Practical
Teaching Hours	3	1	2
Examination Scheme Marks	100	25	Cont. Evaluation : 20 Examination : 30

1. Machines : construction, simple lap and wave windings, emf, torque and power equations, circuit model, generating and motoring modes, magnetizing characteristics, introduction to armature reaction and commutation, self excited generators, shunt series and compound motors, speed control, efficiency and losses.
2. Transformers : fundaments and construction of single phase and three phase transformers, ideal transformer, emf equation, no load conditions, loading, accounting for finite permeability and core losses, equivalent circuit, no load and short circuit tests, per unit system, voltage regulation, efficiency, auto-transformer, three phase transformers, star and delta connections.
3. Synchronous Machines : construction and basic principals, three phase windings, rotating magnetic fields, distribution and pitch factors, emf equation, synchronous speed, armature reaction, synchronous reactance, voltage regulation, synchronizing to mains, damper winding, vector diagram for generating and motoring modes, synchronous motor starting, V curves.
4. Induction Machines : construction and simple theory of operation of three phase induction motor , equivalent circuit, torque speed characteristics, no load and blocked rotor tests, load test, starting, speed control.
5. Fractional kW Motors : Brief description of reluctance motor, hysterisis motor, two phase servo motor, stepper motors.

Practical work shall be based upon the theory course.

References :

1. Nagrath I J : Basic Electrical Engineering, TMH.

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VEER NARMAD SOUTH GUJARAT UNIVERSITY

B.E.- II (Computer Emgg.)

Semester – III

DISCRETE MATHEMATICS : ASH 303 CO

	Lecture	Tutorial	Practical
Teaching Hours	3	1	0
Examination Scheme Marks	100	25	Cont. Evaluation : 00 Examination : 00

1. Discrete mathemtatical models, Mathematical reasoning, Sets, Relations, Functions, Infinite Sets, Groups,Normal groups, Homomorphism, Lattice, Boolean Algebra, Method of generating new algebra from old graph, planar graphs, Trees, Cutsets, Connectivity, Partitions, Transversability, Introduction to combinatorics.

References :

1. Liu C. L. : Elements of Discrete Mathematics, 2nd ed., MH, 1985.
2. Vilenkin N. : Combinatorial Mathematics, Mir Pub., Moscow, 1974.
3. Narsing Deo : Graph Theory with Application to Computer Science, PHI.

VEER NARMAD SOUTH GUJARAT UNIVERSITY

B.E.- II (Computer Emgg.)

Semester – III

STRENGTH OF MATERIALS : AM 304 EC/CO
B.E.II (EC/CO)

	Lecture	Tutorial	Practical
Teaching Hours	2	0	2
Examination Scheme Marks	75	0	Cont. Evaluation : 20 Examination : 30

1. Simple stress/strain in Tension, Shear B. Young's shear & Bulk Modulii, Strength & Elasticity of material., Temp. Stresses.
2. Shear force & Bending moment diagrams & their relationship Theory of Simple lending, Bending & shear stresses.
3. Torsion of circular bars, solid & hollow, Shear stresses & strains.
4. Introduction to compressive stresses, Principal stresses and strains Deformation, vibration & strain energy concept.
5. Mechanical properties of engineering materials including latest advancements as applicable to electrical/electronics/ computer engg.

Practical work shall be based upon the theory course.

References :

1. Junnarkar & Shah : Mechanics of Structure Vol.I, Charotar Publications, Anand.
2. Timoshenke & Young : Elements of Strength of Materials, TMH.
3. Popov, Kapila & Agnihotri : Introductions of Mechanics of Solids, Prentice Halls.

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VEER NARMAD SOUTH GUJARAT UNIVERSITY

B.E.- II (Computer Emgg.)

Semester – III

LINEAR ELECTRONICS-I : EC 305 CO

	Lecture	Tutorial	Practical
Teaching Hours	3	1	2
Examination Scheme Marks	100	25	Cont. Evaluation : 20 Examination : 30

