



**Department of Computer Science & Engineering**  
**Jalpaiguri Govt. Engg. College (A Govt. Autonomous College), Jalpaiguri – 735102**  
**Syllabus for UG Classes effective from First July,2013**

FIRST SEMESTER							
THEORY							
Sl. No.	Paper Code	Paper Name	Contact Hours / week				Credit Point
			L	T	P	Total	
1	HU-102	Economics for Engineers	3	0	0	3	3
2	EE-101	Basic Electrical Engineering	3	1	0	4	4
3	CH-101	Chemistry-I	3	1	0	4	4
4	M-101	Mathematics-I	3	1	0	4	4
5	EC-101	Basic Electronics Engineering	3	1	0	4	4
Total of Theory						19	19
PRACTICAL							
6	EE-191	Basic Electrical Engg. Lab.	0	0	3	3	2
7	CH-191	Chemistry-I Lab.	0	0	3	3	2
8	EC-191	Basic Electronics Engg. Lab.	0	0	3	3	2
9	ME-192	Workshop Practice	0	0	3	3	2
Total of Practical						12	8
Total of Semester						31	27
SECOND SEMESTER							
THEORY							
1	HU-201	English Language & Technical Communication	2	0	0	2	2
2	PH-201	Physics – I	3	1	0	4	4
3	CS-201	Principles of Computer Programming	3	1	0	4	4
4	M-201	Mathematics-II	3	1	0	4	4
5	ME-201	Engineering Mechanics	3	1	0	4	4
Total of Theory						18	18
PRACTICAL							
6	PH 291	Physics – I Lab	0	0	3	3	2
7	CS 291	Principles of Computer Programming Lab	0	0	3	3	2
8	ME 291	Engineering Drawing & Graphics	0	0	3	3	2
Total of Practical						9	6
SESSIONAL							
9	HU 281	English Language & Technical Communication	0	0	3	3	2
10	XC 281	Extra Curricular Activities (NSS/NCC/NSO etc)	0	0	2	2	1
Total of Sessional						5	3
Total of Semester						32	27



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3<sup>rd</sup> SEMESTER

**THEORY**

Sl. No.	Paper Code	Paper Name	Contact Hours / week				Credit Point
			L	T	P	Total	
1	CH 301	Basic Environmental Engineering & Elementary Biology	3	0	0	3	3
2	M(CS)301	Numerical Methods	3	0	0	3	3
3	CS 302	Data Structure & Algorithm	3	0	0	3	3
4	CS 303	Computer Organization	3	1	0	4	4
5	CS 304	Analog & Digital Electronics	3	1	0	4	4
6	EC(CS) 305	Communication Engg. & Coding Theory	3	0	0	3	3
Total of Theory						20	20

**PRACTICAL**

7	M(CS)391	Numerical Methods Lab	0	0	3	3	2
8	CS 392	Data Structure & Algorithm Lab	0	0	3	3	2
9	CS 393	Computer Organization Lab	0	0	3	3	2
10	CS 394	Analog & Digital Electronics Lab	0	0	3	3	2
Total of Practical						12	8
Total of Semester						32	28

4<sup>th</sup> SEMESTER

**THEORY**

1	HU 401	Values & Ethics in Profession	3	0	0	3	3
2	M 401	Mathematics – III	3	1	0	4	4
3	PH 401	Physics – II	3	1	0	4	4
4	CS 401	Formal Language & Automata Theory	3	1	0	4	4
5	CS 402	Operating System	3	0	0	3	3
6	CS 403	Object Oriented Programming(IT)	3	0	0	3	3
Total of Theory						21	21

**PRACTICAL**

7	PH 491	Physics – II Lab	0	0	3	3	2
8	CS 492	Operating System Lab	0	0	3	3	2
9	CS 493	Object Oriented Programming Lab	0	0	3	3	2
Total of Practical						9	6

**SESSIONAL**

10	HU 481	Technical Report writing & Language Lab Practice	0	0	2	2	1
Total of Practical						2	1
Total of Semester						32	28



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**5<sup>th</sup> SEMESTER**

**THEORY**

Sl. No.	Paper Code	Paper Name	Contact Hours / week				Credit Point
			L	T	P	Total	
1	CS 501	Microprocessors & Microcontrollers	3	1	0	4	4
2	CS 502	Software Engineering	3	1	0	4	4
3	CS 503	Design & Analysis of Algorithm	3	1	0	4	4
4	Free Elective-I CS 504	Operation Research (M) Multimedia Technology (IT) Discrete Mathematics (M)	3	1	0	4	4
5	CS 505	Computer Architecture	3	1	0	4	4

Total of Theory 20 20

**PRACTICAL**

6	CS 591	Microprocessors & Microcontrollers Lab	0	0	3	3	2
7	CS 594	Operation Research Lab Multimedia Technology Lab Programming Lab using C++	0	0	3	3	2
8	CS 595	Computer Architecture Lab	0	0	3	3	2

Total of Practical 9 6

**SESSIONAL**

9	CS 581	Seminar	0	0	3	3	2
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Total of Sessional 3 2

Total of Semester 32 28

**6<sup>th</sup> SEMESTER**

**THEORY**

1	HU 601	Principles of Management	3	0	0	3	3
2	CS 601	Database Management System	3	1	0	4	4
3	CS 602	Computer Networks	3	1	0	4	4
4	Professional Elective -I CS 603	Computer Graphics System Software & Administration	3	0	0	3	3
5	Free Elective-II CS 604	Distributed Operating System (CSE) Mobile Computing(IT) Data Warehousing & Data Mining (IT)	3	0	0	3	3
6	CS 605	Advanced Java	3	0	0	3	3

Total of Theory 20 20

**PRACTICAL**

7	CS 691	Database Management System Lab	0	0	3	3	2
8	CS 692	Computer Networks Lab	0	0	3	3	2
9	Professional Elective-I- Lab.CS 693	Computer Graphics Lab System Software & Administration Lab	0	0	3	3	2
10	CS 694	Advanced Java Lab	0	0	3	3	2

Total of Practical 12 8

Total of Semester 32 28



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7 <sup>th</sup> SEMESTER							
THEORY							
Sl. No.	Paper Code	Paper Name	Contact Hours / week				Credit Point
			L	T	P	Total	
1	CS 701	Compiler Design	3	1	0	4	4
2	CS 702	Artificial Intelligence	3	1	0	4	4
3	Professional Elective -II CS 703	Distributed Database Cloud Computing Parallel Computing	3	1	0	4	4
4	Professional Elective- III CS 704	Soft Computing Image Processing Pattern Recognition	3	1	0	4	4
5	CS 705	Web Technology	3	1	0	4	4
Total of Theory						20	20
PRACTICAL							
6	CS 792	Artificial Intelligence Lab	0	0	3	3	2
7	CS 795	Web Technology Lab	0	0	3	3	2
Total of Practical						6	4
SESSIONAL							
8	CS 781	Industrial Training	0	0	0	0	2
9	CS 782	Project I	0	0	3	3	2
Total of Sessional						3	4
Total of Semester						29	28
8 <sup>th</sup> SEMESTER							
THEORY							
1	HU 801	Financial Management & Accounts	3	0	0	3	3
2	Open Elective-III CS 801	Cryptography Network Security Bio Informatics Natural Language Processing	3	1	0	4	4
3	Free Elective-IV CS 802	E-Commerce Internet Technology (IT) Modeling & Simulation (M)	3	1	0	4	4
Total of Theory						11	11
PRACTICAL							
4	Free Elective-V CS 892	E-Commerce Lab Internet Technology (IT) Lab Modeling & Simulation (M) Lab	0	0	3	3	2
Total of Practical						3	2
SESSIONAL							
5	CS 881	Grand Viva Voce	0	0	0	0	4
6	CS 882	Project II	0	0	6	6	5
7	HU 781	Group Discussion	0	0	3	3	2
Total of Sessional						9	11
Total of Semester						23	24



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FIRST YEAR FIRST SEMESTER

Paper Name:-	Economics for Engineers , Paper Code:- HU-102
Contacts:-	3-0-0-3 , Credit Point:-3
Syllabus:- Financial Accounting: Meaning, Nature and scope of Financial Accounting, Accounting concepts & conventions, Business Transactions, Different types of Vouchers, Analysis of Transactions, Recording in Journals and cash books, Posting of Ledgers, Preparation of Trial balance, Preparation of Final Accounts ( Trading Account, Profit & Loss A/C and Balance Sheet) Cost Accounting: Introduction, Classification of Costs; Break-even Analysis; Budgeting & Budgetary Control, Objectives, Advantages & Limitations of Budgeting, Cash Budget, Flexible Budget, Master Budget, etc Financial Management: Cost of Capital: Capital Budgeting, Working Capital Management Economics Introduction: Scarcity and Choice. Definition and Scope of Economics. Concept of Equilibrium. Concept of Market. Demand and Revenue Analysis: Meaning of demand, Determinants of demand, Exception to the law of demand. Elasticity of demand- Meaning, Price Elasticity of demand. Price Elasticity of Supply. Cost and Production Analysis: Cost concept: Classification of cost- Cost output relationship- Cost function and its determinants, uses of Cost function. Production: Meaning, Factors of production- Land, Labour, capital and organization.	
Reference 1 Modern Accountancy A. Mukherjee & M. Hanif Tata McGraw- Hill 2 Accountancy (Vol.1) Dr. S.K. Paul New Central Book Agency 3 Practice in Accountancy S. P. Basu & Monilal Das Rabindra Library 4 Modern Economic Theory K.K. Dewett S.Chand 5 Fundamentals of Economic Principles and problems : A. Banerjee & D. Maumder; ABS Pub. House 6 Economics for Business John Sloman & Mark Sutcliffe Pearson Education 7 Management Accounting R.K. Sharma & S. Gupta Kalyani Publishers 8 Financial Management Dr. S. Kr. Paul New Central Book Agency 9 Financial Management Dr. D. Majumder; Sk. Raju Ali & Lutfun Nesha; ABS Publishing 10. S. A. Sherlekar & V.S. Sherlekar : Modern Business Organization & Management, Himalay Pub. H.	

Paper Name:-	Basic Electrical Engineering , EE-101, 3-1-0-4:4
Syllabus:- Introduction: Overview of Source of energy, Generation, Transmission and Distribution of Electric Power. DC Network: Introduction of Electric Circuit, Loop Analysis, Node-voltage analysis. Star - Delta & Delta-star Transformations, Superposition Theorem, Thevenin's Theorem, Norton's theorems, Analysis of dc network in presence of one non-linear element, Transients in R-L , R-C and R-L-C circuits. Single-phase AC Network: Single-phase AC Circuits, Generation of Sinusoidal Voltage Waveform (AC) and Some Fundamental Concepts, Representation of Sinusoidal Signal by a Phasor, Current and Resonance in R-L-C Series and parallel Circuits. Three-phase AC Network: Three-phase AC Circuits, Three-phase Balanced Supply, Three-phase Delta-Connected Balanced Load, Power in a Three-phase Circuit. Magnetic Circuits: Magnetic circuits, Core losses, Eddy Current & Hysteresis Loss. Transformer: Ideal & Practical Transformer, Testing, Efficiency & Regulation, Three Phase Transformer, Auto-Transformer, Problem solving on Transformers Three-phase Induction Motor: Construction, Principle of Operation, Rotating Magnetic Field, Equivalent Circuit, Power Flow Diagram, Torque-Slip (speed) Characteristics in Three-phase Induction Motor, Starters for Induction Motor. DC Machines: , Constructional Features, Principle of Operation, EMF & Torque Equation of D.C Machines, D.C Generators, D.C Motors, Losses, Efficiency and Testing of D.C. Machines, Problem Solving on D.C Machines. Measuring Instruments: Study of DC-AC Measuring Instruments, Study of Electro-Dynamic Type Instrument,	



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Study of Single Phase Induction Type Energy Meter.

General structure of electrical power system: Power generation to distribution through overhead lines and underground cables with single line diagram.

**Reference**

Text books:

1. Basic Electrical engineering, D.P Kothari & I.J Nagrath, TMH, Second Edition
2. Fundamental of electrical Engineering, Rajendra Prasad, PHI, Edition 2005.
3. Basic Electrical Engineering, V.N Mittle & Arvind Mittal, TMH, Second Edition
4. Basic Electrical Engineering, J.P. Tewari, New age international publication

Reference books:

1. Basic Electrical Engineering(TMh WBUT Series), Abhijit Chakrabarti & Sudipta Nath, TMH
2. Electrical Engineering Fundamental, Vincent.D.Toro, Pearson Education, Second Edition.
2. Hughes Electrical & Electronics Technology, 8/e, Hughes, Pearson Education.
3. Basic Electrical Engineering, T.K. Nagsarkar & M.S. Sukhija, Oxford
4. Introduction to Electrical Engineering, M.S. Naidu & S, Kamakshaiyah, TMH
5. Basic Electrical Engineering, J.J. Cathey & S.A Nasar, TMH, Second Edition.

Paper Name:-	Chemistry-I
Paper Code:-	CH-101
Contacts:-	3-1-0-4
Credit Point:-	4

Syllabus:-

**Module 1**

**Chemical Thermodynamics**

Concept of Thermodynamic system: Definition with example of diathermal wall, adiabatic wall, isolated system, closed system, open system, extensive property, intensive property.

Introduction to first law of thermodynamics: Different statements, mathematical form.

Internal energy: Definition, example, characteristics, physical significance, mathematical expression for change in internal energy, expression for change in internal energy for ideal gas.

Enthalpy: Definition, characteristics, physical significance, Mathematical expression for change in Enthalpy, Expression for change in enthalpy for ideal gas. 3L

Heat Capacity: Definition, classification of heat capacity ( $C_p$  and  $C_v$ ): Definition and general expression of  $C_p$ – $C_v$ . Expression of  $C_p$ – $C_v$  for ideal gas.

Reversible and irreversible processes: Definition, work done in isothermal reversible and isothermal irreversible process for ideal gas, adiabatic changes: Work done in adiabatic process, interrelation between thermodynamic parameters (P, V and T), slope of P–V curve in adiabatic and isothermal process.

Application of first law of thermodynamics to chemical processes: exothermic, endothermic processes, law of Lavoisier and Laplace, Hess's law of constant heat summation, Kirchhoff's law. 3L

2nd law of thermodynamics: Statement, mathematical form of 2nd law of thermodynamics (Carnot cycle). Joule Thomson and throttling processes; Joule Thomson coefficient for ideal gas, concept of inversion temperature. Evaluation of entropy: Characteristics and expression, entropy change in irreversible cyclic process, entropy change for irreversible isothermal expansion of an ideal gas, entropy change of a mixture of gases. 2L

Work function and free energy: Definition, characteristics, physical significance, mathematical expression of  $\Delta A$  and  $\Delta G$  for ideal gas, Maxwell's Expression (only the derivation of four different forms), Gibbs Helmholtz equation, condition of spontaneity and equilibrium reaction. 2L

**Module 2**

**Industrial Chemistry and Polymerization**

**Industrial chemistry**

Solid Fuel: Coal, classification of coal, constituents of coal, carbonization of coal (HTC and LTC), coal analysis: Proximate and ultimate analysis.

Liquid fuel: Petroleum, classification of petroleum, refining, petroleum distillation, thermal cracking, octane number, cetane number, aviation fuel (aviation gasoline, jet gasoline), and bio-diesel.



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Gaseous fuels: Natural gas, water gas, coal gas, bio-gas. 5L  
Polymerization  
Concepts, classifications and industrial applications  
Polymer molecular weight (number avg. weight avg. viscosity avg.: Theory and mathematical expression only), Poly dispersity index (PDI).  
Polymerization processes (addition and condensation polymerization), degree of polymerization, copolymerization.  
Preparation, structure and use of some common polymers: plastic (PE: HDPE, LDPE), rubber (natural rubber, SBR), fibre (nylon 6.6). Vulcanization, conducting and semi-conducting polymers. 3L

Module 3

Reaction dynamics, and structure and reactivity of organic molecules  
Reaction dynamics  
Reaction laws: rate and order; molecularity; zero, first and second order kinetics. Pseudo unimolecular reaction, Arrhenius equation. Mechanism and theories of reaction rates (Transition state theory, Collision theory:). Catalysis: Homogeneous catalysis (Definition, example, mechanism, kinetics). 3L  
Structure and reactivity of Organic molecules  
Electronegativity, electron affinity, hybridisation, Inductive effect, resonance, hyper conjugation, electrometric effect, carbocation, carbanion and free radicals. Brief studies on some addition, elimination, and substitution reactions. 3L

Module 4

Electrochemistry

Conductance

Conductance of electrolytic solutions, specific conductance, equivalent conductance, molar conductance and ion conductance, effect of temperature and concentration (strong and weak electrolyte). Kohlrausch's law of independent migration of ions, transport numbers, and hydration of ions.  
Conductometric titrations: SA vs SB & SA vs WB; precipitation titration KCl vs AgNO<sub>3</sub>. 2L

Electrochemical cell

Cell EMF and its thermodynamic derivation of the EMF of a Galvanic cell (Nernst equation), single electrode potentials, hydrogen half cell, quinhydrone half cell and calomel half cell (construction, representation, cell reaction, expression of potential, discussion, application).  
Storage cell, fuel cell (construction, representation, cell reaction, expression of potential, discussion, application). Application of EMF measurement on (a) ascertain the change in thermodynamic function ( $\Delta G$ ,  $\Delta H$ ,  $\Delta S$ ) (b) ascertain the equilibrium constant of a reversible chemical reaction (c) ascertain the valency of an ion. 3L

Module 5

Solid state and coordination chemistry

Solid state Chemistry

Introduction to stoichiometric defects (Schottky & Frenkel) and non – stoichiometric defects (Metal excess and metal deficiency). Role of silicon and germanium in the field of semiconductor. 2L

Coordination chemistry

Double salt, complex salt, Werner's theory of coordination compounds, coordination number, ligand, chelate, stability constant: stepwise and overall. 2L

Reference Books

P. C. Rakshit, Physical Chemistry, Sarat Book House (7th Edition).  
S. Glasstone, Text Book of Physical Chemistry, Macmillan India Limited.  
S. Pahari, Physical Chemistry, New Central Book Agency.  
S. Sarkar, Fuels and Combustion, Taylor & Francis (3rd Edition), 2009  
P. Ghosh, Polymer Science and Technology of Plastics and Rubbers, Tata McGraw Hill Publishing Company Limited.  
F.W. Billmeyer: Textbook of Polymer Science is published by Wiley India ( is now an Indian print).  
Joel R. Fried, Polymer Science and Technology, Pearson Education (2nd Edition).  
I. L. Finar, Organic Chemistry, Addison Wesley Longman, Inc.  
Physical Chemistry, Atkins, 6th Edition, Oxford Publishers.  
Organic Chemistry, Mark Loudon, 4th Edition, Oxford Publishers.  
Inorganic Chemistry–R. L. Dutta, Current Distributors



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Paper Name:-	Mathematics-I
Paper Code:-	M-101
Contacts:-	3-1-0-4
Credit Point:-	4
Syllabus:-	
Module I	
<i>Matrix:</i> Determinant of a square matrix, Minors and Cofactors, Laplace's method of expansion of a determinant, Product of two determinants, Adjoint of a determinant, Jacobi's theorem on adjoint determinant. Singular and non-singular matrices, Adjoint of a matrix, Inverse of a non-singular matrix and its properties, orthogonal matrix and its properties, Trace of a matrix. Rank of a matrix and its determination using elementary row and column operations, Solution of simultaneous linear equations by matrix inversion method, Consistency and inconsistency of a system of homogeneous and inhomogeneous linear simultaneous equations, Eigen values and eigen vectors of a square matrix (of order 2 or 3), Caley-Hamilton theorem and its applications. 9L	
Module II	
<i>Successive differentiation:</i> Higher order derivatives of a function of single variable, Leibnitz's theorem (statement only and its application, Problems of the type of recurrence relations in derivatives of different orders and also to find $(y_n)_0$ . 2L	
<i>Mean Value Theorems &amp; Expansion of Functions:</i> Rolle's theorem and its application, Mean Value theorems – Lagrange & Cauchy and their application, Taylor's theorem with Lagrange's and Cauchy's form of remainders and its application, Expansions of functions by Taylor's and Maclaurin's theorem, Maclaurin's infinite series expansion of the functions: $\sin x, \cos x, e^x, \log(1+x), (a+x)^n$ , $n$ being an integer or a fraction. 5L	
<i>Reduction formula:</i> Reduction formulae both for indefinite and definite integrals of types $\int \sin^n x dx, \int \cos^n x dx, \int \sin^m x \cos^n x dx, \int \cos^m x \sin^n x dx, \int \frac{dx}{(x^2 + a^2)^n}$ where $m, n$ are positive integers. 2L	
Module III	
<i>Calculus of Functions of Several Variables:</i> Introduction to functions of several variables with examples, Knowledge of limit and continuity, Partial derivatives and related problems, Homogeneous functions and Euler's theorem and related problems up to three variables, Chain rules, Differentiation of implicit functions, Total differentials and their related problems, Jacobians up to three variables and related problems, Maxima, minima and saddle points of functions and related problems, Concept of line integrals, Double and triple integrals. 9L	
Module IV	
<i>Infinite Series:</i> Preliminary ideas of sequence, Infinite series and their convergence/divergence, Infinite series of positive terms, Tests for convergence: Comparison test, Cauchy's Root test, D' Alembert's Ratio test and Raabe's test (statements and related problems on these tests), Alternating series, Leibnitz's Test (statement, definition) illustrated by simple example, Absolute convergence and Conditional convergence. 5L	
Module-V	
<i>Vector Algebra and Vector Calculus:</i> Scalar and vector fields – definition and terminologies, dot and cross products, scalar and vector triple products and related problems, Equation of straight line, plane and sphere, Vector function of a scalar variable, Differentiation of a vector function, Scalar and vector point functions, Gradient of a scalar point function, divergence and curl of a vector point function, Directional derivative. Related problems on these topics. Green's theorem, Gauss Divergence Theorem and Stoke's theorem (Statements and applications). 8L	





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Reference

1. Advanced Engineering Mathematics 8e by Erwin Kreyszig is published by Wiley India
2. Engineering Mathematics: B.S. Grewal
5. Calculus: M. J. Strauss, G. L. Bradley and K. L. Smith (3PrdP Edition, 1PstP Indian Edition 2007, Pearson Education)
6. Engineering Mathematics: S. S. Sastry ( PHI)
7. Advanced Engineering Mathematics, 3E: M.C. Potter, J.L. Goldberg and E.F. Abonfadel (OUP), Indian Edition.
8. Differential Calculus, Ghosh & Maity (Central)
9. Integral Calculus, Ghosh & Maity (Central)
10. Higher Algebra-Classical & Modern, J.G. Chakravorty and P.R. Ghosh(U.N. Dhur)
11. Vector Analysis (Schaum Series), M. R. Spiegel (MGH)

Paper Name:-	Basic Electronics Engineering
Paper Code:-	EC-101
Contacts:-	3-1-0-4
Credit Point:-	4
<p>Syllabus:-</p> <p>Pre-requisite: Knowledge of class XII level Physics and Mathematics</p> <p>Introduction: Basic ideas on different circuit components (Resistor, Inductor, Capacitor) 1L</p> <p>Module – 1: Semiconductors: 4L</p> <p>Crystalline material: Mechanical properties, Conductors, Semiconductors and Insulators: electrical properties. Energy band theory, Fermi levels; Semiconductors: intrinsic and extrinsic, energy band diagram, electrical conduction phenomenon, P-type and N-type semiconductors, drift and diffusion carriers.</p> <p>Module – 2: Diodes and Diode Circuits: 3L+3L = 6L</p> <p>Formation of P-N junction, energy band diagram, built-in-potential, forward and reverse biased P-N junction, formation of depletion region, Junction capacitance, V-I characteristics of diode, Simple diode circuits, load line, linear piecewise model; Rectifier circuits: half wave, full wave, (PIV, DC voltage and current, ripple factor, efficiency), idea of regulation, rectifier filter circuits, clipper, clamper, voltage multiplier circuits, breakdown mechanism of diodes, Zener diode, Varactor diode.</p> <p>Module – 3: Bipolar Junction Transistors : 5L+2L=7L</p> <p>Formation of PNP / NPN junctions, energy band diagram; current flow diagram, transistor mechanism and transistor principles, CE, CB, CC configuration, transistor input output characteristics: amplification factors for CB, CC and CE modes. Biasing and Bias stability: calculation of stability factor; small signal analysis, h-parameter model.</p> <p>Module – 4: Field Effect Transistors: 5L</p> <p>Concept of Field Effect Transistors (channel width modulation), Gate isolation types, JFET Structure and characteristics, MOSFET Structure and characteristics, depletion and enhancement type; CS, CG, CD amplifier configurations, FET parameters, small signal equivalent circuits for different configurations; CMOS: Basic Principles.</p> <p>Module – 5: Feed Back Amplifier and Operational Amplifiers: 4L+4L = 8L</p> <p>Positive and negative feed back, close loop gain, open loop gain, topologies of feed back amplifier; output impedance, input impedance, sensitivities (qualitative), bandwidth stability; effect of positive feed back: instability and oscillation, condition of oscillation, Barkhausen criteria. Introduction to integrated circuits, open loop characteristics of operational amplifier; Application of operational amplifier; inverting and non-inverting mode of operation, Adders, Subtractors, Constant gain multiplier, Voltage follower, Comparator, Integrator, Differentiator. OPAMP parameters: CMRR, OFFSET parameters, slew rate.</p> <p>Module – 6: Special Semiconductor devices: 3L</p> <p>SCR, DIAC, TRIAC, UJT, IGBT- structure, characterization, principle of operation and applications.</p> <p>Module – 7: Cathode Ray Oscilloscope (CRO) 4L</p> <p>CRT structure, block diagram, operation, Deflection systems, sweep circuit operation, basic block of CRO, applications of CRO, Frequency, phase and amplitude measurement using CRO, Lissajous figure.</p> <p>Module – 8: Digital Electronics: 2L</p>	



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Introduction to binary number; Basic Boolean algebra; De Morgan's Theorem, Logic gates.  
 Outcome: The students will be able to select proper electronics component and device depending on the requirement. The student should be able to use required rectifier circuit and to calculate its different parameters. The students must be able to design a transistor amplifier.

Reference: Text.  
 Chattopadhyay & Rakshit: Electronics Fundamentals & Applications  
 Millman & Halkias: Integrated Electronics References:  
 Boylestad & Nashelsky: Electronic Devices & Circuit Theory  
 Sanjeev Gupta: Electronics Devices Circuits  
 Malvino: Electronic Principle

Paper Name:-	Basic Electrical Engineering Lab
Paper Code:-	EE-191
Contacts:-	0-0-3-3
Credit Point:-	2

Syllabus:-  
 List of Experiments:  
 1. Characteristics of Fluorescent lamps  
 2. Characteristics of Tungsten and Carbon filament lamps  
 3. (a) Verification of Thevenin's theorem.  
 (b) Verification of Norton's theorems.  
 4. Verification of Maximum power theorem.  
 5. Verification of Superposition theorem  
 6. Study of R-L-C Series circuit  
 7. Study of R-L-C parallel circuit  
 8. Calibration of ammeter and voltmeter.  
 9. Open circuit and Short circuit test of a single phase Transformer.  
 10. No load characteristics of D.C shunt Generators  
 11. Starting and reversing of speed of a D.C. shunt  
 12. Speed control of DC shunt motor.  
 13. Measurement of power in a three phase circuit by two wattmeter method

Paper Name:-	Chemistry lab
Paper Code:-	CH-191
Contacts:-	0-0-3-3
Credit Point:-	2

Syllabus:- To Determine the alkalinity in a given water sample.  
 Redox titration (estimation of iron using permanganometry)  
 To determine calcium and magnesium hardness of a given water sample separately.  
 Estimation of available chlorine in bleaching powder.  
 To determine chloride ion in a given water sample by argentometric method (using chromate indicator solution).  
 Heterogeneous equilibrium (determination of partition coefficient of acetic acid between n-butanol and water)  
 Viscosity of solutions (determination of percentage composition of sugar solution from viscosity)  
 Conductometric titration for determination of the strength of a given HCl solution by titration against a standard NaOH solution.  
 pH- metric titration for determination of strength of a given HCl solution against a standard NaOH solution.  
 Determination of dissolved oxygen present in a given water sample.  
 Estimation of available oxygen in pyrolusite.



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Paper Name:-	Basic Electrical Engineering Lab
Paper Code:-	EC-191
Contacts:-	0-0-3-3
Credit Point:-	2
<p>Syllabus:-          There will be a couple of familiarization lectures before the practical classes are undertaken where basic concept of the instruments handled Eg: CRO, Multimeters etc will be given.          List of Experiments:          Familiarization with passive and active electronic components such as Resistors, Inductors, Capacitors, Diodes, Transistors (BJT) and electronic equipment like DC power supplies, multimeters etc.          Familiarization with measuring and testing equipment like CRO, Signal generators etc.          Study of I-V characteristics of Junction diodes.          Study of I-V characteristics of Zener diodes.          Study of Half and Full wave rectifiers with Regulation and Ripple factors.          Study of I-V characteristics of BJTs.          Study of Characteristic curves for CB, CE and CC mode transistors          Study of I-V characteristics of Field Effect Transistors.          Determination of input-offset voltage, input bias current and Slew rate of OPAMPs.          Determination of Common-mode Rejection ratio, Bandwidth and Off-set null of OPAMPs.          Study of OPAMP circuits: Inverting and Non-inverting amplifiers, Adders, Integrators and Differentiators.</p>	

Paper Name:-	Workshop Practice
Paper Code:-	ME-192
Contacts:-	0-0-3-3
Credit Point:-	2
<p align="center"><b>Fig. 1: Job for fitting practice</b></p> <p align="center"><b>Fig. 2: Job for practice on a lathe</b></p>	

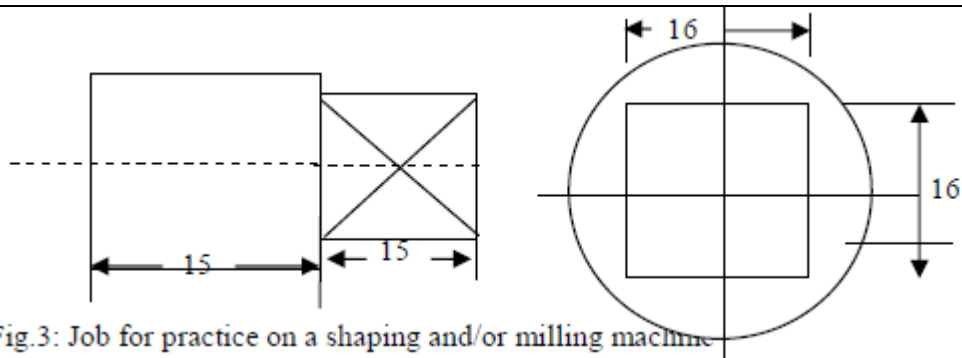


Fig.3: Job for practice on a shaping and/or milling machine

Syllabus:-

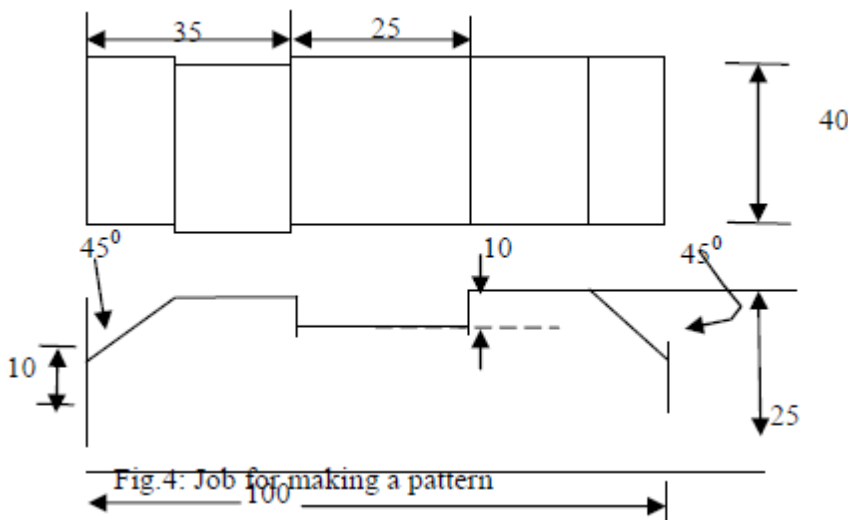


Fig.4: Job for making a pattern

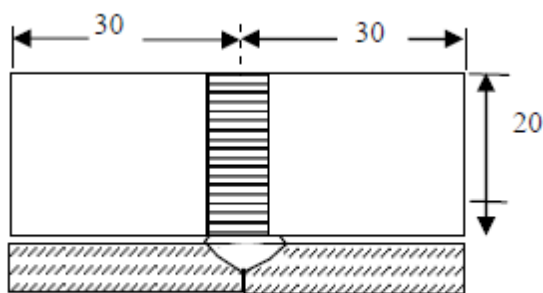


Fig.5: Welding specimen for practice

**FITTING** : Making a gauge from MS plate as shown in Fig.1.

Operations required:

- Squaring and finishing of the blank by filing
- Making the Vee-portion by sawing and filing
- Drilling (in machine) and tapping (hand)

2. **MACHINING** : To make a pin as shown in Fig.2 from a  $\varnothing 20$ mm mild steel rod in a lathe.

3. **MACHINING** : To make a MS prism as shown in Fig.3 from a  $\varnothing 20$ mm mild steel rod in a shaping and / or milling machine.

**PATTERN MAKING, SAND MOULDING AND CASTING**: To make a wooden pattern and a sand mould with that pattern for casting a cast iron block as shown in Fig.4.

**WELDING (GAS WELDING)**: To join two thin mild steel plates or sheets (1 to 3mm thick) as shown in Fig. 5 by gas welding.

**WELDING (ARC WELDING)** : To join two thick (6mm) MS plate as shown in Fig. 5 by arc welding.

**SHEET METAL WORK** (in 1 day or 3 hours); Forming a cone, for example.



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Paper Name:-	English Language and Technical Education
Paper Code:-	HU-201
Contacts:-	2-0-0-2
Credit Point:-	2
Syllabus:-	
Guidelines for Course Execution:	
Objectives of the Course: This Course has been designed	
1. To impart advanced skills of Technical Communication in English through Language Lab. Practice Sessions to 1st Semester UG students of Engineering & Technology.	
2. To enable them to communicate confidently and competently in English Language in all spheres.	
Desired Entry Behaviour:	
The students must have basic command of English to Talk about day-to-day events and experiences of life. Comprehend Lectures delivered in English. Read and understand relevant materials written in English. Write grammatically correct English. Strategies for Course Execution:	
1. It is a Course that aims to develop Technical Communication Skills. It is, therefore, <i>Lab-</i> based and practical in orientation. Students should be involved in Practice Sessions.	
2. The content topics should be conveyed through real-life situations. Lecture classes should be conducted as Lecture cum Tutorial classes.	
3. Keeping in view the requirements of students, the teachers may have to prepare some learning aids task materials.	
4. Some time should be spent in teaching stress and intonation.	
5. In teaching ‘Speaking skill,’ emphasis should be on <i>clarity, intelligibility, fluency, (as well as accepted pronunciation)</i> .	
6. Micro Presentation and Group Discussion Sessions should be used for developing Communicative Competence	
7. The Language Lab, device should be used for giving audio-visual inputs to elicit students’ responses by way of Micro-Presentation, Pair Conversation, Group Talk and Class Discussion.	
8. The teacher must function as <i>a creative monitor in the Language Lab for the following:</i>	
A. Developing Listening Comprehension Skill;	
1. Developing Listening Comprehension through Language Lab Device	
2. Developing sub skills of the Listening Skill by Conversational Practice Sessions	
3. Focusing on intelligent and advanced Listening Sessions e.g. Seminars, Paper Presentation, Mock Interviews etc.	
4. Conducting Conversational Practice: Face to Face & Via Media (Telephone, Audio, Video + Clips)	
B. Developing Speaking Competence:	
a) Helping students in achieving <i>clarity and fluency</i> ; manipulating paralinguistic features of speaking ( <i>voice modulation ,pitch , tone stress , effective pauses</i> )	
Conducting <i>Task oriented interpersonal ,informal and semiformal Speaking / Classroom Presentation</i>	
b) <i>Teaching strategies for Group Discussion</i>	
<i>Teaching Cohesion and Coherence</i>	
<i>Teaching effective communication &amp; strategies for handling criticism and adverse remarks</i>	
<i>Teaching strategies of Turn- taking, effective intervention, kinesics (use of body language) and courtesies and all componentss of soft skills.</i>	
C. Developing Reading Comprehension Skill:	
a) Developing Reading Skill through Non Technical (Literary) Texts(See Recommended Book 5)	
1. The Thief by Ruskin Bond	
2. The Open Window by Saki	
3. Marriage is a private Affair by Chinua Achebe	
4. The Moon in the Earthen Pot by Gopini Karunakar	
b) Developing Reading Skill through Radio Commentary, Technical Texts and Case Studies (Refer to Recommended Book 1.)* Freedom by G. B. Shaw (Radio Commentary)	
a) Guiding students for Intensive & Extensive Reading( See Recommended Book 1 )	
D. Developing Writing Competence:	



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- a) Teaching all varieties of Technical Report, Business Letters and Job Application (Expressing Ideas within restricted word limit through paragraph division, Listing Reference Materials through Charts, Graphs, Tables and Diagrams);
- b) Teaching correct Punctuation & Spelling, Semantics of Connectives, Modifiers and Modals, variety of sentences and paragraphs
- c) Teaching Organizational Communication: Memo, Notice, Circular, Agenda / Minutes etc.

**SYLLABUS -- DETAILED OUTLINES**

**A. ENGLISH LANGUAGE GRAMMAR: 5L**

Correction of Errors in Sentences, Building Vocabulary, Word formation, Single Word for a group of Words, Fill in the blanks using correct Words, Sentence Structures and Transformation, Active & Passive Voice, Direct & Indirect Narration, (MCQ Practice during classes)

**B. READING COMPREHENSION:**

Strategies for Reading Comprehension 1L  
 Practicing Technical & Non Technical Texts for Global/Local/Inferential/Referential comprehension; 3L  
 Precis Writing

**C. TECHNICAL COMMUNICATION**

The Theory of Communication –Definition & Scope, Barriers of Communication, Different Communication Models, Effective Communication (Verbal / Non verbal), Presentation / Public Speaking Skills 5L  
 (MCQ Practice during classes) 5

**D. MASTERING TECHNICAL COMMUNICATION**

Technical Report (formal drafting) 3L  
 Business Letter (formal drafting) 4L  
 Job Application (formal drafting) 3L  
 Organizational Communication (see page 3) 3L  
 Group Discussion –Principle & Practice 3L  
 Total Lectures 30

**MARKS SCHEME (Written Examination) Total Marks 70**

1. 10 Multiple Choice Questions (Communication & Eng. Language-Vocabulary & Syntax) Marks 10
2. Short Questions & Precis writing on unseen passages Marks 15 (10+5)
3. 3 Essay type Questions on Technical Communication (Technical Report / Business Letter / Job Application / Organizational Communication etc.) Marks 45-15\*3

**MARKS SCHEME (Internal Examination) Total Marks 30**

1. Attendance Marks 5
2. Testing Speaking Ability Marks 5
3. Testing Listening Ability Marks 5
4. 2 Unit Tests Marks 15

Paper Name:-	Physics-I
Paper Code:-	PH-201
Contacts:-	3-1-0-4
Credit Point:-	4

**Syllabus:- Module 1:**

**Oscillation:**

Simple Harmonic motion: Preliminary concepts, Superposition of Simple Harmonic motions in two mutually perpendicular directions: Lissajous figure.