1. Diode Circuit Analysis : Introduction to Semiconductor junction Diode; Nonlinear properties; Ideal diode; Basic theory and analysis of simple diode circuit; DC load line; Small signal analysis and concept of dynamic resistance; AC load line; Diode capacitance; Temparature effects of diode; Different types of diode (Zener, schottckey) Manufacturer's specifications.
2. Rectifiers : Circuit analysis of halfwave and full wave rectifier using semiconducter devices; Bridge rectifier; Ripple and form factor calculation for above circuits; Efficiency and PIV for above circuits; Types of filters; C filter, L filter, LC filter, PIE filter; Analysis of filter and calculation of ripple and regulation.
3. Introduction To Transistor Circuits : Transistor characteristic; Plots for NPN and PNP configurations; Current flow mechanism in the junction transistor and calulation of Alpha and Beta; Analysis of CE configuration; Current amplification in the transistor; Graphical analysis of transistor circuits; Power calculations; Infinite bypass capacitor; Infinite coupling capacitors; Different dc biasing methods; Fixed bias, emitter stabilized bias, potential divider bias, dc bias with voltage feedback; Common base configuration analysis; Emitter follower.
4. Bias Stability : Quiescent point variation due to uncertainty in Beta; Effect of temparature on the Q point; Stability factor analysis; Temparature compensation using diode biasing.
5. Integrated Circuits : Integrated circuit; Transistor and its integrated circuit; Integrated diode capacitor and resistor; Thin film and monolithic type; Integrated circuit inductor; Advantage of integrated circuit over its discrete counter part.
6. Small Signal Low Frequency Analysis And Design : Hybrid parameters; CE configuration; CB configuration; CC configuration; Impedance reflection; Bootstraping circuit; Phase splitter; Interpretation of manufacturers specification.
7. Multiple Transistor Circuits : Cascading of amplifier stages; Differnece amplifier; Common mode rejection ratio; Difference amplifier with constant current source; Different amplifier with emitter resistor for balance; Darligton amplifier; Cascode amplifier.

Practical work shall be based upon the theory course.

References :

1. Schilling & Belove : Electronic Circuits-Discrete and Integrated, McGraw-Hill Publication, 3rd edition 1989, Reprint 1994.
2. Boylestad & Nashlesky : Electronic Devices & Circuit Theory, Prentice-Hall India, 5th edition 1992, Ninth reprint 1995.
3. Sedra & Smith : Microelectronic Circuits, 3rd Edition, 1990.

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VEER NARMAD SOUTH GUJARAT UNIVERSITY

B.E.- II (Computer Emgg.)

Semester – III

DATA STRUCTURE & PROGRAMMING METHODOLOGY : EC 306 CO

	Lecture	Tutorial	Practical
Teaching Hours	3	1	2
Examination Scheme Marks	100	25	Cont. Evaluation : 20 Examination : 30

1. Structured Approach To Programming : Step wise refinement techniques; programming techniques; documentation; Basic concepts in program testing and reasoning about programs : loop invariants; procedures; scope rules; recursion. Implementation of the algorithms for internal sorting and searching in C.
2. Study Of Data Structures : Arrays; records; strings; stacks; queues; lists; trees and graphs. Implementation of these in C.

Practical work shall be based upon the theory course.

References :

1. Trembley & Sorenson : An Introduction to Data Structures with Applications, 2nd edition, (TMH(1993)/ISED(1984)), Reprint - 1995.
2. Tanenbaum A.M. & Augenstein M. J. : Data Structures using C, Prentice-Hall India, 1981, Reprint 1996.
3. Lipschutz : Data Structures, Tata McGraw Hill, Reprint 1995.

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VEER NARMAD SOUTH GUJARAT UNIVERSITY

B.E.II (Computer Engg.)

Semester – IV

B.E.II (CO) 4th Semester		Teaching Scheme			Examination Scheme						
					Theory Exam		Practical/Quiz/Viva/T.W. etc.				
					University Exam.		University Exam.		Tutorial	Cont. Evaluation	Total Marks
Course	Course No.	L Hrs.	T Hrs.	P Hrs.	Duration Hrs.	Marks	Duration Hrs.	Marks			
Control System Engg.	ELE 401 CO	3	0	2	3	100	3	30	0	20	50
Engineering Mathematics – III	ASH 402 CO	3	2	0	3	100	0	0	50	0	50
Engineering Management	EC 403 CO	3	0	0	3	100	0	0	0	0	0
Linear Electronics-II	EC 404 CO	3	1	2	3	100	3	30	25	20	75
Digital Electronic	EC 405 CO	3	0	2	3	100	3	30	0	20	50
Computer Based Information Processing	EC 406 CO	3	1	2	3	100	3	30	25	20	75
	TOTAL:	**18**	**4**	**8**	-	**600**	**-**	**120**	**100**	**80**	**300**
Total Contact Hours: 30									**Total Marks: 900**		

VEER NARMAD SOUTH GUJARAT UNIVERSITY

B.E.- II (Computer Emgg.)