Damped vibration: Differential equation and its solution, Logarithmic decrement, Quality Factor.

Forced vibration: Differential equation and its solution, Amplitude and velocity resonance, Sharpness of resonance. Application in L-C-R circuit. (2L+3L+3L)

**Module 2:**

**Optics I:**

2.1 Interference of electromagnetic waves: Condition for sustained interference, double slit as an example. Qualitative idea of Spatial and Temporal Coherence, conservation of energy and intensity distribution, Newton's ring.



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2.2 Diffraction of light: Fresnel and Fraunhofer class. Fraunhofer diffraction for single slit and double slit. Intensity distribution of N-slits and plane diffraction grating (No deduction of the intensity distributions for N-slit), Missing orders. Rayleigh criterion, resolving power of grating and microscope. (3L+5L)

Module 3:

Optics II

3.1 Polarization: General concept of polarization, Plane of vibration, Qualitative discussion on plane, circularly and elliptically polarized light. Polarization through reflection and Brewster's law. Double refraction (birefringence) – Ordinary and Extra-ordinary rays. Nicol's prism, Polaroid, Half wave and quarter wave plate.

3.2 Laser: Spontaneous and Stimulated emission of radiation, Population inversion, Einstein's A & B coefficient (derivation of the mutual relation), Optical resonator and condition necessary for active Laser action, Ruby Laser, He-Ne Laser, application of laser.

3.3 Holography: Theory of holography, viewing of hologram, applications. (4L+4L+3L)

Module 4:

Quantum Physics:

4.1 Concept of dependence of mass with velocity, mass energy equivalence, energy-momentum relation (no deduction required), Blackbody radiation: Rayleigh Jean's law (derivation without the calculation of number of states), Ultraviolet catastrophe, Wien's law, Planck's radiation law (calculation of average energy of the oscillator), Derivation of Wein's law and Stephan's law from Planck's radiation law. Rayleigh Jean's law and Wien's law as limiting case of Planck's law. Compton's effect (calculation of Compton wavelength is required).

4.2 Wave-particle duality and de Broglie's hypothesis. Concept of matter waves, Davission-Germer experiment, Concept of wave packets and Heisenberg's uncertainty principle. (5L+4L)

Module 5:

Crystallography:

5.1 Elementary ideas of crystal structure: Lattice, Basis, Unit cell, fundamental types of lattice-Bravais Lattice, simple cubic, FCC and BCC lattices (use of models in class during teaching is desirable), Miller indices and Miller planes, coordination number and atomic packing factor.

5.2 X-rays: origin of characteristic and continuous x-rays, Bragg's law (no derivation), determination of lattice constant.

Paper Name:-	Introduction to Computing
Paper Code:-	CS-201
Contacts:-	3-1-0-4
Credit Point:-	4
Syllabus:- Fundamentals of Computer:	
History of Computer, Generation of Computer, Classification of Computers 2L	
Basic Anatomy of Computer System, Primary & Secondary Memory, Processing Unit, Input & Output Devices 3L	
Binary & Allied number systems representation of signed and unsigned numbers. BCD, ASII. Binary Arithmetic & logic gates 6L	
Assembly language, high level language, compiler and assembler (basic concepts) 2L	
Basic concepts of operating systems like MS DOS, MS WINDOW, UNIX, Algorithm & flow chart 2L	
C Fundamentals:	
The C character set identifiers and keywords, data type & sizes, variable names, declaration, statements 3L	
Operators & Expressions:	
Arithmetic operators, relational and logical operators, type, conversion, increment and decrement operators, bit wise operators, assignment operators and expressions, precedence and order of evaluation. Input and Output: Standard input and output, formatted output -- printf, formatted input scanf. 5L	
Flow of Control:	
Statement and blocks, if - else, switch, loops - while, for do while, break and continue, go to and labels 2L	
Fundamentals and Program Structures:	
Basic of functions, function types, functions returning values, functions not returning values, auto, external, static and register variables, scope rules, recursion, function prototypes, C preprocessor, command line	



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arguments. 6L	
Arrays and Pointers:	
One dimensional arrays, pointers and functions, multidimensional arrays.	6L
Structures Union and Files:	
Basic of structures, structures and functions, arrays of structures, bit fields, formatted and unformatted files. 5L	
Reference : Introduction To Computing (TMH WBUT Series), E. Balagurusamy, TMH	
Kerningham, B.W.	The Elements of Programming Style
Yourdon, E.	Techniques of Program Structures and Design
Schied F.S.	Theory and Problems of Computers and Programming
Gottfried	Programming with C Schaum
Kerningham B.W. & Ritchie D.M.	The C Programming Language
Rajaraman V.	Fundamental of Computers
Balaguruswamy	Programming in C
Kanetkar Y.	Let us C
M.M.Oka	Computer Fundamentals, EPH
Leon	Introduction to Computers, Vikas
Leon-	Fundamental of Information Technology, Vikas
Ram B.	Computer Fundamentals, New Age International
Ravichandran D.	Programming in C, New Age International
Xavier C. C	Language & Numerical Methods, New Age Inter.
Xavier C.	Introduction to Computers, New Age International
Rao S.B.	Numerical Methods with Programs in Basic Fortran Pascal & C++,
Dutta N.	Computer Programming & Numerical Analysis, Universities Press
Bhanu Pratap	Computer Fundamentals
Rajaram	Computer Concepts & C Program, Scitech

Paper Name:-	Mathematics-II
Paper Code:-	M-201
Contacts:-	3-1-0-4
Credit Point:-	4
Syllabus:- Module I	
<i>Ordinary differential equations (ODE)- First order and first degree:</i> Exact equations, Necessary and sufficient condition of exactness of a first order and first degree ODE (statement only), Rules for finding Integrating factors, Linear equation, Bernoulli's equation. General solution of ODE of first order and higher degree (different forms with special reference to Clairaut's equation). 6L	
Module II	
<i>ODE- Higher order and first degree:</i> General linear ODE of order two with constant coefficients, C.F. & P.I., D-operator methods for finding P.I., Method of variation of parameters, Cauchy-Euler equations, Solution of simultaneous linear differential equations. 7L	
Module III	
Partial Differential Equations: Origin of PDE, its order and degree, concept of solution in PDE. Solution of First Order Partial differential equation by Lagrange's Method, Integral Surfaces passing through a given curve, Solution of non-linear first order partial differential equations by Charpit's method, Solution of Second order Linear partial Differential equations with constant coefficients and with variable coefficients. 14L	
Module IV	
<i>Improper Integral:</i> Basic ideas of improper integrals, working knowledge of Beta and Gamma functions (convergence to be assumed) and their interrelations. 3L	
<i>Laplace Transform (LT):</i> Definition and existence of LT, LT of elementary functions, First and second shifting properties, Change of scale property; LT of $\frac{f(t)}{t}$ , $t^n f(t)$ , $f^{(n)}(t)$ and $\int f(u)du$ . Evaluation of improper integrals using LT, LT of periodic and step functions, Inverse LT: Definition and its properties; Convolution Theorem (statement only) and its application to the evaluation of inverse LT, Solution of linear ODE with constant coefficients (initial value problem) using LT. 10L	





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Reference

1. Advanced Engineering Mathematics, Erwin Kreyszig, (Wiley Eastern)
2. Engineering Mathematics: B.S. Grewal (S. Chand & Co.)
3. Engineering Mathematics (Volume 2): S. S. Sastry (Prentice-Hall of India)
4. Advanced Engineering Mathematics, 3E: M.C. Potter, J.L. Goldberg and E.F. Abonfadel (OUP), Indian Edition
5. An Introduction to Differential Equations, R.K. Ghosh and K.C. Maity ( New Central Book Agency )
6. Elements of Partial Differential Equations, I. N. Sneddon, (McGraw-Hill International)
7. Laplace Transforms, M. R. Spiegel(MGH)

Paper Name:-	Engineering Mechanics
Paper Code:-	ME-201
Contacts:-	3-1-0-4
Credit Point:-	4

Syllabus:-

Module – 1

Importance of mechanics in Engg.; Introduction to Statics; Concept of particle and Rigid Body; Types of Forces: 2L

Introduction to Vector Algebra; Parallelogram Law; Triangle and Polygon Law; Addition and Subtraction of Vector; Dot product and Cross product of Vectors; Unit Vector; Dot product and Cross product of Vectors and their applications. Types of Vectors ( Sliding Vector, Bound Vector ). 4L+1T

Two dimensional force system, Resolution of forces; Moments; Varignon's theorem; Couple; Equivalence of Force and Force – Couple system. 4L+2T

Module – II

Equilibrium of a body under two dimensional force system and under two dimensional force-moment system; Free body diagram; Lami's Theorem. 3L+1T

Friction; Co-efficient of friction; Laws of friction; Angle of Repose; Wedge friction. 3L+1T

Module – III

Centroid and Centre of Gravity; Centroid of Triangle, Quadrant of a circle and rectangle; Centroid of a composite area. 3L+1T

Moment of Inertia of a plane figure about Co-planer axes; Parallel axis theorem; Polar Moment of Inertia; Mass Moment of Inertia of cylinder, sphere and cone about the axis of symmetry. 3L+1T

Module – IV

Introduction to Dynamics; Kinematics and Kinetics; Newton's Laws of motion; Plane rectilinear motion under uniform and non-uniform acceleration; 3L+1T

x-t, v-t and a-t graphs; Motion under gravity; Plane Curvilinear motion; Circular motion; Projectile motion. 3L+1T

Module – V

Kinetics of particles; Newton's second Law; D' Alembert's principle; Principle of work, Energy and power; Principle of conservation of energy. 3L+1T

Module – VI

Concept of stresses and strains; Normal stress; Shear stress; Normal strain; Shear strain; Hooke's Law; Poisson's ratio; Stress-strain diagram of ductile material and brittle material; Elastic Modulus and Shear Modulus; Factor of safety-basic idea; bulk Modulus; Volumetric strain. 3L+1T

Reference

- Engineering mechanics : Statics and dynamics by I.H. Shames, 4<sup>th</sup> ed. – PHI.  
 Engineering mechanics by Timoshenko, Young and Rao, Revised 4<sup>th</sup> ed. – TMH.  
 Elements of Strength of Materials by Timoshenko & Young, 5<sup>th</sup> ed. – E.W.P.  
 Fundamentals of Engineering Mechanics by Debabrata Nag & abhijit Chanda – Chhaya Prakashani.  
 Engineering Mechanics by Basudeb Bhattacharya- Oxford University press.  
 Engineering Mechanics: Statics & Dynamics by Hibbeler & Gupta, 11<sup>th</sup> ed. – pearson.  
 Engineering mechanics [vol-1 & II] by Meriam & kraige, 5<sup>th</sup> ed. – Wiley india.

Paper Name:-	Physic-I Lab
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Paper Code:-	PH-291
Contacts:-	0-0-3-3
Credit Point:-	2
<p>Syllabus:-</p> <p>Group 1: Experiment from Higher Secondary knowledge of Physics</p> <p>Determination of thermal conductivity of a good conductor by Searle's method.</p> <p>Determination of thermal conductivity of a bad conductor by Lees and Charlton's method.</p> <p>Determination of dispersive power of the material of given prism.</p> <p>Use of Carry Foster's bridge to determine unknown resistance.</p> <p>Group 2: Experiments on General properties of matter</p> <p>Determination of Young's modulus by Flexure method and calculation of bending moment and shear force at a point on the beam.</p> <p>Determination of modulus of rigidity by static / dynamic method.</p> <p>Determination of co-efficient of viscosity by Poiseuille's capillary flow method.</p> <p>Group 3: Optics</p> <p>Determination of wavelength of light by Newton's ring method.</p> <p>Determination of wavelength of light by Fresnel's bi-prism method.</p> <p>Determination of wavelength of light by Laser diffraction method.</p> <p>Determination of numerical aperture and the energy losses related to optical fibre experiment.</p> <p>Innovative experiment:</p> <p>One more experiment designed by the student or the concerned teacher or both.</p>	

Paper Name:-	Principles of Computer Programming lab
Paper Code:-	CS-291
Contacts:-	0-0-3-3
Credit Point:-	2
<p>Syllabus:- Exercises should include but not limited to:</p> <ol style="list-style-type: none"> <li>1. DOS System commands and Editors ( Preliminaries)</li> <li>2. UNIX system commands and vi ( Preliminaries)</li> <li>3. Simple Programs: simple and compound interest. To check whether a given number is apalindrome or not, evaluate summation series, factorial of a number , generate Pascal's triangle, find roots of a quadratic equation</li> <li>4. Programs to demonstrate control structure : text processing, use of break and continue, etc.</li> <li>5. Programs involving functions and recursion</li> <li>6. Programs involving the use of arrays with subscripts and pointers</li> <li>7. Programs using structures and files.</li> </ol>	

Paper Name:-	Engineering Drawing & Graphics Lab
Paper Code:-	ME-291
Contacts:-	0-0-3-3
Credit Point:-	2
<p>Syllabus:- THEORETICAL PART</p> <p>Introduction to Lines , Lettering, Dimensioning, Scales. – 1L</p> <p>Geometrical Construction and curves. – 1L</p> <p>Projection of points, Lines and Surfaces. – 2L</p> <p>Projection of solids. – 2L</p> <p>Isometric Views. – 1L</p> <p>Sectional Views. - 1L</p> <p>Development of Surfaces. – 1L</p> <p>Introduction to Computer Aided Drafting. – 3L</p>	



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<b>PRACTICAL PART</b>	
LINES, LETTERING, DIMENSIONING, SCALES: Plain scale, Diagonal scale.	- 6hrs.
GEOMETRICAL CONSTRUCTION AND CURVES : Construction of Polygons, Parabola, Hyperbola , Ellipse.	- 6 hrs.
PROJECTION OF POINTS, LINES, SURFACES : Orthographic projection – 1 <sup>st</sup> and 3 <sup>rd</sup> angle projection, Projection of lines and surfaces – Hexagon.	- 3 hrs.
PROJECTION OF SOLIDS : Cube, Pyramid, prism, Cylinder, Cone.	- 6 hrs.
DRAWING ISOMETRIC VIEW FROM ORTHOGONAL / SECTIONAL VIEWS OF SIMPLE SOLID OBJECTS.	- 3 hrs.
FULL AND HALF SECTIONAL VIEWS OF SOLIDS.	- 3 hrs.
DEVELOPMENT OF SURFACES : Prism , Cylinder, Cone.	- 3 hrs.
<b>Reference</b>	
Narayana, K.L. and Kannaiah, P. Text Book of engineering Drawing “ Engineering Graphics”, scitech Publication.	
Bhatt, N.D. “Elementary Engineering Drawing”, Charotar Book Stall, Anand,1998.	
Lakshminarayanan, v. and Vaish Wanar, R.S., “ Engineering Graphics”, Jain brothers, New Delhi,1998.	
Chandra, A.M. and Chandra Satish, “ Engineering Graphics”, Narosa, 1998.	
Jolhe, “ Engineering Graphics”, Tata Mc Graw –Hill – WBUT Series.	
Gill, P.S., “ A Text Book of Engineering Drawing”, Katson Publishing House ( Kataria and Sons ).	
Venugopal, K., “ Engineering Drawing & Graphics+ AUTO CAD”, New Age International.	
Venkata Reddy K., “ Text Book of Engineering Drawing (2 <sup>nd</sup> Edition)”, BS Publication.	

Paper Name:-	English Language & Technical Communication Lab
Paper Code:-	HU -281
Contacts:-	0-0-3-3
Credit Point:-	2
<b>Syllabus:-</b>	
a) Honing ‘Listening Skill’ and its sub skills through Language Lab Audio device; 3P	
b) Honing ‘Speaking Skill’ and its sub skills; 2P	
c) Helping them master Linguistic/Paralinguistic features (Pronunciation/Phonetics/Voice modulation/ Stress/ Intonation/ Pitch & Accent) of connected speech; 2P	
j) Honing ‘Conversation Skill’ using Language Lab Audio –Visual input; Conversational Practice Sessions (Face to Face / via Telephone , Mobile phone & Role Play Mode); 2P	
k) Introducing ‘Group Discussion’ through audio –Visual input and acquainting them with keystrategies for success;2P	
f) G D Practice Sessions for helping them internalize basic Principles (turn- taking, creativeintervention, by using correct body language, courtesies & other soft skills) of GD; 4P	
g) Honing ‘Reading Skills’ and its sub skills using Visual / Graphics/Diagrams /ChartDisplay/Technical/Non Technical Passages; Learning Global / Contextual / Inferential Comprehension; 2P	
h) Honing ‘Writing Skill’ and its sub skills by using Language Lab Audio –Visual input; Practice Sessions 2P	
Total Practical Classes 17	
<b>Reference</b>	
Books Recommended:	
Dr. D. Sudharani: Manual for English Language Laboratory Pearson Education (WB edition),2010	
Board of Editors: Contemporary Communicative English for Technical Communication Pearson Longman, 2010	

Paper Name:-	Extra Curricular Activities
Paper Code:-	XC -281
Contacts:-	0-0-2-2
Credit Point:-	1



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Syllabus:- a) Creating awareness in social issues  
b) Participating in mass education programmes  
c) Proposal for local slum area development  
d) Waste disposal  
e) Environmental awareness  
f) Production Oriented Programmes  
g) Relief & Rehabilitation work during Natural calamities

Creating awareness in social issues:  
1. Women's development – includes health, income-generation, rights awareness.  
2. Hospital activities – Eg. Writing letters for patients, guiding visitors  
3. Old age home – visiting the aging in-mates, arranging for their entertainment.  
4. Children's Homes – visiting the young in-mates, arranging for their entertainment  
5. Linking with NGOs to work on other social issues. (Eg. Children of sex-workers)  
6. Gender issues- Developing an awareness, to link it with Women's Cell of college

Participating in mass education programmes  
1. Adult education  
2. Children's education

Proposal for local slum area development  
One or two slums to be identified and according to the needs, activities to be developed and proposals and reports are to be submitted.

Environmental awareness  
• Resource conservation – Awareness to be developed on water, energy, soil.  
• Preservation of heritage monuments- Marches, poster campaigns  
• Alternative energy consciousness amongst younger school-children.  
• Plantation and beautification- Plantation of trees, their preservation and upkeep, developing NSS parks.  
• Waste disposal- Proper methods of domestic waste disposal.

Production Oriented Programmes  
5. Working with people and explaining and teaching improved agricultural practices  
6. Rodent control and pest control practices;  
7. Soil-testing, soil health care and soil conservation;  
8. Assistance in repair of agriculture machinery;  
9. Work for the promotion and strengthening of cooperative societies in villages;  
10. Assistance and guidance in poultry farming, animal husbandry, care of animal health etc.;  
11. Popularization of small savings and  
12. Assistance in procuring bank loans

Relief & Rehabilitation work during Natural calamities  
g) Assisting the authorities in distribution of rations, medicine, clothes etc.;  
h) Assisting the health authorities in inoculation and immunization, supply of medicine etc.;  
i) Working with the local people in reconstruction of their huts, cleaning of wells, building roads etc.;  
j) Assisting and working with local authorities in relief and rescue operation; Collection of clothes and other materials, and sending the same to the affected areas;

SECOND YEAR FIRST SEMESTER

Paper Name:-	Basic Environmental Engineering & Elementary Biology
Paper Code:-	CH301
Contacts:-	3-0-0-3
Credit Point:-	3



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Syllabus:- Basic ideas of environment, basic concepts, man, society & environment, their interrelationship. 1L

Mathematics of population growth and associated problems, Importance of population study in environmental engineering, Definition of resource, types of resource, renewable, non-renewable, potentially renewable, effect of excessive use vis-à-vis

Population growth, Sustainable Development. 2L

Materials balance: Steady state conservation system, steady state system with non-conservative pollutants, step function. 1L

Environmental degradation: Natural environmental Hazards like Flood, earthquake, Landslide-causes, effects and Control/management; anthropogenic degradation like Acid rain-cause, effects and control. Nature and scope of Environmental Science and Engineering. 2L

Ecology

Elements of ecology: System, open system, closed system, definition of ecology, species, population, community, definition of ecosystem- components types and function. 1L

Structure and function of the following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems, Mangrove ecosystem (special reference to Sundar ban); Food chain [definition and one example of each food chain], Food web. 2L

Biogeochemical Cycle- definition, significance, flow chart of different cycles with only elementary reaction [Oxygen, carbon, Nitrogen, Phosphate, Sulphur]. 1L

Biodiversity- types, importance, Endemic species, Biodiversity Hot-spot, Threats to biodiversity, Conservation of biodiversity. 2L

Air pollution and control

Atmospheric Composition: Troposphere, Stratosphere, Mesosphere, Thermosphere, Tropopause and Mesopause. 1L

Energy balance: Conductive and Convective heat transfer, radiation heat transfer, simple global temperature model [Earth as a black body, earth as albedo], Problems. 1L

Green house effects: Definition, impact of greenhouse gases on the global climate and consequently on sea water level, agriculture and marine food. Global warming and its consequence, Control of Global warming. Earth's heat budget. 1L

Lapse rate: Ambient lapse rate adiabatic lapse rate, atmospheric stability, temperature inversion (radiation inversion). 2L

Atmospheric dispersion: Maximum mixing depth, ventilation coefficient, effective stack height, smokestack plumes and Gaussian plume model. 2L

Definition of pollutants and contaminants, Primary and secondary pollutants: emission standard, criteria pollutant.

Sources and effect of different air pollutants- Suspended particulate matter, oxides of carbon, oxides of nitrogen, oxides of sulphur, particulate, PAN. 2L

Smog, Photochemical smog and London smog.

Depletion Ozone layer: CFC, destruction of ozone layer by CFC, impact of other greenhouse gases, effect of ozone modification. 1L

Standards and control measures: Industrial, commercial and residential air quality standard, control measure (ESP, cyclone separator, bag house, catalytic converter, scrubber (ventury), Statement with brief reference). 1L

Water Pollution and Control

Hydrosphere, Hydrological cycle and Natural water.

Pollutants of water, their origin and effects: Oxygen demanding wastes, pathogens, nutrients, Salts, thermal application,

Heavy metals, pesticides, volatile organic compounds. 2L

River/Lake/ground water pollution: River: DO, 5 day BOD test, Seeded BOD test, BOD reaction rate constants, Effect of

Oxygen demanding wastes on river [deoxygenation, reaeration], COD, Oil, Greases, pH. 2L

Lake: Eutrophication [Definition, source and effect]. 1L

Ground water: Aquifers, hydraulic gradient, ground water flow (Definition only) 1L

Standard and control: Waste water standard [BOD, COD, Oil, Grease],

Water Treatment system [coagulation and flocculation, sedimentation and filtration, disinfection, hardness and



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<p>alkalinity, softening]  Waste water treatment system, primary and secondary treatments [Trickling filters, rotating biological contractor, Activated sludge, sludge treatment, oxidation ponds] tertiary treatment definition. 2L  Water pollution due to the toxic elements and their biochemical effects: Lead, Mercury, Cadmium, and Arsenic 1L  Land Pollution  Lithosphere; Internal structure of earth, rock and soil 1L  Solid Waste: Municipal, industrial, commercial, agricultural, domestic, pathological and hazardous solid wastes; Recovery and disposal method- Open dumping, Land filling, incineration, composting, recycling.  Solid waste management and control (hazardous and biomedical waste). 2L  Noise Pollution  Definition of noise, effect of noise pollution, noise classification [Transport noise, occupational noise, neighbourhood noise] 1L  Definition of noise frequency, noise pressure, noise intensity, noise threshold limit value, equivalent noise level, 10 L (18hr Index), Ldn.  Noise pollution control.  Environmental Management:  Environmental impact assessment, Environmental Audit, Environmental laws and protection act of India, Different international environmental treaty/ agreement/ protocol. 2L</p>
<p>Reference  1. Masters, G. M., "Introduction to Environmental Engineering and Science", Prentice-Hall of India Pvt. Ltd.,  2. De, A. K., "Environmental Chemistry", New Age International.</p>

Paper Name:-	Numerical Methods
Paper Code:-	-M(CS) 301
Contacts:-	3-0-0-3
Credit Point:-	3
<p>Syllabus:-  What is Numerical Analysis?  Errors in Numerical computation : Gross error, Round off error, Truncation error, Approximate numbers. Significant figures. Absolute, relative and percentage error. Definition of Operators: <math>\Delta</math>, <math>\nabla</math>, <math>E</math>, <math>E^{-1}</math>, <math>\mu</math>, <math>\delta</math> and simple relation among them.  Interpolation: Newton forward/backward interpolation, Lagrange's and Newton's divided difference Interpolation.  Numerical Differentiation based on Newton's forward and backward and Lagrange's formulae.  Numerical Integration : Trapezoidal rule, Simpson's 1/3 rule, Simpson's 3/8 rule, Expression for corresponding error terms.  Numerical solution of a system of linear equations : Gauss elimination method, Matrix inversion, LU factorization method, Gauss-Seidel iterative method, Gauss-Jacobi method.  Numerical Solution of Algebraic equation : Bisection method, Regula-Falsi method, Newton-Raphson method.  Numerical Solution of Ordinary Differential Equation : Euler's method, Modified Euler's method, Runge-Kutta methods, Picard's method, Taylor's Method.</p>	
<p>Reference  1. Numerical Analysis &amp; Computational Proc... Mollah Sa, Sa.  2. N. Dutta : Computer Programming &amp; Numerical Analysis, Universities Press.  3. E. Balagurusamy, Numerical Methods.  4. Aitkinston : Elementary Numerical Analysis</p>	

Paper Name:-	Data Structure & Algorithms
Paper Code:-	CS 302
Contacts:-	3-0-0-3
Credit Point:-	3



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**Syllabus for UG Classes effective from First July,2013**

Syllabus:- Introduction (2L): Concepts of data structures, Abstract Data Type. Algorithms and programs, basic idea of pseudo-code. Algorithm efficiency and time, space trade off, different order notations.

Fundamental Data Structures (2L):

Array: Different representations – row major, column major. Sparse matrix - its implementation and usage. Array representation of polynomials.

Linked List (4L): Singly linked list, circular linked list, doubly linked list, linked list representation of polynomial and applications.

Linear Data Structure (5L): Stack and its implementations (using array, using linked list), applications. Queue, circular queue, dequeue. Implementation of queue- both linear and circular (using array, using linked list), applications, prefix, infix, postfix notations.

Recursion (2L): Principles of recursion – use of stack, differences between recursion and iteration, tail recursion. Applications - The Tower of Hanoi Problem.

Nonlinear Data structures (8L): Tree: Basic terminologies, forest, tree representation (using array, using linked list). Binary trees - binary tree traversal (pre-, in-, post- order), threaded binary tree (left, right, full), application, non-recursive traversal algorithms, expression tree.

Binary search tree- operations (creation, insertion, deletion, searching). Height balanced binary tree – AVL tree (insertion, deletion with examples only). B- Trees – operations (insertion, deletion with examples only), Application of Trees. Heaps and its application- priority queue implementation.

Sorting Algorithms (4L): Bubble sort and its optimizations, insertion sort, shell sort, selection sort, merge sort, quick sort, heap sort, radix sort, Time complexity of various sorting algorithms.

Searching (2L): Sequential search, binary search, interpolation search.

Hashing (2L): Hashing functions, collision resolution techniques, Hash applications.

Graphs (5L):

Graph definitions and concepts (directed/undirected graph, weighted/un-weighted edges, sub-graph, degree, cut-vertex/ articulation point, pendant node, clique, complete graph, connected components – strongly connected component, weakly connected component, path, shortest path, Graph representations/storage implementations – adjacency matrix, adjacency list, adjacency multi-list. Graph traversal and connectivity – Depth-first search (DFS), Breadth-first search (BFS) – concepts of edges used in DFS and BFS (tree-edge, back-edge, cross-edge, forward-edge), applications. Minimal spanning tree – Prim’s algorithm (basic idea of greedy methods).

Reference

1. “Data Structures in C” by Aaron M. Tenenbaum.
2. “Data Structures and algorithms ” by S. Lipschutz
3. Data Structure using C by P. Gupta

Paper Name:-	Computer organization
Paper Code:-	CS303
Contacts:-	3-1-0-4
Credit Point:-	4
Syllabus:-	
Pre-requisite: Concept of basic components of a digital computer, Basic concept of Fundamentals & Programme structures. Basic number systems, Binary numbers, representation of signed and unsigned numbers, Binary Arithmetic as covered in Basic Computation & Principles of Computer Programming Second semester, first year. Boolean Algebra, Karnaugh Maps, Logic Gates – covered in Basic Electronics in First year	
Module – 1: [8L]: Von Neumann and Harvard Architecture, Von Neumann Bottleneck. Fetch, decode and execute cycle, Concept of operator, operand, registers and storage, Instruction format. Instruction sets and addressing modes. [7L]	
2’s Complement Number systems. Fixed and floating point representation of numbers. [1L]	
Module – 2: [8L]: Design of adders – Serial vs Parallel Adders, ripple carry, carry look ahead and carry save adder. [3L]	



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Design of ALU. [1L], Fixed point multiplication -Booth's algorithm. [1L], Fixed point division - Restoring and non-restoring algorithms. [2L], Floating point - IEEE 754 standard. [1L]  
Module – 3: [10L]: Memory unit design with special emphasis on implementation of CPU-memory interfacing. [2L]  
Memory organization, static and dynamic memory, memory hierarchy, associative memory. [3L], Cache memory, Virtual memory. Data path design for read/write access. [5L]  
Module – 4: [10L]: Design of control unit - hardwired and microprogrammed control. [3L], Introduction to instruction pipelining. [2L], Introduction to RISC architectures. RISC vs CISC architectures. [2L], I/O operations – Programmed IO, Memory mapped IO, Polled I/O, interrupt and DMA. [3L]

Paper Name:-	Analog & Digital Electronics
Paper Code:-	CS 304
Contacts:-	3-0-0-3
Credit Point:-	3
Syllabus:-	
Module -1: [6L] 1. Different Classes of Amplifiers - (Class-A, B, AB and C - basic concepts, power, efficiency [2L]; Recapitulation of basic concepts of Feedback and Oscillation [1L], 2. Astable & Monostable Multivibrators [1L]; Schmitt Trigger circuits [1L], 555 Timer [1L].	
Digital Electronics	
Module – 2: [12 L] 1. Binary Number System & Boolean Algebra (recapitulation ) [1L]; BCD, ASCII, EBDIC, Gray codes and their Conversions [1L]; Signed binary number representation with 1's and 2's complement methods [1L], Binary arithmetic, Venn diagram, Boolean algebra (recapitulation) [1L]; Representation in SOP and POS forms [1L]; Minimization of logic expressions by algebraic method. [2L] 2. Combinational circuits - Adder and Subtractor circuits (half & full adder & subtractor) [2L]; Encoder, Decoder, Comparator, Multiplexer, De-Multiplexer and Parity Generator circuits and design. [3L].	
Module - 3: [15L] 1. Sequential Circuits - Basic Flip-flop & Latch [1L], Flip-flops -SR, JK, D, T and JK Master-slave, One Flip Flop to another Flip-Flop design. [3L] 2. Registers (SISO, SIPO, PIPO, PISO), bidirectional universal Shift Register. [2L] 3. Ring counter, Johnson counter [1L], Basic concept and designing of Mod N Counter, Synchronous and Asynchronous counters and their design [4L] Sequence generator and Programmable Logic Devices-PLD, PLA, PAL, FPGA structures & applications[4L].	
Module – 4: [4L] 1. IC Digital Logic Families - Characteristics of digital IC's, Transistor – Transistor Logic family, Standard TTL characteristics, Totem pole, Open collector TTL, Tristate TTL, Basic ideas about ECL Metal-oxide semiconductor (MOS) family, NMOS and CMOS gates and their characteristics. Total: 37 hours	
Reference	
<i>Textbooks:</i> Microelectronics Engineering - Sedra& Smith-Oxford. Principles of Electronic Devices & circuits—B L Thereja&Sedha—S Chand Digital Electronics – salivhanan – Vikas Digital Electronics – Logic & Systems by J.Bigmeil&R.Donovan; Cambridge Learning.	
<i>Reference:</i> Electronic Devices & Circuit Theory – Boyelstad&Nashelsky - PHI Bell-Linear IC & OP AMP—Oxford Morries Mano- Digital Logic Design- PHI R.P.Jain—Modern Digital Electronics, 2/e ,McGraw Hill H.Taub&D.Shilling, Digital Integrated Electronics- McGraw Hill. D.RayChaudhuri- Digital Circuits-Vol-I & II, 2/e- Platinum Publishers Leach &Malvino—Digital Principles & Application, 5/e, McGraw Hill	





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Paper Name:-	Communication Engg.& Coding Theory
Paper Code:-	EC(CS) 305
Contacts:-	3-0-0-3
Credit Point:-	3
<p>Syllabus:-</p> <p>Module - 1: <i>Elements of Communication system, Analog Modulation &amp; Demodulation, Noise, SNR Analog-to-Digital Conversion.</i> (Basic ideas in brief) [9]</p> <p>Details: Introduction to Base Band transmission &amp; Modulation (basic concept) (IL); Elements of Communication systems (mention of transmitter, receiver and channel); origin of noise and its effect, Importance of SNR in system design (IL); Basic principles of Linear Modulation (Amplitude Modulation), brief ideas about SSB-SC and DSB-SC (Generation and Detection not required) (IL); Basic principles of Non-linear modulation (Angle Modulation - FM, PM). Basics of PLL (IL); Sampling theorem, Sampling rate, Impulse sampling, Reconstruction from samples, Aliasing (IL); Analog Pulse Modulation - PAM (Natural &amp; flat topped sampling), PWM, PPM (IL); Basic concept of Pulse Code Modulation, Block diagram of PCM (IL); Multiplexing - TDM, FDM basic ideas (IL);</p> <p>Module - 2: Digital Transmission: [8]</p> <p>Details: Concept of Quantisation &amp; Quantisation error, Uniform Quantiser (IL); Non-uniform Quantiser, A-law &amp; <math>\mu</math>-law. Companding (mention only) (IL); Encoding, Coding efficiency (IL); Line coding &amp; properties, NRZ &amp; RZ, AMI, Manchester coding (IL); Baseband Pulse Transmission, Matched filter (mention of its importance and basic concept only), Error rate due to noise (2L); ISI, Raised cosine function, Nyquist criterion for distortion-less base-band binary transmission, Eye pattern, Signal power in binary digital signals (2L);</p> <p>Module - 3: Digital Carrier Modulation &amp; Demodulation Techniques: [8]</p> <p>Details: Bit rate, Baud rate (IL); Information capacity, Shannon's limit (IL); M-ary encoding, Introduction to the different digital modulation techniques - ASK, FSK, PSK, BPSK, QPSK, mention of 8 BPSK, 16 BPSK (2L); Introduction to QAM, mention of 8QAM, 16 QAM without elaboration (IL); Delta modulation, Adaptive delta modulation (basic concept and importance only, no details) (IL); introduction to the concept of DPCM, Delta Modulation, Adaptive Delta modulation and their relevance (IL); Spread Spectrum Modulation - concept only. (IL).</p> <p>Module - 4: Information Theory &amp; Coding: [8]</p> <p>Details: Introduction, News value &amp; Information content (IL); Entropy (IL); Mutual information (IL); Information rate (IL); Shannon-Fano algorithm for encoding (IL); Shannon's Theorem - Source Coding Theorem (IL); Channel Coding Theorem, Information Capacity Theorem (basic understanding only) (IL); Error Control &amp; Coding - basic principle only. (IL);</p> <p>Reference</p> <p><i>Text Books:</i></p> <ol style="list-style-type: none"> <li>1 Communication System by B.P.Lathi, Oxford publisher.</li> <li>2. Data Communication and Networking by Behrouz A. Forouzan, Published by Tata McGraw-Hill</li> <li>3 Analog and Digital Communication System by Sanjay Sharma, Published by Katson</li> </ol> <p><i>References:</i></p> <ol style="list-style-type: none"> <li>4. Communication Systems 4th Edition by Simon Haykin; Published by Wiley India (Student Edition)</li> <li>5. Principles and Analog and Digital Communication by Jerry D Gibson, Published by MacMillan.</li> <li>6. Communication Systems by A. B. Carlson, Published by McGraw-Hill.</li> </ol>	

Paper Name:-	Numerical Methods Lab
Paper Code:-	M(CS) 391
Contacts:-	0-0-2-2
Credit Point:-	2



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**Syllabus:-**

Assignments on Newton forward /backward, Lagrange's interpolation.  
 Assignments on Interpolation, Newton's Divided difference.  
 Assignments on numerical integration using Trapezoidal rule, Simpson's 1/3 rule, Simpson's 3/8 rule.  
 Assignments on numerical solution of a system of linear equations using Gauss elimination and Gauss-Seidel iterations.  
 Assignments on numerical solution of Algebraic Equation by Regular-falsi and Newton-Raphson methods.  
 Assignments on ordinary differential equation: Euler's and Runge-Kutta methods.

Paper Name:-	Data Structure & Algorithm Lab
Paper Code:-	CS-392
Contacts:-	0-0-3-3
Credit Point:-	2

**Syllabus:-**

Experiments should include but not limited to :

Implementation of array operations: insertion, deletion. Sparse representation of an array. Multiplication, addition of two Sparse Matrices.

Stacks and Queues: stacks & queues implementation using array. Adding, deleting elements in Circular Queue. Priority Queue implementation, Infix to postfix conversion, postfix evaluation using stack. Implementation of some recursion functions.

Evaluation of expressions on Multiple stacks & queues:

Implementation of linked lists: inserting, deleting, inverting a linked list. Merge two linked Lists, Break a linked list into two parts. Implement the operations on Doubly Linked list, Circular Linked List.

Implementation of stacks & queues using Linked List.

Polynomial addition, Polynomial multiplication.

Implementation of different Sorting Algorithms.

Implementation of different Searching Methods, Hash tables implementation.

Tree implementation using array, using Linked List. Recursive and Non recursive traversal of Trees

Threaded binary tree traversal. AVL tree implementation, Application of Trees.

Implementation of Graph, Graph traversal using BFS and DFS, find shortest path in a graph.