Semester – IV

CONTROL SYSTEM ENGINEERING : ELE 401 CO

	Lecture	Tutorial	Practical
Teaching Hours	3	0	2
Examination Scheme Marks	100	0	Cont. Evaluation : 20 Examination : 30

1. Introduction to Control Systems : Open loop control and close loop control; Illustrative examples of control systems.
2. Mathematical Background : Laplace transformation; Laplace transformation theorems; Inverse Laplace transformation; Solution of linear differential equations using Laplace transformation.
3. Mathematical Models of Physical Systems : Linear and non-linear systems; equations and transfer functions for mechanical translational systems and electrical network; Complex impedences; Force-Voltage and Force-Current analogy; Block diagram representation of control systems; Block diagram reduction; Potentiometers and synchros as error-sensing devices; Transfer functions of armature-controlled and field-controlled DC servomotors and 2-phase AC servomotors; DC and AC tachometers; Block diagram representation of DC and AC position control systems; Signal flow graphs; Mason's gain formula.
4. Time Domain Analysis of Control Systems : Typical test signals; Response of first-order systems; Transient response of a second order system due to step input; Time domain specifications of a second order system; Impulse and ramp response of second order system; Routh's stability criterion; Steady-state errors; Static error coefficients; Error series and dynamic error coefficients.
5. Frequency Domain Analysis of Control Systems : Steady state response of a system due to sinusoidal input; Frequency response; Logarithmic plots or bode diagrams; Log-magnitude versus phase plots; Resonent peak and resonent frequency of a second order system; Polar plots; Nyquist stability criterion; Stability analysis; Relative stability; Gain margin and phase margin; Closed loop frequency response; M. circles and N. circles; Nichol's chart.
6. Root Locus Techniques : Basic properties of root Loci; Construction of the root Loci; Effects of adding poles and zeros; Effects of movements of poles and zeros.
7. Compensating Networks : Basic configurations of phase lead; phase-lag and lag-lead networks; their properties, polar and Bode plots for above networks.

Practical work shall be based upon the theory course.

1. I. J. Nagrath & M. Gopal, Control Systems Engineering, Wiley Eastern Ltd.
2. Benjamin C. Kuo, Automatic Control Systems, Prentice-Hall of India, 5th Ed.
3. Katsuhiko Ogata, Modern Control Engineering, Prentice-Hall of India.

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VEER NARMAD SOUTH GUJARAT UNIVERSITY

B.E.- II (Computer Emgg.)

Semester – III / IV

ENGINEERING MATHEMATICS III : ASH 303 EC / ASH 402 CO
B.E.II (EC/CO)

	Lecture	Tutorial	Practical
Teaching Hours	3	2	0
Examination Scheme Marks	100	50	Cont. Evaluation : 00 Examination : 00

1. Multiple Integrals : Reorientation of concept of integrals, double and triple integrals, evaluation techniques, change of order of integration, integrals in polar and cylindrical coordinates, change of variables of multiple integrals, Application of double and triple integrals for evaluation of area, volume and mass.
2. Vector Calculus : Basic concepts of Vector calculus, line integrals, scalar and vector point functions, differential operator, gradient, directional derivative, divergence, curl and Laplacian with their properties and physical interpretation.
3. Surface integrals, Green's, Gauss and Stokes theorem (without proof), Applications.
4. Gamma, Beta and Error functions : Improper integrals and their convergence, Gamma and Beta functions and their properties, Error functions, Evaluation and application.
5. Fourier Series : Fourier expansion of functions with arbitrary period, in particular periodic functions with period 2π, conditions of convergence, Fourier series of even and odd functions, Half range Fourier series.
6. Partial Differential Equations (PDE) : Basic mathematical concepts, First order PDE of Lagrange's form, $Pp + Qq = R$, Second order pde of mathematical Physics (Heat, Wave and Laplace equation) with standard boundary conditions, Solution by separation of variable method using Fourier Series. Partial differential equation Modelling.
7. Complex Variables : Basic mathematical concepts, Analytic functions, C-R equations, Harmonic functions, Related problems; Linear transformations of complex domains, Some special transformations, bilinear transformation, Conformal Mapping and applications; complex integration including contour Integration (Simple cases).

References :

1. Kreyszig : Advanced Engineering Mathematics, John Wiley, International Student Ed. (1995).
2. R. Wylle : Advanced Engineering Mathematics, Mc-Graw Hill, International Student Ed. (1993).

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VEER NARMAD SOUTH GUJARAT UNIVERSITY

B.E.- II (Computer Emgg.)