**Computer organization**

**Code: CS393**

**Contacts: 3**

**Credits: 2**

1. Familiarity with IC-chips, e.g.  
 a) Multiplexer , b) Decoder, c) Encoder b) Comparator  
 Truth Table verification and clarification from Data-book.
  2. Design an Adder/Subtractor composite unit .
  3. Design a BCD adder.
  4. Design of a 'Carry-Look-Ahead' Adder circuit.
  5. Use a multiplexer unit to design a composite ALU .
  6. Use ALU chip for multibit arithmetic operation.
  7. Implement read write operation using RAM IC.
  8. (a) & (b) Cascade two RAM ICs for vertical and horizontal expansion.
- (Detailed instructions for Laboratory Manual to follow for further guidance. The details will be uploaded in the website from time to time)

Paper Name:-	Analog & Digital Electronics Lab
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Syllabus for UG Classes effective from First July, 2013

Paper Code:-	CS 394
Contacts:-	0-0-3-3
Credit Point:-	2
Syllabus:- ANALOG: At least any two of the following 1. Design a Class A amplifier 2. Design a Phase-Shift Oscillator 3. Design of a Schmitt Trigger using 555 timer. DIGITAL: At least any four of the following 1. Design a Full Adder using basic gates and verify its output / Design a Full Subtractor circuit using basic gates and verify its output. 2. Construction of simple Decoder & Multiplexer circuits using logic gates. 3. Realization of RS / JK / D flip flops using logic gates. 4. Design of Shift Register using J-K / D Flip Flop. 5. Realization of Synchronous Up/Down counter. 6. Design of MOD- N Counter	

SECOND YEAR SECOND SEMESTER

Paper Name:-	VALUES & ETHICS IN PROFESSION
Paper Code:-	HU-401
Contacts:-	3-0-0-3
Credit Point:-	3
Syllabus:- Science, Technology and Engineering as knowledge and as Social and Professional Activities. Effects of Technological Growth: Rapid Technological growth and depletion of resources, Reports of the Club of Rome. Limits of growth: sustainable development Energy Crisis: Renewable Energy Resources, Environmental degradation and pollution. Eco-friendly Technologies. Environmental Regulations, Environmental Ethics, Appropriate Technology Movement of Schumacher; later developments Technology and developing notions. Problems of Technology transfer, Technology assessment impact analysis. Human Operator in Engineering projects and industries. Problems of man, machine, interaction, Impact of assembly line and automation. Human centered Technology. Ethics of Profession: Engineering profession: Ethical issues in Engineering practice, Conflicts between business demands and professional ideals. Social and ethical responsibilities of Technologists. Codes of professional ethics. Whistle blowing and beyond, Case studies. Profession and Human Values: Values Crisis in contemporary society Nature of values: Value Spectrum of a good life Psychological values: Integrated personality; mental health Societal values: The modern search for a good society, justice, democracy, secularism, rule of law, values in Indian Constitution. Aesthetic values: Perception and enjoyment of beauty, simplicity, clarity Moral and ethical values: Nature of moral judgements; canons of ethics; ethics of virtue; ethics of duty; ethics of responsibility.	
Reference 1. Stephen H Unger, Controlling Technology: Ethics and the Responsible Engineers, John Wiley & Sons, New York 1994 (2 <sup>nd</sup> Ed) 2. Deborah Johnson, Ethical Issues in Engineering, Prentice Hall, Englewood Cliffs, New Jersey 1991. 3. A N Tripathi, Human values in the Engineering Profession, Monograph published by IIM, Calcutta 1996.	

Paper Name:-	Mathematics III
Paper Code:-	M 401



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 Syllabus for UG Classes effective from First July, 2013

<b>Contacts:-</b>	<b>3-1-0-4</b>
<b>Credit Point:-</b>	<b>4</b>
<p><b>Module-1:</b>  <b>Theory of Probability:</b> Classical definition of probability and its limitation. Axiomatic definition of probability, Conditional probability, Independent events and related problems, Baye's theorem ( statement only) &amp; related problems. One dimensional random variable. Probability distributions- (discrete and continuous); Expectation and Variance. Binomial; Poisson, Uniform, Exponential, Normal distributions and related problems. <math>t</math>, <math>\chi^2</math> and F-distribution( Definition only). Transformation of random variables, Central Limit Theorem. 10L</p> <p><b>Module-2:</b>  <b>Sampling Theorem:</b> Random sampling, Parameter. Statistic and its Sampling. Standard error of statistic. Sampling distribution of sample mean and variance in random sampling from a normal distribution (Statement only) and related problems.  <b>Estimation of parameters:</b> Consistent and unbiased estimators. Point estimation. Interval estimation. Maximum likelihood estimation of parameters (Binomial, Poisson and Normal ). Confidence intervals and related problems. 7L</p> <p><b>Module-3:</b>  <b>Testing of Hypothesis:</b> Simple and Composite hypothesis; Critical Region; Level of Significance; Type-I and Type-II errors. One sample and two sample tests for mean and proportions. <math>\chi^2</math> test of goodness of fit 5L</p> <p><b>Module-4:</b>  <b>Graph Theory:</b>, graphs. Digraphs. Graph isomorphism. Weighted graph. Connected and disconnected graph. Complement of a graph. Regular graph. Complete graph. Sub graph. Walks. Paths. Trail. Cycle. Circuits. Euler graph. Cut sets and cut vertices. Matrix representation of a graph. Adjacency and incidence matrices of a graph. Bipartite graph. Definition and properties of tree. Binary tree. Spanning tree of a graph. Minimal spanning tree. Properties of trees. Algorithms. Dijkstra's algorithm for shortest path problem. Determination of minimal spanning tree using DFS, BFS, Kruskal's and Prim's algorithm. Planar and dual graphs. Network. Flow Augmented path. Ford –Fulkerson algorithm for Max Flow-Mini Cut Theorem ( Statement only). 20L</p> <p><b>Books:</b></p> <ol style="list-style-type: none"> <li>1. Graph Theory: V.K.Balakrishnan, Schaum's Outline, THM</li> <li>2. Introduction to Graph Theory, D.B.West, PHI</li> <li>3. Graph Theory, N.Deo, PHI</li> <li>4. Mathematical Probability A.Banerjee, S.K.De and S.Sen ( U.N.Dhur &amp; Sons)</li> <li>5. Mathematical Statistics, S.K.De and S.Sen ( U.N.Dhur &amp; Sons)</li> <li>6. Statistical Methods, N.G.Das, TMH</li> <li>7. Fundamentals of Mathematical Statistics: A Modern Approach, S.C.Gupta, V.K.Kapoor (S.Chand)</li> </ol>	

**Formal Language & Automata Theory, CS 401, 3-1-0-4, 4**

Prerequisites of Formal Language & Automata Theory:

Elementary discrete mathematics including the notion of set, function, relation, product, partial order, equivalence relation, graph & tree. They should have a thorough understanding of the principle of mathematical induction.

Fundamentals: Basic definition of sequential circuit, block diagram, mathematical representation, concept of transition table and transition diagram (Relating of Automata concept to sequential circuit concept) . Design of sequence detector, Introduction to finite state model [ 2L]

Finite state machine: Definitions, capability & state equivalent,  $k^{\text{th}}$ - equivalent concept [ 1L]

Merger graph, Merger table, Compatibility graph [ 1L]

Finite Memory Machine, Definiteness, Testing Table, Testing Graph [2L]

Deterministic finite automaton and non deterministic finite automaton. [1L]

Transition diagrams and Language recognizers. [1L]

Finite Automata: NFA with lamda transitions - Significance, acceptance of languages. [1L]

Conversions and Equivalence: Equivalence between NFA with and without  $\hat{I}$  transitions. NFA to DFA conversion. [2L]

Minimization of FSM, Equivalence between two FSM's , Limitations of FSM [1L]

Application of finite automata, Finite Automata with output- Moore & Melay machine. [2L]



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Learning outcome of Finite Automata: The student will be able to define a system and recognize the behavior of a system. They will be able to minimize a system and compare different systems.

Regular Languages : Regular sets. [1L]

Regular expressions, identity rules. Arden's theorem state and prove [1L]

Constructing finite Automata for a given regular expressions, Regular string accepted by NFA/DFA [1L]

Pumping lemma of regular sets. Closure properties of regular sets (proofs not required). [1L]

Grammar Formalism: Regular grammars-right linear and left linear grammars. [1L]

Equivalence between regular linear grammar and FA. [1L]

Inter conversion, Context free grammar. [1L]

Derivation trees, sentential forms. Right most and leftmost derivation of strings. (Concept only) [1L]

Learning outcome of Regular Languages and Grammar:

Student will convert Finite Automata to regular expression. Students will be able to check equivalence between regular linear grammar and FA.

Context Free Grammars, Ambiguity in context free grammars. [1L]

Minimization of Context Free Grammars. [1L]

Chomsky normal form and Greibach normal form. [1L]

Pumping Lemma for Context Free Languages. [1L]

Enumeration of properties of CFL (proofs omitted). Closure property of CFL, Ogden's lemma & its applications [1L]

Push Down Automata: Push down automata, definition. [1L]

Acceptance of CFL, Acceptance by final state and acceptance by empty state and its equivalence. [1L]

Equivalence of CFL and PDA, interconversion. (Proofs not required). [1L]

Introduction to DCFL and DPDA. [1L]

Learning outcome of PDA and context free grammar:

Students will be able to minimize context free grammar. Student will be able to check equivalence of CFL and PDA. They will be able to design Turing Machine

Turing Machine : Turing Machine, definition, model [1L]

Design of TM, Computable functions, Recursive Functions & Sets, Recursively Enumerable Sets, Equivalent Models [2L], Church's hypothesis, counter machine [1L]

Types of Turing machines (proofs not required) [1 L], Universal Turing Machine, Halting problem [2L]

Learning outcome of Turing Machine: Students will be able to design Turing machine.

TEXT BOOKS:

"Introduction to Automata Theory Language and Computation", Hopcroft H.E. and Ullman J. D., Pearson Education.

"Theory of Computer Science", Automata Languages and computation", Mishra and Chandrashekar, PHI.

"Formal Languages and Automata Theory", C.K.Nagpal, Oxford

1. "Switching & Finite Automata", ZVI Kohavi, 2nd Edn., Tata McGraw Hill

2. "Introduction to Computer Theory", Daniel I.A. Cohen, John Wiley

3. "Introduction to languages and the Theory of Computation", John C Martin, TMH

4. "Elements of Theory of Computation", Lewis H.P. & Papadimitrou C.H. Pearson, PHI

Physics, PH-401, 3-1-0-4, Credit Point:- 4

Vector Calculus: 1.1 Physical significances of grad., div., curl.. Line integral., surface integral., volume integral-- physical examples in the context of electricity and magnetism and statements of Stokes theorem and Gauss theorem [[No Proof]]..Expression of grad., div., curl and Laplacian in Spherical and Cylindrical co-ordinates.. 2L

Electricity: 2.1 Coulombs law in vector form.. Electrostatic field and its curl.. Gauss's law in integral form and conversion to differential form .. Electrostatic potential and field., Poisson's Eqn.. Laplace's eqn (Application to Cartesian., Spherically and Cylindrically symmetric systems – effective 1D problems)) Electric current, drift velocity, Current Density, continuity equation, steady current

2.2 Dielectrics--concept of polarization., the relation  $D = \epsilon_0 E + P$ , Polarizability. Electronic polarization and polarization in monatomic and polyatomic gasses. 3L

Magnetostatics & Time Varying Field: 3. Lorentz force., force on a small current element placed in a magnetic field.. Biot--Savart law and its applications., divergence of magnetic field., vector potential., Ampere's law in



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integral form and conversion to differential form. Faraday’s law of electro-magnetic induction in integral form and conversion to differential form. 3L  
 Electromagnetic Theory: 4.1 Concept of displacement current Maxwell’s field equations, Maxwell’s wave equation and its solution for free space. E.M. wave in a charge free conducting media, Skin depth, physical significance of Skin Depth, E.M. energy flow, & Pointing Vector.6L  
 Quantum Mechanics: 5.1 Generalized coordinates, Lagrange’s Equation of motion and Lagrangian, generalized force potential, moments and energy. Hamilton’s Equation of motion and Hamiltonian.. Properties of Hamilton and Hamilton’s equation of motion.

Paper Name:-	Operating System
Paper Code:-	CS 402
Contacts:-	3-0-0-3
Credit Point:-	3

Introduction[4L]  
 Introduction to OS. Operating system functions, evaluation of O.S., Different types of O.S.: batch, multi-programmed, time-sharing, real-time, distributed, parallel.  
 System Structure[3L]  
 Computer system operation, I/O structure, storage structure, storage hierarchy, different types of protections, operating system structure(simple, layered, virtual machine), O/S services, system calls.  
 Process Management [17L]  
 Processes[3L]: Concept of processes, process scheduling, operations on processes, co-operating Processes, inter-process communication.  
 Threads[2L]:overview, benefits of threads, user and kernel threads.  
 CPU scheduling[3L]:scheduling criteria, preemptive & non-preemptive scheduling, scheduling algorithms (FCFS, SJF, RR, priority), algorithm evaluation, multi-processor scheduling.  
 Process Synchronization [5L]: background, critical section problem, critical region, synchronization hardware, classical problems of synchronization, semaphores.  
 Deadlocks [4L]:system model, dead lock characterization, methods for handling deadlocks, deadlock prevention, deadlock avoidance , deadlock detection, recovery from deadlock.  
 Storage Management[19L]  
 Memory Management[5L]:background, logical vs. physical address space, swapping, contiguous memory allocation, paging, segmentation, segmentation with paging.  
 Virtual Memory[3L]: background, demand paging, performance, page replacement, page replacement algorithms (FCFS, LRU), allocation of frames, thrashing.  
 File Systems[4L]: file concept, access methods, directory structure, file system structure, allocation methods (contiguous, linked, indexed), free space management (bit vector, linked list, grouping),directory implementation (linear list, hash table), efficiency & performance.  
 I/O Management [4L]: I/O hardware, polling, interrupts, DMA, application I/O interface (block and character devices, network devices, clocks and timers, blocking and non blocking I/O), kernel I/O subsystem (scheduling, buffering, caching, spooling and device reservation, error handling), performance.  
 Disk Management[3L]: disk structure, disk scheduling, (FCFS, SSTF, SCAN, C-SCAN), disk reliability, disk formatting, boot block, bad blocks.  
 Protection & Security [4L]: Goals of protection, domain of protection, security problem, authentication, one time password, program threats, system threats, threat monitoring, encryption.

Reference

1. Milenkovie M.,“Operating System: Concept & Design”, McGrawHill.
2. Tanenbaum A.S.,“Operating System Design & Implementation”, PracticeHall NJ.
3. Silberschatz A. and PetersonJ. L.,“Operating System Concepts”,Wiley.
4. Dhamdhare: Operating System ,TMH
5. Stallings, William,“Operating Systems”,Maxwell McMillan International Editions,1992.
6. DietelH. N.,“An Introduction to OperatingSystems”,AddisonWesley.



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Paper Name:-	Object Oriented Programming(IT)
Paper Code:-	: CS403
Contacts:-	3-0-0-3
Credit Point:-	3
<p>Syllabus:-</p> <p>Object oriented design [10 L]            Concepts of object oriented programming language, Major and minor elements, Object, Class, relationships among objects, aggregation, links, relationships among classes-association, aggregation, using, instantiation, meta-class, grouping constructs.</p> <p>Object oriented concepts [4 L]            Difference between OOP and other conventional programming – advantages and disadvantages. Class, object, message passing, inheritance, encapsulation, polymorphism</p> <p>Basic concepts of object oriented programming using Java [22 L]            Implementation of Object oriented concepts using Java.            Language features to be covered:            Class &amp; Object proprieties [6L]            Basic concepts of java programming – advantages of java, byte-code &amp; JVM, data types, access specifiers, operators, control statements &amp; loops, array, creation of class, object, constructor, finalize and garbage collection, use of method overloading, this keyword, use of objects as parameter &amp; methods returning objects, call by value &amp; call by reference, static variables &amp; methods, garbage collection, nested &amp; inner classes, basic string handling concepts- String (discuss charAt() , compare To(), equals(), equals Ignore Case(), indexOf(), length() , substring(), to Char Array () , to Lower Case(), to String(), to Upper Case() , trim() , value Of() methods) &amp; String Buffer classes (discuss append(), capacity(), char At(), delete(), delete Char At(), ensure Capacity(), get Chars(),index Of(), insert(), length(), set Char At(), set Length(), substring(), toString() methods), concept of mutable and immutable string,            command line arguments, basics of I/O operations – keyboard input using Buffered Reader &amp; Scanner classes. Reusability properties[6L] – Super class &amp; subclasses – including multilevel hierarchy, process of constructor calling in inheritance,            use of super and final keywords with super() method, dynamic method dispatch, use of abstract classes &amp; methods, interfaces. Creation of packages, importing packages, member access for packages.            Exception handling &amp; Multithreading [6L] – Exception handling basics, different types of exception classes, use of try &amp; catch with throw, throws &amp; finally, creation of user defined exception classes.            Basics of multithreading, main thread, thread life cycle, creation of multiple threads, thread priorities, thread synchronization, inter thread communication, deadlocks for threads, suspending &amp; resuming threads.            Applet Programming (using swing) [4L] – Basics of applet programming, applet life cycle, difference between application &amp; applet programming, parameter passing in applets, concept of delegation event model and listener, I/O in applets, use of repaint(), get Document Base(), get Code Base() methods, layout manager (basic concept), creation of buttons (J Button class only) &amp; text fields.</p>	

**PRACTICAL**

Paper Name:-	Operating System Lab
Paper Code:-	CS-492
Contacts:-	0-0-3-3
Credit Point:-	2
<p>Syllabus:-</p> <ol style="list-style-type: none"> <li>1.Shel programming [6P]: creating a script, making a script executable, shell syntax( variables, conditions, control structures, functions, commands).</li> <li>2.Process[6P]: starting new process, replacing a process image, duplicating a process image, waiting for a process, zombie process.</li> <li>3.Signal[9P]: signal handling, sending signals, signal interface, signal sets.</li> <li>4.Semaphore[6P]: programming with semaphores (use function ssemctl, semget, semop, set_semvalue, del_sem value, semaphore_p, semaphore_v).</li> <li>5.POSIX Threads[9P]: programming with p thread functions (viz. pthread_create, pthread_join, p thread_exit, pthread_attr_init, pthread_cancel)</li> </ol>	



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6. Inter-process communication[9P]: pipes (use functions pipe, popen, pclose), named pipes (FIFOs, accessing FIFO)

Paper Name:-	Object Oriented Programming Lab
Paper Code:-	Code: CS-493
Contacts:-	0-0-3-3
Credit Point:-	2
Syllabus:- 1. Assignments on class, constructor, overloading, inheritance, overriding 2. Assignments on wrapper class, arrays 3. Assignments on developing interfaces- multiple inheritance, extending interfaces 4. Assignments on creating and accessing packages 5. Assignments on multithreaded programming 6. Assignments on applet programming Note: Use Java for programming Preferably download "java_ee_sdk-6u4-jdk7-windows.exe" from <a href="http://www.oracle.com/technetwork/java/javae/downloads/java-ee-sdk-6u3-jdk-7u1-downloads-523391.html">http://www.oracle.com/technetwork/java/javae/downloads/java-ee-sdk-6u3-jdk-7u1-downloads-523391.html</a>	

**Physics-II Lab.**

**Code: PH-491**

**Contacts: (3P)**

**Credit: (2)**

Group 1: Experiments on Electricity and Magnetism

1. Determination of dielectric constant of a given dielectric material.
3. Determination of resistance of ballistic galvanometer by half deflection method and study of variation of logarithmic decrement with series resistance.
4. Determination of the thermo-electric power at a certain temperature of the given thermocouple.
5. Determination of specific charge (e/m) of electron by J.J. Thomson's method.