Semester – IV

ENGINEERING MANAGEMENT : EC 403 CO

	Lecture	Tutorial	Practical
Teaching Hours	3	0	0
Examination Scheme Marks	100	0	Cont. Evaluation : 00 Examination : 00

Operations Research :

1. Introduction : Evolution of OR, team approach, quantitative approach, application.
2. Linear Programming : Basic concepts, formulation of models, limitations of LP.
   LP Methods : Graphical & Simple Method, Degenercy, multiple optimal solution, unbounded problem, infeasible problem, Transportation problem and transportation models, Assignment problem & assignment method.
3. Decision Theory : Decision making under different situation (certainty, uncertainty, under risk), Decision tree model.
4. Queueing System : Queueing problem, assumptions, *M/M/1 Model.
5. Simulation : Analytical and simulation models, Monte Carlo simulation model; Computer simulation.
   (* denotes Poisson arrival, Poisson departure, single server, infinite capacity and FIFO service discipline).

Business Management :

1. Introduction : Engineering, Management and organisation. Evolution process.
2. Business Organisation : Types - individual, proprietorship, partnership, joint stock company, Co-operative and State owned organisation.
3. Management : Definitions, concepts and principles, Management process, Functional (Production, Finance, Marketing, Personnel) Management, Co-ordination and its importance.
4. Trade Unions and Industrial Relations : Collective bargaining, industrial dispute act, social security measures in India.

References :

1. O. P. Khanna : Industrial Engg. & Management, Dhanpatrai & Sons, New Delhi.
2. S. D. Sarma : Operations Research, Kedarnath Ramnath & Co., Meerut.
3. K. V. Rao : Management Science, McGraw Hill Co., New Delhi.
4. R. D. Agrawal : Organization & Management, Tata McGraw Hill, New Delhi.

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VEER NARMAD SOUTH GUJARAT UNIVERSITY

B.E.- II (Computer Emgg.)

Semester – IV

LINEAR ELECTRONICS-II : EC 404 CO

	Lecture	Tutorial	Practical
Teaching Hours	3	1	2
Examination Scheme Marks	100	25	Cont. Evaluation : 20 Examination : 30

1. Negative Feedback In Amplifiers : Basic concets of feedback amplifiers; Effect on gain; Input and output impedances of feedback amplifiers and sensitivity function; Examples of the basic feedback amplifier analysis; Introduction to its design and its application.
2. Frequency Response Of Amplifiers : R-C coupled amplifier with bipolar transister; Effect of emitter bypass capacitor; Coupling capacitor of base and collector; Introduction to JFET and MOSFET; Low frequency analysis of FET amplifier; Source bypass capacitor; Drain coupling capacitor and gate coupling capacitor.
3. Audio Frequency Linear Power Amplifiers : Introduction to Class A, B, AB and C operation; Class A common-emitter power amplifier; Transformer coupled amplifier; Class B push-pull power amplifier; Amplifiers using complementary symmetry; Class C amplifier.
4. Voltage Regulators : Voltage regulator circuits; Introduction; Comparision elements and DC amplifier elements; Control Elements; Switch mode voltage regulator; Use of op-amp and Linear IC as voltage regulater elements; Over voltage and short circuit protection; Typical design examples using voltage regulator IC.
5. Operational Amplifiers : Characteristic and specifications of op-amp; Concept of offset voltage and currents; application of op-amp; Differentiators; Integrators; Function generators; Log amplifiers; Instrumentation amplifiers; Multivibrators; Triangular and square wave generators; Rectifiers and peak detectors; Oscillators; Active filters.
6. Timer Ic Circuit And Its Application

Practical work shall be based upon the theory course.

References :

1. Donald L. Schiling Charles Belove : Electronic Cirucits (Integrated & Discrete), McGraw-Hill, 1989 Pub. Reprint 1994.
2. Millman & Halkias : Integrated Electronics, McGraw-Hill Pub., 1992.
3. Ramakant A Gayakwad : Op-Amp & Linear Integrated Circuits, Prentice-Hall of India Private Ltd., (3rd Edition), 1993 Pub.

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VEER NARMAD SOUTH GUJARAT UNIVERSITY

B.E.- II (Computer Emgg.)