Group 2: Quantum Physics

6. Determination of Planck's constant using photocell.
7. Determination of Lande's g factor using Electron spin resonance spectrometer.
8. Determination of Stefan's radiation constant
9. Verification of Bohr's atomic orbital theory through Frank-Hertz experiment.
10. Determination of Rydberg constant by studying Hydrogen/ Helium spectrum

Group 3: Modern Physics

11. Determination of Hall coefficient of semiconductors.
12. Determination of band gap of semiconductors.
13. To study current-voltage characteristics, load response, areal characteristics and spectral response of photo voltaic solar cells.
  - a) A candidate is required to perform 3 experiments taking one from each group. Initiative should be taken so that most of the Experiments are covered in a college in the distribution mentioned above. Emphasis should be given on the estimation of error in the data taken.
  - b) In addition a student should perform one more experiments where he/she will have to transduce the output of any of the above experiments or the experiment mentioned in c) into electrical voltage and collect the data in a computer using phoenix or similar interface.
  - c) Innovative experiment: One more experiment designed by the student or the concerned teacher or both.





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HU-481 Technical Report Writing Practice 0-0-2-2-1:

Guidelines for Course Execution:

Objectives of this Course: This course has been designed:

1. To inculcate a sense of confidence in the students.
2. To help them become good communicators both socially and professionally.
3. To assist them to enhance their power of Technical Communication.

Detailed Course Outlines:

Technical Report Writing:

1. Report Types (Organizational / Commercial / Business / Project )
2. Report Format & Organization of Writing Materials
3. Report Writing (Practice Sessions & Workshops)

Interview Sessions;

- a) Training students to face Job Interviews confidently and successfully
- b) Arranging Mock Interviews and Practice Sessions for integrating Listening Skill with Speaking Skill in a formal

situation for effective communication

4. Presentation:

- a) Teaching Presentation as a skill
- b) Strategies and Standard Practices of Individual /Group Presentation
- c) Media & Means of Presentation: OHP/POWER POINT/ Other Audio-Visual Aids

5. Competitive Examination:

- a) Making the students aware of Provincial /National/International Competitive Examinations
- b) Strategies/Tactics for success in Competitive Examinations
- c) SWOT Analysis and its Application in fixing Target

Books – Recommended:

Nira Konar: English Language Laboratory: A Comprehensive Manual PHI Learning, 2011

D. Sudharani: Advanced Manual for Communication Laboratories & Technical Report Writing Pearson Education (W.B. edition), 2011

**THIRD YEAR FIRST SEMESTER**

Paper Name:-	Microprocessors & Microcontrollers
Paper Code:-	CS-501
Contacts:-	3-1-0-4
Credit Point:-	4
Syllabus:-	
Module -1:	[8L]
Introduction to Microcomputer based system. History of evolution of Microprocessor and Microcontrollers and their advantages and disadvantages. [1L] Architecture of 8085 Microprocessor, Pin description of 8085. [2L] Address/data bus Demultiplexing , Status Signals and the control signals. [1L] Instruction set of 8085 microprocessor, Addressing modes, [3L] Timing diagram of the instructions (a few examples). [1L]	
Module -2:	[9L]
Assembly language programming with examples, Counter and Time Delays, Stack and Subroutine, [6L] Interrupts of 8085 processor (software and hardware), I/O Device Interfacing-I/O Mapped I/O and Memory Mapped I/O , Serial (using SID and SOD pins and RIM, SIM Instructions) and Parallel data transfer, [3L]	
Module 3:	[10L]
The 8086 microprocessor- Architecture, Addressing modes, Interrupts [3L] Introduction to 8051 Microcontroller –Architecture, Pin Details. [3L] Addressing modes, Instruction set, Examples of Simple Assembly Language. [4L]	
Module -4:	[9L]
Memory interfacing with 8085, 8086 [2L] Support IC chips- 8255 ,8251,8237/8257,8259 [4L] Interfacing of 8255 PPI with 8085 and Microcontroller 8051. [2L] Brief introduction to PIC microcontroller (16F877) [1L]	



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Reference

1. Microprocessors and microcontrollers - N. Senthil Kumar, M. Saravanan and Jeevananthan (OUP)
2. 8051 Microcontroller – K. Ayala (Cengage learning)
3. MICROPROCESSOR architecture, programming and Application with 8085-R.Gaonkar(Penram)
4. Microcontrollers: Principles & Applications, Ajit Pal, PHI 2011.
5. Naresh Grover, “Microprocessor comprehensive studies Architecture, Programming and Interfacing” Dhanpat Rai, 2003
6. 8051 Microprocessor – V. Udayashankara and M.S Mallikarjunaswami (TMH).
7. Microprocessor 8085 and its Interfacing—S Mathur (PHI)
8. An Introduction to Microprocessor and Applications – Krishna Kant (Macmillan)

Reference:

1. 8086 Microprocessor – K Ayala (Cengage learning)
2. The 8085 Microprocessor, Architecture, Programming and Interfacing- K Uday Kumar, B .S Umashankar (Pearson)
3. The X-86 PC Assembly language, Design and Interfacing - Mazidi, Mazidi and Causey (PEARSON)
4. The 8051 microcontroller and Embedded systems - Mazidi, Mazidi and McKinley (PEARSON)
5. Microprocessors – The 8086/8088, 80186/80386/80486 and the Pentium family – N. B. Bahadure (PHI).
6. The 8051 microcontrollers – Uma Rao and Andhe Pallavi (PEARSON).

Paper Name:-	Software Engineering
Paper Code:-	CS-502
Contacts:-	3-1-0-4
Credit Point:-	4

Software Engineering – Objectives, Definitions, Software Process models - Waterfall Model, Prototype model, RAD, Evolutionary Model, Spiral Model (3L)

Software Project Management- Feasibility Analysis, Technical Feasibility, Project Planning, Cost- Benefit Analysis, Project Estimation Techniques, COCOMO model, Scheduling, Risk Management, Software Configuration Management [8L]

Structured Analysis, Context diagram and DFD, Physical and Logical DFDs, Data Modeling, ER diagrams, Software Requirements Specification (4L)

Design Aspects : Top-Down And Bottom-Up design; Decision tree, decision table and structured English, Structure chart, Transform analysis Functional vs. Object- Oriented approach. [4L]

Unified Modeling Language

Class diagram, interaction diagram: collaboration diagram, sequence diagram, state chart diagram, activity diagram, implementation diagram. (3L)

Coding & Documentation – Structured Programming, Modular Programming, Module Relationship- Coupling, Cohesion, OOP programming, Information Hiding, Reuse, System Documentation. [6L]

Testing – Levels of Testing, Unit Testing, Black Box Testing, White Box Testing, Integration Testing, System Testing. (4L)

Software Quality, Reliability, Quality Assurance, Software Maintenance, Software Architecture. [6L]

Reference

Software Engineering- Rajib Mall (PHI)

Software Engineering : A practitioner’s approach– Pressman (TMH)

Software Engineering Principles and Practices-Deepak Jain (Oxford)

Software Engineering – Agarwal and Agarwal (PHI)

Paper Name:-	Design & Analysis of Algorithm
Paper Code:-	CS-503
Contacts:-	3-1-0-4
Credit Point:-	4



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**Syllabus:-**

Complexity Analysis: [2L]

Time and Space Complexity, Different Asymptotic notations—their mathematical significance, Algorithm Design Techniques.

Divide and Conquer:[4L]

Basic method, use, Examples—Binary Search, Merge Sort, Quick Sort and their complexity. Heap Sort and its complexity.

Dynamic Programming:[3L]

Basic method, use, Examples— Matrix Chain Manipulation, All pair shortest paths, single source shortest path.

Backtracking:[2L]

Basic method,use, Examples—8queensproblem,Graph coloring problem.

Greedy Method:[3L]

Basic method, use, Examples—Knapsack problem, Job sequencing with deadlines, Minimum cost spanning tree by Prim’s and Kruskal’s algorithm.

Lower Bound Theory:[1L]

$O(n \lg n)$  bound for comparison sort.

Disjoint set manipulation:[2L]

Set manipulation algorithm like UNION-FIND, union by rank, path compression technique.

Graph traversal algorithm: Recapitulation[1L]

Breadth First Search(BFS)and Depth First Search(DFS)—Classification of edges—tree, forward, back and cross edges—complexity and comparison.

String matching problem:[3L]

Different techniques—Naïve algorithm, string matching using finite automata, and Knuth, Morris, Pratt(KMP) algorithm with their complexities.

Amortized Analysis:[3L]

Aggregate, Accounting, and Potential Method.

Matrix Manipulation Algorithm:[1L]

Strassen’s matrix manipulation algorithm with complexity.

Notion of NP-completeness:[3L]

P class, NP class, NP hard class, NP complete class—their interrelationship, Satisfiability problem, Cook’s theorem (Statement only), Clique decision problem.

Approximation Algorithms:[3L]

Necessity of approximation scheme, performance guarantee and polynomial time approximation schemes, travelling salesman problem.

**Text Book:**

1. T. H. Cormen, C. E. Leiserson, R. L. Rivest and C. Stein, “Introduction to Algorithms”.
2. A. Aho, J. Hopcroft and J. Ullman “The Design and Analysis of Algorithms.”
3. D. E. Knuth “The Art of Computer Programming”, Vol. 3.
4. Jon Kleinberg and Eva Tardos, "Algorithm Design."

**Reference:**

1. K. Mehlhorn, “Data Structures and Algorithms”- Vol. I & Vol. II.
2. S. Baase “Computer Algorithms.”
3. E. Horowitz and Shani “Fundamentals of Computer Algorithms.”
4. E. M. Reingold, J. Nievergelt and N. Deo- “Combinatorial Algorithms- Theory and Practice”, Prentice Hall, 1997.

Paper Name:-	Operation Research(M)
Paper Code:-	CS-504A
Contacts:-	3-1-0-4
Credit Point:-	4



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Linear Programming Problems (LPP):  
 Basic LPP and Applications; Various Components of LP Problem Formulation.  
 Solution of Linear Programming Problems:  
 Solution of LPP: Graphical Method;  
 Definitions: Feasible Solution, Basic and non-basic Variables, Basic Feasible Solution, Degenerate and Non-degenerate Solution,  
 Convex set and explanation with examples. 5L  
 Solution of LPP by Simplex Method; Charnes' Big-M Method; Duality Theory. Transportation Problems and Assignment Problems.  
 Network Analysis:  
 Shortest Path: Floyd Algorithm; Maximal Flow Problem (Ford-Fulkerson); PERT-CPM (Cost Analysis, Crashing, Resource , Allocation excluded). 6L  
 Inventory Control: Introduction to EOQ Models of Deterministic and Probabilistic ; 3L  
 Game Theory:  
 Introduction; 2-Person Zero-sum Game; Saddle Point; Mini-Max and Maxi-Min Theorems (statement only) and problems; Games without Saddle Point;  $n \times 2$  or  $2 \times n$ ; Principle of Dominance. 5L  
 Queuing Theory:  
 Introduction; Basic Definitions and Notations; Axiomatic Derivation of the Arrival & Departure (Poisson Queue). Poisson Queue  
 Models: (M/M/1): ( $\infty$  / FIFO) and (M/M/1: N / FIFO) and problems. 5L  
 Integer Programming: Branch and Bound Method, Cutting Plane Method. 5L

Text Books: 1. Ghosh and Chakraborty, "Linear Programming and Theory of Games", Central Book Agency.  
 2. P. M. Karak – "Linear Programming and Theory of Games", ABS Publishing House.  
 3. H. A. Taha, "Operations Research", Pearson.  
 4. Ravindran, Philips and Solberg - "Operations Research", WILEY INDIA  
 References: 1. Kanti Swaroop — "Operations Research", Sultan Chand & Sons.  
 2. Rathindra P. Sen—"Operations Research: Algorithms and Applications", PHI.  
 3. R. Panneerselvam - "Operations Research", PHI.  
 4. A.M. Natarajan, P. Balasubramani and A. Tamilarasi - "Operations Research", Pearson

Paper Name:-	Multimedia Technology (IT)
Paper Code:-	CS-504B
Contacts:-	3-1-0-4
Credit Point:-	4

Introduction [2L]  
 Multimedia today, Impact of Multimedia, Multimedia Systems, Components and Its Applications  
 Text and Audio [6L]  
 Text: Types of Text, Ways to Present Text, Aspects of Text Design, Character, Character Set, Codes, Unicode, Encryption;  
 Audio: Basic Sound Concepts, Types of Sound, Digitizing Sound, Computer Representation of Sound (Sampling Rate, Sampling Size, Quantization), Audio Formats, Audio tools, MIDI  
 Image and Video (8L)  
 Image: Formats, Image Color Scheme, Image Enhancement; Video: Analogue and Digital Video, Recording Formats and Standards (JPEG, MPEG, H.261) Transmission of Video Signals, Video Capture, and Computer based Animation.  
 Synchronization [4L]  
 Temporal relationships, synchronization accuracy specification factors, quality of service Storage models and Access Techniques [(4L]  
 Magnetic media, optical media, file systems (traditional, multimedia)  
 Multimedia devices – Output devices, CD-ROM, DVD, Scanner, CCD  
 Image and Video Database [8L]  
 Image representation, segmentation, similarity based retrieval, image retrieval by color, shape and texture;



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indexing- kd trees, R-trees, quad trees; Case studies- QBIC, Virage. Video Content, querying, video segmentation, indexing Document Architecture and Content Management [9L]  
 Content Design and Development, General Design Principles  
 Hypertext: Concept, Open Document Architecture (ODA), Multimedia and Hypermedia Coding Expert Group (MHEG), Standard Generalized Markup Language (SGML), Document Type Definition (DTD), Hypertext Markup , Language (HTML) in Web Publishing. Case study of Applications  
 Multimedia Applications [4L]  
 Interactive television, Video-on-demand, Video Conferencing, Educational Applications, Industrial Applications, Multimedia archives and digital libraries, media editors.

**Books:**

1. Ralf Steinmetz and Klara Nahrstedt , Multimedia: Computing, Communications & Applications , Pearson
2. Nalin K. Sharda , Multimedia Information System , PHI.
3. Fred Halsall , Multimedia Communications , Pearson Ed.
4. Koegel Buford , Multimedia Systems , Pearson Ed.
5. Fred Hoffstetter , Multimedia Literacy , McGraw Hill.
6. Ralf Steinmetz and Klara Nahrstedt ,Multimedia Fundamentals:Vol.1-Media Coding and Content Processing

Paper Name:-	Discrete Mathematics(M)
Paper Code:-	CS-504C
Contacts:-	3-0-0-3
Credit Point:-	3

Module I: Introduction to Propositional Calculus: Propositions, Logical Connectives, Conjunction, Disjunction, Negation and their truth table. Conditional Connectives, Implication, Converse, Contrapositive, Inverse, Biconditional statements with truth table, Logical Equivalence, Tautology, Normal forms-CNF, DNF . 10L  
 Module II: Theory of Numbers: Well Ordering Principle, Divisibility theory and properties of divisibility; Fundamental theorem of Arithmetic; Euclidean Algorithm for finding G.C.D and some basic properties of G.C.D with simple examples; Congruences, Residue classes of integer modulo ( $^nZ_n$ ) and its examples. Order, Relation and Lattices: POSET, Hasse Diagram, Minimal , Maximal, Greatest and Least elements in a POSET, Lattices and its properties, Principle of Duality, Distributive and Complemented Lattices. 10L  
 Module III: Counting Techniques: Permutations, Combinations, Binomial coefficients, Pigeon- hole Principle, Principles of inclusion and exclusions; Recurrence relations: Formulation/Modelling of different counting problems in terms of recurrence relations, Solution of linear recurrence relations with constant coefficients ( upto second order) by (i) The iterative method (ii) Characteristic roots method (iii) Generating functions method. 10L  
 Module IV: Graph Coloring: Chromatic Numbers and its bounds, Independence and Clique Numbers, Perfect Graphs-Definition and examples, Chromatic polynomial and its determination, Applications of Graph Coloring.  
 Matchings: Definitions and Examples of Perfect Matching, Maximal and Maximum Matching, Hall's Marriage Theorem (Statement only) and related problems. 6L

**Reference**

1. Pulak Kundu, KPBS.
2. B.K .PAL & K.DAS U.N DHUR & SONS PRIVATE LTD.
3. Russell Merris, Combinatorics, Wiley-Interscience series in Discrete Mathematics and Optimisation
4. N. Chandrasekaran and M. Umaparvathi, Discrete Mathematics, PHI
5. Gary Haggard, John Schlipf and Sue Whitesides, Discrete Mathematics for Computer Science, CENGAGE Learning
6. Gary Chartrand and Ping Zhang – Introduction to Graph Theory, TMH



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Paper Name:-	Computer Architecture
Paper Code:-	CS-505
Contacts:-	3-1-0-4
Credit Point:-	4
<p>Pre-requisite: Basic Electronics in First year, Principle of Computer Programming in second semester, Analog &amp; Digital Electronics and Computer Organization in Third semester.</p> <p>Introduction: Review of basic computer architecture (Revisited), Quantitative techniques in computer design, measuring and reporting performance. (3L)</p> <p>Pipelining: Basic concepts, instruction and arithmetic pipeline, data hazards, control hazards and structural hazards, techniques for handling hazards. Exception handling. Pipeline optimization techniques; Compiler techniques for improving performance. (9L)</p> <p>Module – 2: [8L] Hierarchical memory technology: Inclusion, Coherence and locality properties; Cache memory organizations, Techniques for reducing cache misses; Virtual memory organization, mapping and management techniques, memory replacement policies. (8L)</p> <p>Module – 3: [6L] Instruction-level parallelism: basic concepts, techniques for increasing ILP, superscalar, super pipelined and VLIW processor architectures. Array and vector processors. (6L)</p> <p>Module – 4: [12 L] Multiprocessor architecture: taxonomy of parallel architectures; Centralized shared-memory architecture: synchronization, memory consistency, interconnection networks. Distributed shared-memory architecture. Cluster computers. (8L)</p> <p>Non von Neumann architectures: data flow computers, reduction computer architectures, systolic architectures.</p>	
<p>Reference</p> <p>Advanced Computer Architecture: Parallelism, Scalability, Programmability            Publisher: McGraw Hill Education (India) Private Limited</p> <p>2 Computer Architecture and Parallel Processing 1st Edition , BRIGGS , HWANG Publisher: TMH</p> <p>3. Computer Organization and Architecture , T K Ghosh, Tata McGraw - Hill Education</p>	

**PRACTICAL**

Paper Name:-	Microprocessor & Microcontroller Lab
Paper Code:-	CS-591
Contacts:-	0-0-3-3
Credit Point:-	2
<p>Module 1: <span style="float: right;">3P</span>            Study of Prewritten programs on 8085 trainer kit using the basic instruction set (data transfer, Load/Store, Arithmetic, Logical). Or, Familiarization with 8085 simulator on PC. Programs using basic instruction set (data transfer, Load/Store, Arithmetic, Logical) on the simulator</p> <p>Module 2: <span style="float: right;">18P</span>            Programming using kit or Simulator for:</p> <ol style="list-style-type: none"> <li>1. Table look up</li> <li>2. Copying a block of memory</li> <li>3. Shifting a block of memory</li> <li>4. Packing and unpacking of BCD numbers</li> <li>5. Addition of BCD numbers</li> <li>6. Binary to ASCII conversion and vice-versa (Using Subroutine Call)</li> <li>07. BCD to Binary Conversion and vice-versa vii) String Matching, Multiplication</li> </ol> <p>Module 3: <span style="float: right;">3P</span>            Program using IN/OUT instructions and 8255 PPI on the trainer kit e.g. subroutine for delay, Glowing all the LEDs one by one with particular delay , Reading switches state and glowing LEDs accordingly.</p> <p>Module 4: <span style="float: right;">3P</span></p>	



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Serial communication between two trainer kits.

Module 5:

3P

Study of Prewritten programs on 8051 Microcontroller Kit using the basic instruction set (data transfer, Load/Store, Arithmetic, Logical). Or, Familiarization with 8051 Simulator on PC. Study of prewritten programs using basic instruction set (data transfer, Load/Store, Arithmetic, Logical).

Paper Name:-	Operation Research Lab
Paper Code:-	CS-594A
Contacts:-	0-0-3-3
Credit Point:-	2
Software based lab using C /C++ 1. Assignment on Transportation problem. 2. Assignment on Assignment problem 3. Assignment on Duality 4. Assignment on Simplex method (Including Charns' Big-M Method) 5. Assignment on Shortest Path by using Dijkstra's or Floyd's Algorithm 6. Assignment on Maximal Flow Problem (Ford-Fulkerson Method). 7. Assignment on PERT/CPM 8. Familiarization with O.R package: TORA	

Paper Name:-	Multimedia Technology Lab
Paper Code:-	CS-594B
Contacts:-	0-0-3-3
Credit Point:-	2
1. Sound capturing & editing using tools like SOUNDFORGE 2. Image editing using tools like Adobe Photoshop 3. Creating/editing motion video/animation clips (using tools like Flash / Adobe Premier) 4. Creation of Content using HTML (basic tags, table form, frame, link to other Image) 5. Creating style sheet using DHTML 6. Home Page creation using HTML, DHTML.	
Reference 1. Adobe , Adobe Photoshop 6.0: Classroom in a book Pearson Ed. 2. Anushka Wirasinha , Flash in a Flash- Web Development , PHI 3. Macromedia Flash5 fast and easy Web Development, Design, PHI 4. Castro, HTML4 for the World Wide Web, Pearson Ed. 5. Schurman & Purdi , Dynamic HTML in Action, Second Edition , PHI	



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Paper Name:-	Programming Lab Using C++
Paper Code:-	CS-594C
Contacts:-	0-1-2-3
Credit Point:-	2
Introduction of UNIX/Linux Operating System which includes preliminary commands, start-up & shutdown methodology, file handling as well as introduction to editors like Vi editor, introduction to GNU C & C++ compiler, as well as introduction to GNU & GDB script. [4P] Introduction to C++, basic loop control, executing programs, writing functions, selection statements, review of functions and parameters, command line arguments, recursion, I/O streams, arrays and string manipulation, pointers, structures & unions. [6P] Object-Oriented Programming in C++, fundamentals of classes, constructors-destructors. Dealing with member functions, operator overloading and polymorphism (both static & dynamic). [6P] Dealing with inheritance, derived class handling, abstract class, virtual class, overriding, template class, namespace & exception handling. [4P] Dynamic memory allocation, implementation of Linked Lists, using C++. [4P] Note: GNU C++ can be used for the programming, since it is free and has no licensing anomaly	

Paper Name:-	Computer Architecture Lab
Paper Code:-	CS-595
Contacts:-	0-0-3-3
Credit Point:-	2
All laboratory assignments are based on Hardware Description Language (VHDL or Verilog) Simulation. [Pre-requisite: The hardware based design has been done in the Analog & Digital Electronics laboratory ] 1. HDL introduction 2. Basic digital logic base programming with HDL 3. 8-bit Addition, Multiplication, Division 4. 8-bit Register design 5. Memory unit design and perform memory operators. 6. 8-bit simple ALU design 7. 8-bit simple CPU design 8. Interfacing of CPU and Memory	

**CS-581 Seminar 0-0-3-3-2:**

Each and every student have to appear in Group Discussion, Self Introduction, Technical seminar & non-technical seminar on very recent topics.

Four clusters are formed among the students on the basis of their respective results. Four students are chosen at random, one from each cluster, and a group is formed. The main focus is to form a balanced group, so that each and every student gets equal opportunity.

Then, the seminar topic are made available on the portal and a choice filling mechanism is used for the distribution of the topics. Based on their respective seminar topics, each group needs to conduct a survey, get a grip on the topic and present it in front of a panel of teachers.





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THIRD YEAR SECOND SEMESTER

Paper Name:-	PRINCIPLE OF MANAGEMENT
Paper Code:-	HU 601
Contacts:-	3-0-0-3
Credit Point:-	3
<p>Basic concepts of management: Definition – Essence, Functions, Roles, Level.            Functions of Management: Planning – Concept, Nature, Types, Analysis, Management by objectives;            Organization Structure – Concept, Structure, Principles, Centralization, Decentralization, Span of Management;            Organizational Effectiveness.            Management and Society– Concept, External Environment, CSR, Corporate Governance, Ethical Standards.            People Management– Overview, Job design, Recruitment &amp; Selection, Training &amp; Development, Stress Management. Managerial Competencies– Communication, Motivation, Team Effectiveness, Conflict Management, Creativity, Entrepreneurship            Leadership:Concept, Nature, Styles.            Decision making: Concept, Nature, Process, Tools &amp; techniques.            Economic, Financial &amp; Quantitative Analysis– Production, Markets, National Income, Accounting, Financial Function &amp; Goals, Financial Statement &amp; Ratio Analysis, Quantitative Methods – Statistical Interference, Forecasting, Regression Analysis, Statistical Quality Control.            Customer Management– Market Planning &amp; Research, Marketing Mix, Advertising &amp; Brand Management.            Operations &amp; Technology Management– Production &amp; Operations Management, Logistics &amp; Supply Chain Management, TQM, Kaizen &amp; Six Sigma, MIS.</p>	
<p>Text Books:</p> <ol style="list-style-type: none"> <li>1. Management: Principles, Processes &amp; Practices – Bhat, A &amp; Kumar, A (OUP).</li> <li>2. Essentials for Management – Koontz, Revised edition, Tata McGraw Hill (TMH)</li> <li>3. Management – Stoner, James A. F. (Pearson)</li> <li>4. Management - Ghuman, Tata McGraw Hill(TMh)</li> </ol>	

Paper Name:-	Database Management System
Paper Code:-	CS-601
Contacts:-	3-1-0-4
Credit Point:-	4
<p>Introduction [4L]: Traditional File System vs. Database System, Various Components of DBMS, Data Models, Tasks of DBA, Three Schema Architecture of DBMS.            Entity-Relationship Model [6L]: Basic concepts, Design Issues, , Keys, E-R Diagram, Weak Entity Sets, Extended E-R features, ER Model to Relational Mapping.            Relational Model [5L]: Concept of Relations, The Catalog, Keys, Foreign Key, Relational Algebra, Relational Calculus(Only Tuple), Extended Relational Algebra Operations.            SQL and Integrity Constraints [8L]: Concept of DDL, DML, DCL. Basic Structure, Set operations, Aggregate Functions, Group By and Having Clause, Domain Constraints, Referential Integrity Constraints, Assertions, Views, Triggers, Nested Sub Queries ,Correlated Sub Queries, Stored procedures.            Relational Database Design [9L]: Functional Dependency, Armstrong’s Axioms, Canonical Covers, Different Anomalies in designing a Database, Normalization using FD-1NF,2NF,3NF and BCNF, Lossless Decomposition, Dependency Preserving Decomposition, Lossless and Dependency Preserving Algorithm into 3NF , Multi-valued dependencies, 4NF.            Transaction processing, Concurrency Control and Recovery Management [7L]: Transaction model, ACID properties, Conflict &amp; View Serializability, lock based protocols, two phase locking, Undo-Redo with write ahead logging and Recovery Methods.</p>	
<p>File Organization &amp; Index Structures [6L]: File &amp; Record Concept, Placing file records on Disk, Fixed and Variable sized Records, Types of Single-Level Index (primary,secondary, clustering), Multilevel Indexes, Dynamic Multilevel Indexes using B tree and B+ tree .</p>	



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Reference

1. Henry F. Korth and Silberschatz Abraham, “Database System Concepts”, Mc.Graw Hill.
2. Elmasri Ramez and Novathe Shamkant, “Fundamentals of Database Systems”, Benjamin Cummings Publishing. Company.
3. Ramakrishnan: Database Management System , McGraw-Hill

Paper Name:-	Computer Networks
Paper Code:-	CS-602
Contacts:-	3-1-0-4
Credit Point:-	4

Overview of Data Communication and Networking: [4L]  
 Introduction; Data communications: components, data representation (ASCII,ISO etc.), direction of data flow (simplex, half duplex, full duplex); network criteria, physical structure (type of connection, topology), categories of network (LAN, MAN,WAN); Internet: brief history, Protocols and standards; Reference models: OSI reference model, TCP/IP reference model, their comparative study.

Physical Level: [6L]  
 Overview of data(analog & digital), signal(analog & digital), transmission (analog & digital) & transmission media (guided & unguided); Circuit switching: time division & space division switch, TDM bus; Telephone Network;

Data link Layer: [5L]  
 Types of errors, framing(character and bit stuffing), error detection & correction methods; Flow control; Protocols: Stop & wait ARQ, Go-Back- N ARQ, Selective repeat ARQ, HDLC;

Medium Access sub layer: [5L]  
 Point to Point Protocol, LCP, NCP, Token Ring; Reservation, Polling, Multiple access protocols: Pure ALOHA, Slotted ALOHA, CSMA, CSMA/CD, CSMA/CA Traditional Ethernet, fast Ethernet(in brief);

Network layer: [8L]  
 Internetworking & devices: Repeaters, Hubs, Bridges, Switches, Router, Gateway; Addressing : IP addressing, subnetting; Routing : techniques, static vs. dynamic routing , Unicast Routing Protocols: RIP, OSPF, BGP; Other Procols: ARP, IP, ICMP, IPV6;.

Transport layer: [4L]  
 Process to Process delivery; UDP; TCP; Congestion Control: Open Loop, Closed Loop choke packets; Quality of service: techniques to improve QoS: Leaky bucket algorithm, Token bucket algorithm,

Application Layer [5L]  
 Introduction to DNS, SMTP, SNMP, FTP, HTTP & WWW; Security: Cryptography (Public, Private Key based), Digital Signature, Firewalls.

Reference

- 1.B. A. Forouzan – “Data Communications and Networking (3rd Ed.) “ – TMH
  2. A. S. Tanenbaum – “Computer Networks (4th Ed.)” – Pearson Education/PHI
  3. W. Stallings – “Data and Computer Communications (5th Ed.)” – PHI/ Pearson Education
  4. Zheng & Akhtar, Network for Computer Scientists & Engineers, OUP
  5. Black, Data & Computer Communication, PHI
  6. Miller, data Communication & Network, Vikas
  7. Miller, Digital & Data Communication, Jaico
  8. Shay, Understanding Data Communication & Network, Vikas
- Reference Books:
1. Kurose and Rose – “ Computer Networking -A top down approach featuring the internet” – Pearson
  2. Leon, Garica, Widjaja – “Communication Networks” – TMH

Paper Name:-	Distributed Operating System (CSE)
Paper Code:-	CS-604A
Contacts:-	3-0-0-3
Credit Point:-	3



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Introduction to Distributed System [2]  
Introduction, Examples of distributed system, Resource sharing, Challenges  
Operating System Structures: [3]  
Review of structures: monolithic kernel, layered systems, virtual machines. Process based models and client server architecture; The micro-kernel based client-server approach.  
Communication [4]  
Inter-process communication , Remote Procedure Call, Remote Object Invocation, Tasks and Threads. Examples from LINUX, Solaris 2 and Windows NT.  
Theoretical Foundations: [2]  
Introduction. Inherent Limitations of distributed Systems. Lamport's Logical clock. Global State  
Distributed Mutual Exclusion:[4]  
Classification of distributed mutual exclusion algorithm. NonToken based Algorithm:Lamport's algorithm, Ricart-Agrawala algorithm. Token based Algorithm: Suzuki-Kasami's broadcast algorithm.  
Distributed Deadlock Detection: [4]  
Deadlock handling strategies in distributed systems. Control organizations for distributed deadlock detection. Centralized and Distributed deadlock detection algorithms: Completely Centralized algorithms, path pushing, edge chasing, global state detection algorithm.  
Protection and Security: [4]  
Requirements for protection and security regimes. The access matrix model of protection. System and user modes, rings of protection, access lists, capabilities. User authentication, passwords and signatures. Use of single key and public key encryption.  
Distributed file systems: [6]  
Issues in the design of distributed file systems: naming, transparency, update semantics and fault resilience. Use of the Virtual File System layer. Examples of distributed systems including Sun NFS, the Andrew filestore, CODA file system and OSF DCE.  
Distributed Shared Memory: [4]  
Architecture and motivations. Algorithms for implementing DSM. Memory Coherence  
CORBA: [3]  
The Common Object Request Broker Architecture model and software and its relationship to OS.

Books:

- 1 Andrew S. Tanenbaum and Maarten Van Steen, Distributed Systems Principles and Paradigms, PHI
2. Singhal Mukesh & Shivaratri N. G., Advanced Concepts in Operating Systems, TMH
3. Tanenbaum, A. S. Distributed Operating Systems, (ISBN 0-131-439-340), Prentice Hall 199
4. Tanenbaum, A. S. Modern Operating Systems, 2nd Edition (ISBN 0-13-031358-0), Prentice Hall 2001.
5. Bacon, J., Concurrent Systems, 2nd Edition, (ISBN 0-201-177-676), Addison Wesley 1998.
6. Silberschatz, A., Galvin, P. and Gagne, G., Applied Operating Systems Concepts, 1st Edition, (ISBN 0-471-36508-4), Wiley 2000.
7. Coulouris, G. et al, Distributed Systems: Concepts and Design, 3rd Edition, (ISBN 0-201-61918-0), Addison Wesley 2001.
8. Galli, D.L., Distributed Operating Systems: Concepts and Practice (ISBN 0-13-079843-6), PHI

Paper Name:-	Mobile Computing(IT)
Paper Code:-	CS-604B
Contacts:-	3-0-0-3
Credit Point:-	3



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Introduction to Personal Communications Services (PCS): PCS Architecture, Mobility management, Networks signalling. Global System for Mobile Communication (GSM) system overview: GSM Architecture, Mobility management, Network signalling. [5L]  
 General Packet Radio Services (GPRS): GPRS Architecture, GPRS Network Nodes. Mobile Data Communication: WLANs (Wireless LANs) IEEE 802.11 standard, Mobile IP.[5L]  
 Wireless Application Protocol (WAP): The Mobile Internet standard, WAP Gateway and Protocols, wireless mark up Languages (WML). Wireless Local Loop(WLL): Introduction to WLL Architecture, wireless Local Loop Technologies. [7L]  
 Third Generation (3G) Mobile Services: Introduction to International Mobile Telecommunications 2000 (IMT 2000) vision, Wideband Code Division Multiple Access (W-CDMA), and CDMA 2000, Quality of services in 3G.[7L]  
 Global Mobile Satellite Systems; case studies of the IRIDIUM and GLOBALSTAR systems. Wireless Enterprise Networks: Introduction to Virtual Networks, Blue tooth technology, Blue tooth Protocols.[7L]  
 Server-side programming in Java, Pervasive web application architecture, Device independent example application[8L]

Text :

1. “Pervasive Computing”, Burkhardt, Pearson
2. “Mobile Communication”, J. Schiller, Pearson
3. “Wireless and Mobile Networks Architectures”, Yi-Bing Lin & Imrich Chlamtac, John Wiley & Sons, 2001
4. “Mobile and Personal Communication systems and services”, Raj Pandya, Prentice Hall of India, 2001.

Reference :

1. “Guide to Designing and Implementing wireless LANs”, Mark Ciampa, Thomson learning, Vikas Publishing House, 2001.
2. “Wireless Web Development”, Ray Rischpater, Springer Publishing,
3. “The Wireless Application Protocol”, Sandeep Singhal, Pearson .
4. “Third Generation Mobile Telecommunication systems”, by P.Stavronlakis, Springer Publishers,

Paper Name:-	Data Warehousing & Data Mining (IT)
Paper Code:-	CS-604C
Contacts:-	3-0-0-4
Credit Point:-	3

Syllabus:- Module 1: Overview and Concepts of Data Warehousing (Lectures : 9)  
 Overview of Data warehousing Strategic information and the need for Data warehousing, Defining a Data warehouse, Evolution of Data warehousing, Data warehousing and Business Intelligence, The Building Blocks of Data warehouse.  
 Defining features – Subject-oriented data, Integrated data, Time-variant data, Nonvolatile data, Data granularity Data warehouses and Data marts  
 Architectural Types – Centralized, Independent data marts, Federated, Hub-and-Spoke, Data mart bus  
 Overview of components - Source Data, Data Staging, Data Storage, Information Delivery, Metadata, and Management and Control components, Business Requirements and Data warehouse  
 Dimensional nature of Business data and Dimensional Analysis, Dimension hierarchies and categories, Key Business, Metrics (Facts), Requirement Gathering methods and Requirements Definition Document (contents)  
 Business Requirements and Data Design – Structure for Business Dimensions and Key Measurements, Levels of detail Business Requirements and the Architecture plan, Business Requirements and Data Storage Specifications, Business Requirements and Information Delivery Strategy  
 Module 2 : Data warehouse Architecture and Infrastructure (Lectures : 8)  
 Architectural components, Concepts of Data warehouse architecture – Definition and architecture in the areas of Data acquisition, Data storage, and Information delivery  
 Distinguishing characteristics – Different objectives and scope, Data content, Complex analysis for faster response, Flexible and Dynamic, Metadata-driven etc  
 Architectural Framework – supporting flow of data, and the Management and Control module



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Technical architecture – Data acquisition, Data storage, and Information delivery, Overview of the components of Architectural Types introduced in Module 1. Infrastructure for Data warehousing  
Distinction between architecture and infrastructure, Understanding of how data warehouse infrastructure supports its architecture, Components of physical infrastructure, Hardware and Operating systems for data warehouse, Database Software, Collection of Tools, Data warehouse Appliances – evolution and benefits  
The role of Metadata, Understanding the importance of Metadata  
Metadata types by functional areas – Data acquisition, Data storage, and Information delivery  
Business Metadata – overview of content and examples  
Technical Metadata – overview of content and examples  
Metadata Requirements, Sources of Metadata, Metadata management – challenges, Metadata Repository, Metadata integration and standards  
Module 3 : Data Design and Data Preparation (Lectures : 9)  
Principles of Dimensional Modeling  
Data Design – Design decisions, Basics of Dimensional modeling, E-R modeling versus Dimensional modeling  
The STAR schema – illustration, Dimension Table, Fact Table, Factless Fact Table, Data granularity  
STAR schema keys – Primary, Surrogate, and Foreign  
Advantages of the STAR schema, STAR schema examples  
Data Extraction, Transformation, and Loading  
Overview of ETL, Requirements of ETL and steps  
Data extraction – identification of sources and techniques  
Data transformation – Basic tasks, Transformation types, Data integration and consolidation, Transformation for dimension  
Attributes  
Data loading – Techniques and processes, Data refresh versus update, Procedures for Dimension tables, Fact tables :  
History and incremental loads  
ETL Tool options  
Data Quality  
Importance of data quality, Challenges for data quality, Data quality tools, Data cleansing and purification, Master Data Management  
Module 4 : Information access and delivery (Lectures : 10)  
Matching information to classes of users  
Information from Data warehouse versus Operational systems, Users of information – their needs and how to provide information  
Information delivery – queries, reports, analysis, and applications  
Information delivery tools – Desktop environment, Methodology and criteria for tool selection, Information delivery framework, Business Activity Monitoring, Dashboards and Scorecards  
OLAP in Data warehouse  
Overall concept of Online Analytical Processing (OLAP), OLAP definitions and rules, OLAP characteristics  
Major features and functions of OLAP – General features, Dimensional analysis, Hypercubes, Drill Down and Roll Up,  
Slice and Dice, Rotation, Uses and Benefits  
Familiarity with OLAP models – Overview of variations, MOLAP, ROLAP, HOLAP, DOLAP, Database OLAP, Web OLAP  
OLAP  
Data Warehouse and the web  
Web-enabled Data Warehouse – adapting data warehouse for the web  
Web-based information delivery – Browser technology for data warehouse and Security issues  
OLAP and Web – Enterprise OLAP, Web-OLAP approaches, OLAP Engine design  
Data Mining  
Overview of Data mining – Definition, Knowledge Discovery Process (Relationships, Patterns, Phases of the process),