Semester – IV

DIGITAL ELECTRONICS : EC 405 CO

	Lecture	Tutorial	Practical
Teaching Hours	3	0	2
Examination Scheme Marks	100	0	Cont. Evaluation : 20 Examination : 30

1. Number Systems : Decimal number system; Binary, octal and hexadecimal number systems; Conversion from one number to another number system; Addition, subtraction, multiplication and division using different number systems; Representation of binary number in sign-magnitude, sign 1's complement and sign 2's complement notation; Rules for addition and subtraction with complement reprsentation; BCD, EBCDIC, ASCII, Extended ASCII, Gray and other codes.
2. Logic Gates And Boolean Algebra : AND, OR, NOT, NAND, NOR, Ex-OR logic gates; Positive and negative logic; Fundamental concepts of boolean algebra; Demorgan's laws; Principles of duality; Simplification of Boolean expressions; Canonical and standard forms for Boolean functions; SOP and POS forms; Realization of Boolean functions using only NAND and NOR gates.
3. Boolean Function Minimization : Objectives of the minimization procedures; Karnaugh map method;Don't care conditions; Quine-McCluskey tabulation method;Concept of prime implicants.
4. Combinational Logic Circuits Using Descrete Logic Gates : Half adder and full adder; Half subtractor and full subtractor; Parity generator and checker; Code converters; Binary multiplier; Majority circuits, magnitude comparator.
5. Combinational Logic Circuit Using Msi Integrated Circuits : Binary parallel adder;BCD adder; Encoder, priority encoder, decoder; Multiplexer and demultiplexer circuits; Implementation of Boolean functions using decoder and multiplexer; Arithmetic and logic unit; BCD to 7-segment decoder; Common anode and common cathode 7-segment displays; Random access memory, Read only memory and erasable programmable ROMS; Programmable logic array (PLA) and programmable array logic (PAL).
6. Introduction To Sequential Logic Circuits : Basic concepts of sequential circuits; Cross coupled SR flip-flop using NAND or NOR gates; JK flip-flop rise condition; Clocked flip-flop; D-type and Toggle flip-flops; Truth tables and excitation tables for flip-flops; Master slave configuration; Edge triggered and level triggered flip-flops; Elemination of switch bounce using flip-flops; Flip-flops with preset and clear.
7. Sequential Logic Circuit Design : Basic concepts of counters and registers; Binary counters; BCD counters; Up down counter; Johnson counter, module-n counter; Design of counter using state diagrams and table; Sequence generators; Shift left and right register; Registers with parallel load; Serial-in-parallel-out(SIPO) and parallel-in-serial-out(PISO); Register using different type of flip-flop; Sequence generator.

Practical work shall be based upon the theory course.

References :

1. Morris Mano : Digital Logic and Computer Design, Prentice-Hall of India, New Delhi, 1992.
2. Bartee Thomas : Digital Computer Fundamentals, McGraw-Hill, 1995.
3. Taub And Schilling : Digital Integrated Electronics, McGraw-Hill, 1985.
4. Richard Sandige : Modern Digital Design, McGraw-Hill, 1990.

VEER NARMAD SOUTH GUJARAT UNIVERSITY

B.E.- II (Computer Emgg.)

Semester – IV

COMPUTER BASED INFORMATION PROCESSING : EC 406 CO

	Lecture	Tutorial	Practical
Teaching Hours	3	1	2
Examination Scheme Marks	100	25	Cont. Evaluation : 20 Examination : 30

1. Introduction To Data Processing : Data Processing Techniques; Traditional Data Processing & Data Base Processing Techniques; DBMS; Data Independence; Shared Data - Advantages of DBMS; Architecture of a typical DBMS; DDLs; DMLs; Query Languages; Embedded Query Languages.
2. Data Base Project Development Process : Information Model; Universe of Discourse; Logical Database Design; Physical Data Base Design; Semantic Data Model; Relationships in SDM; Other Data Models; DBTG; Hierarchical Model; ER Model; ANSI/X3/SPARC Model; Relational Model; Comparison; Study of DBTG & Hierarchical Model only from comparison point of view; Super keys; Generalization & aggregation.
3. System Flow Study of Commercial Applications like Payroll; Inventory control; Accounting; Sales; University Course Management etc. Implementation issues.
4. Characteristics of secondary storage devices; file organization techniques; Performance of heap; sequential; indexed sequential hashed; multi-indexed; inverted; and multi-ring files B; trees use of files in data processing.
5. Implementation of commercial systems like pay-roll; inventory control etc. with a typical DBMS package.

Practical work shall be based upon the theory course.

References :

1. Majumdar A K & Bhattacharya P : Introduction to Data Base Management Systems, Tata McGraw- Hill, 1996 Edition.
2. Korth & Schilberscatz : Data Base Systems Concepts, McGraw-Hill, IS 2nd edition, 1995 Reprint.
3. Naveen Prakash : Inroduction to Data Base Management Systems, Tata McGraw- Hill, 1991 edition, 1994 Reprint.
4. RAM : Computer Fundamental Architecture & Organization, Wiley Eastern Limited, 1992 reprint.
5. Vipul Lal : Inside Clipper 5, Tata McGraw Hill, 1995 Reprint.

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