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<p>OLAP versus Data mining          Some aspects of Data mining – Association rules, Outlier analysis, Predictive analytics etc)          Concepts of Data mining in a Data warehouse environment          Major Data Mining techniques – Cluster Detection, Decision Trees, Memory-based Reasoning, Link Analysis, Neural Networks, Genetic Algorithms etc          Data Mining Applications in industry – Benefits of Data mining, Discussion on applications in Customer Relationship Management (CRM), Retail, Telecommunication, Biotechnology, Banking and Finance etc</p>
<p>Books Recommended:          1. Data Warehousing Fundamentals for IT Professionals, Second Edition by Paulraj Ponniah, Wiley India          References:          2. Data Warehousing, Data Mining, &amp; OLAP – Second Edition by Alex Berson and Stephen J. Smith, TMH          3. Data warehouse Toolkit by Ralph Kimball, Wiley India</p>

Paper Name:-	Advanced Java
Paper Code:-	CS-605
Contacts:-	3-0-0-3
Credit Point:-	3
<p>Client &amp; server side programming.          Enterprise architecture styles: Single tier , 2-tier , 3-tier, n-tier; Relative comparison of the different layers of architectures. MVC Architecture: Explanation, Need, Drawbacks, J2EE WEB SERVICES, Different components &amp; containers. [4L]          Servlet: Introduction, Advantages over CGI, How it works?, Servlet life cycle, Servlet API (Different interfaces &amp; classes of generic servlet &amp; HTTP servlet), Accessing user information by means of Request &amp; Response, Servlet session management techniques and relative comparison. [4L]          JSP: Introduction, Comparison between JSP &amp; servlet., Architecture/Life cycle, Different types of JSP architectures and relative comparison.; JSP tags ,Directives, Scripting elements, Actions; JSP implicit objects, Accessing user information using implicit objects. [5L]          EJB :Introduction, Comparison of EJB &amp; Java Beans , Applications, Drawbacks, Different types of enterprise beans ,Services provided by EJB container. [5L]          RMI: Introduction and applications, Architecture ,Use of RMI Registry.          JNDI: Introduction and applications, Comparison between LDAP and JNDI          JDO (Java Data Objects): Introduction, Integration of EJB and JDO, JDO &amp; RMI          JINI :Introduction, Applications [5L]          JDBC: Introduction, Database driver ,Different approaches to connect an application to a database server, Establishing a database connection and executing SQL statements, JDBC prepared statements, JDBC data sources. [5L]          XML: Java &amp; XML, XML syntax, Document type definition., Parsers, SAX parsers, DOM parsers, SAX vs. Dom, JAXP and JAXB. [8L]</p>	
<p>Text :          1. “Professional JAVA Server Programming”, Allamaraju and Buest ,SPD Publication          2. “Beginning J2EE 1.4” Ivor Horton, SPD Publication.          3. “Advanced Programming for JAVA 2 Platform” Austin and Pawlan, Pearson          Reference Books:          1. Internet &amp; Java Programming by Krishnamoorthy &amp; S. Prabhu(New Age Publication)</p>	

**PRACTICAL**

Paper Name:-	Database Management System Lab
Paper Code:-	CS-691
Contacts:-	0-0-3-3
Credit Point:-	2



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**Structured Query Language**

**1. Creating Table**

Create table statement.

Specifying Constraints like Primary Key, Foreign Key, Unique Key, Check constraint, Substring matching Method etc, Adding and Dropping Constraints into already created table., Displaying various constraints of a table using USER\_CONSTRAINTS table., Using Pseudo columns like ROWID,ROWNUM, SYSDATE etc.

**2. Table and Record Handling**

INSERT, DELETE, UPDATE, TRUNCATE, DROP, ALTER Command.

Creating and using SEQUENCE.

Use of To\_Char() and To\_Date() functions.

**3. Retrieving Data from a Database**

Joining of Tables, Query that requires more than 2 tables

Using IN, BETWEEN, LIKE, ORDER BY, GROUP BY and HAVING Clause

Using Aggregate Functions

Use of NOT EXIST, Nested and Correlated sub queries.

Create Assertions.

**4. Database Management**

Creating Views

Creating Database Users

Using GRANT and REVOKE

**5. Oracle PL / SQL**

Defining Variables, Control Structures etc.

Cursors, Triggers.

**Books:**

1.SQL, PL/SQL the Programming Language of Oracle Author-Ivan Bayross, BPB Publications.

2.SQL/PL SQL for Oracle 9i Author- P.S. Deshpande Pub: Dreamtech Press

**Network Lab**

**Code: CS692**

**Contact: 3P Credits: 2**

- IPC (Message queue)
- TELNET,FTP, HTTP,DNS Server Configuration
- NIC Installation & Configuration (Windows/Linux)
- Familiarization with
  - o Networking cables (CAT5, UTP) oConnectors (RJ45, T-connector) o Hubs, Switches
- TCP/UDP Socket Programming
- Multicast & Broadcast Sockets
- Implementation of a Prototype Multithreaded Server
- Implementation of
  - o Data Link Layer Flow Control Mechanism (Stop & Wait, Sliding Window)
  - o Data Link Layer Error Detection Mechanism (Cyclic Redundancy Check)
  - o Data Link Layer Error Control Mechanism (Selective Repeat, Go Back N)

Paper Name:-	Computer Graphics Lab
Paper Code:-	CS-693A
Contacts:-	0-0-3-3
Credit Point:-	2



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Lab 1: Point plotting, line & regular figure algorithms  
 Lab 2: Raster scan line algorithms  
 Lab 3: Raster scan circle drawing algorithms  
 Lab 4: Clipping & Windowing algorithms for points and lines  
 Lab 5: Clipping & Windowing algorithms for polygons  
 Lab 6: 2-D transformations (Rotation, Reflection, Scaling, Shearing, Translation etc.)  
 Lab 7: 3-D transformations (Rotation, Reflection, Scaling, Shearing, Translation etc.)  
 Lab 8: Filling algorithms (Boundary Fill Algorithm and Flood Fill Algorithm)

Paper Name:-	SYSTEM SOFTWARE & ADMINISTRATION LAB
Paper Code:-	CS 693B
Contacts:-	0-0-3-3
Credit Point:-	2
<ul style="list-style-type: none"> <li>· Packet Monitoring software (tcpdump, snort, ethereal)</li> <li>· Trace route, Ping, Finger, Nmap</li> <li>· Server configuration (FTP, SMTP, DNS)</li> <li>· NFS Configuration</li> <li>· Firewall Configuration using iptables/ipchains (Linux only)</li> <li>· Experiments using Turbo C Assembler</li> </ul> <p>Note: All the above experiments may be performed in both Unix /Linux &amp; Windows</p>	

Paper Name:-	ADVANCED JAVA LAB
Paper Code:-	CS 694
Contacts:-	0-0-3-3
Credit Point:-	2
<p>UNIT-I          The Applet class - Event Handling - Working with windows, Graphics and Text using AWT Classes - AWT Controls - Layout Managers and menus - Images. Introducing Swing: swing- components and containers - the swing packages - Painting in a Swing - Exploring Swing: JLabel and ImageIcon - JTextField - The Swing Buttons - Jtabbed Pane - Jscroll Pane - Jlist - JComboBox - Trees- Jtable.</p> <p>UNIT-II          JDBC: JDBC Architecture - Installing the ODBC Driver - Connecting to a Database – Structured Query language. JDBC programming concept: Database URL - Executing the action commands - Query with JDBC - Populating a Database - Executing Queries - Metadata - Scrollable and Updatable Result Sets.</p> <p>UNIT-III          Servlets: A simple Servlets - The servlet API - Servlet Package - Handling HTTP Request and Response. JSP : Evolution of the Web Application - Overview of the HTTP - Introduction to Servlets - JSP Overview - JSP syntax and semantics - Expressions, scriptlets and Declarations</p> <p>UNIT-IV          Request Dispatching - Session and Thread Management - Application Event Listeners Database Access with JDBC.</p> <p>UNIT-V          Networking Basics - Socket Programming - Proxy server - TCP/IP Sockets - Net address - datagrams.</p>	
<p><b>TEXT BOOKS</b></p> <ol style="list-style-type: none"> <li>1. Herbert Schildt - The Complete Reference Java - Tata McGraw Hill</li> <li>2. Cays Horstmann and Gary Cornell - Core Java Volume II, Pearson Edition, 2001</li> <li>3. Phil Hanna - JSP 2.0: The Complete Reference -Tata McGraw Hill</li> </ol> <p><b>REFERENCE</b></p> <ol style="list-style-type: none"> <li>1. P. Naughton and H. Schildt - Java2: The Complete Reference - Tata McGraw Hill</li> <li>2. K. Arnold and J. Gosling - The Java Programming Language - Edition 2, Publication, 2000</li> <li>3. Deitel &amp; Deitel, "Java How to program", 8th ed., PHI.</li> </ol>	





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FOURTH YEAR FIRST SEMESTER

Paper Name:-	Compiler Design
Paper Code:-	CS-701
Contacts:-	3-1-0-4
Credit Point:-	4
<p>Introduction to Compiling[2L]: Compilers, Analysis-synthesis model ,The phases of the compiler, Cousins of the compiler.</p> <p>Lexical Analysis[5L]: The role of the lexical analyzer, Tokens, Patterns, Lexemes, Input buffering, Specifications of a token, Recognition of tokens, Finite automata, From a regular expression to an NFA, From a regular expression to DFA, Design of a lexical analyzer generator (Lex).</p> <p>Syntax Analysis[8L]: The role of a parser, Context free grammars, Writing a grammar, Top down Parsing, Non-recursive Predictive parsing(LL), Bottom up parsing, Handles, Viable prefixes, Operator precedence parsing, LR parsers(SLR, LALR), Parser generators(YACC). Error Recovery strategies for different parsing techniques.</p> <p>Syntax directed translation[4L]: Syntax directed definitions, Construction of syntax trees, Bottom-up evaluation of S attributed definitions, L attributed definitions, Bottom-up evaluation of inherited attributes.</p> <p>Type checking[3L]: Type systems, Specification of a simple type checker, Equivalence of type expressions, Type conversions</p> <p>Run time environments[4L]: Source language issues (Activation trees, Control stack, scope of declaration, Binding of names), Storage organization (Subdivision of run-time memory, Activation records), Storage allocation strategies, Parameter passing (call by value, call by reference, copy restore, call by name), Symbol tables, dynamic storage allocation techniques.</p> <p>Intermediate code generation[3L]: Intermediate languages, Graphical representation, Three-address code, Implementation of three address statements (Quadruples, Triples, Indirect triples).</p> <p>Code optimization[4L]: Introduction, Basic blocks &amp; flowgraphs, Transformation of basic blocks, Dag representation of basic blocks, The principle sources of optimization, Loops in flow graph, Peephole optimization.</p> <p>Code generations[3L]: Issues in the design of code generator, a simple code generator, Register allocation &amp; assignment.</p>	
Text books:	
1. Aho, Sethi, Ullman - "Compiler Principles, Techniques and Tools"- Pearson Education.	
2. Holub- "Compiler Design in C" - PHI	
3. Tremblay and Sorenson Compiler Writing-Mcgraw Hill International.	
4. Chattopadhyay, S- Compiler Design( PHI)	

Paper Name:-	Artificial Intelligence
Paper Code:-	CS-702
Contacts:-	3-1-0-4
Credit Point:-	4
<p>Introduction[2]: Overview of Artificial intelligence- Problems of AI, AI technique, Tic - Tac – Toe problem.</p> <p>Intelligent Agents[2]: Agents &amp; environment, nature of environment, structure of agents, goal based agents, utility based agents, learning agents.</p> <p>Problem Solving[2]: Problems, Problem Space &amp; search: Defining the problem as state space search, production system, problem characteristics, issues in the design of search programs.</p> <p>Search techniques [5]: Solving problems by searching: problem solving agents, searching for solutions; uniform search strategies: breadth first search, depth first search, depth limited search, bidirectional search, comparing uniform search strategies.</p> <p>Heuristic search strategies [4]: Greedy best-first search, A* search, memory bounded heuristic search: local search algorithms &amp; optimization problems: Hill climbing search, simulated annealing search, local beam search, genetic algorithms; constraint satisfaction problems, local search for constraint satisfaction problems.</p> <p>Adversarial search[3]: Games, optimal decisions &amp; strategies in games, the mini max search procedure, alpha-beta pruning, additional refinements, iterative deepening.</p> <p>Knowledge &amp; reasoning[3]: Knowledge representation issues, representation &amp; mapping, approaches to</p>	



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knowledge representation, issues in knowledge representation.  
 Using predicate logic [2]: Representing simple fact in logic, representing instant & ISA relationship, computable functions & predicates, resolution, natural deduction.  
 Representing knowledge using rules [3]: Procedural versus declarative knowledge, logic programming, forward versus backward reasoning, matching, control knowledge.  
 Probabilistic reasoning[3]: Representing knowledge in an uncertain domain, the semantics of Bayesian networks, Dempster-Shafer theory, Fuzzy sets & fuzzy logics.  
 Planning[2]: Overview, components of a planning system, Goal stack planning, Hierarchical planning, other planning techniques.  
 Natural Language processing[2]: Introduction, Syntactic processing, semantic analysis, discourse & pragmatic processing.  
 Learning[3]: Forms of learning, inductive learning, learning decision trees, explanation based learning, learning using relevance information, neural net learning & genetic learning.  
 Expert Systems [2]: Representing and using domain knowledge, expert system shells, and knowledge acquisition.  
 Basic knowledge of programming language like Prolog & Lisp.[3]

**Books:**

1. Artificial Intelligence, Ritch & Knight, TMH
2. Artificial Intelligence A Modern Approach, Stuart Russel Peter Norvig Pearson
3. Introduction to Artificial Intelligence & Expert Systems, Patterson, PHI
4. Poole, Computational Intelligence, OUP
5. Logic & Prolog Programming, Saroj Kaushik, New Age International
6. Expert Systems, Giarranto, VIKAS
7. Artificial Intelligence, Russel, Pearson

Paper Name:-	Distributed Database
Paper Code:-	CS-703A
Contacts:-	3-1-0-4
Credit Point:-	4

**Module I [5]**

Distributed DBMS features and needs. Reference architecture. Levels of distribution transparency, replication.

Distributed database design - fragmentation, allocation criteria.

**Module II [10]**

Storage mechanisms. Translation of global queries. / Global query optimisation. Query execution and access plan.

Concurrency control- 2 phases locks. Distributed deadlocks. Time based and quorum based protocols. Comparison. Reliability-non-blocking commitment protocols.

**Module III [10]**

Partitioned networks. Checkpoints and cold starts. Management of distributed transactions-2 phase unit protocols.

Architectural aspects. Node and link failure recoveries.

**Module IV [10]**

Distributed data dictionary management. Distributed database administration. Heterogeneous databases- federated database, reference architecture, loosely and tightly coupled.

**Module V [10]**

Alternative architecture. Development tasks, Operation- global task management. Client server databases- SQL server, Open data base connectivity. Constructing an application.



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Reference

1. Database System Concepts, Silberschatz Korth, Sudarshan, MH
2. Distributed Database, Tannenbaum, Pearson
3. Principles of Distributed Database Systems, M. Tamerzsu Patrick Valduriez, Pearson
3. Database Management Systems, Ramakrishnan, MH
4. Beginning SQL Server 2000 programming, Dewson, SPD/WROX
6. Database Management Systems, Leon, VIKAS
7. MySQL: Enterprise Solutions, Alexander Pachey, Wiley Dreamtech

Paper Name:-	Cloud Computing
Paper Code:-	CS 703B
Contacts:-	3-1-0-4
Credit Point:-	4

Syllabus:-

Module 1: Definition of Cloud Computing and its Basics (Lectures: 9)

1. Definition of Cloud Computing:

Defining a Cloud, Cloud Types–NIST model, Cloud Cube model, Deployment models (Public, Private, Hybrid and Community Clouds), Service models–Infrastructure as a Service, Platform as a Service, Software as a Service with examples of services/service providers, Cloud Reference model Characteristics of Cloud Computing–a shift in paradigm, Benefits and advantages of Cloud Computing

2. Cloud Architecture:

A brief introduction on Composability, Infrastructure, Platforms, Virtual Appliances, Communication Protocols, Applications, Connecting to the Cloud by Clients

3. Services and Applications by Type

IaaS–Basic concept, Workload, partitioning of virtual private server instances, Pods, aggregations, silos

PaaS–Basic concept, tools and development environment with examples

SaaS- Basic concept and characteristics, Open SaaS and SOA, examples of SaaS platform

Identity as a Service (IDaaS) Compliance as a Service (CaaS)

Module 2: Use of Platforms in Cloud Computing (Lectures: 12)

1. Concepts of Abstraction and Virtualization

Virtualization technologies: Types of virtualization (access, application, CPU, storage), Mobility patterns (P2V, V2V, V2P, P2P, D2C, C2C, C2D, D2D)

Load Balancing and Virtualization: Basic Concepts, Network resources for load balancing, Advanced load balancing (including Application Delivery Controller and Application Delivery Network), Mention of The Google Cloud as an example of use of load balancing

Hypervisors: Virtual machine technology and types, VMware Sphere

Machine Imaging (including mention of Open Virtualization Format –OVF)

Porting of applications in the Cloud: The simple Cloud API and App Zero Virtual Application appliance

2. Concepts of Platform as a Service

Definition of services, Distinction between SaaS and PaaS (knowledge of Sales force. com/Force.com), Application development

Use of PaaS Application frameworks

3. Use of Google Web Services

Discussion of Google Applications Portfolio–Indexed search, Dark Web, Aggregation and disintermediation, Productivity applications and service, Ad words, Google Analytics, Google Translate, a brief discussion on Google Toolkit (including introduction of Google APIs in brief), major features of Google App Engine service.

4. Use of Amazon Web Services

Amazon Web Service components and services: Amazon Elastic Cloud, Amazon Simple Storage system, Amazon Elastic Block Store, Amazon Simple DB and Relational Database Service

5. Use of Microsoft Cloud Services

Windows Azure platform: Microsoft's approach, architecture, and main elements, overview of Windows

Azure App Fabric, Content Delivery Network, SQL Azure, and Windows Live services



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<p>Module3:CloudInfrastructure(Lectures: 7)  Typesofservicesrequiredinimplementation–Consulting,Configuration, Customization and Support  1.Cloud Management  An overview of the features of network management systems and a brief introduction of related products from large cloud vendors, Monitoring of an entire cloud computing deployment stack–an overview with Mention of some products, Life cycle management of cloud services (six stages of life cycle)  2.Concepts of Cloud Security  Cloud security concerns, Security boundary, Security service boundary Overview of security mapping  Security of data: Brokered cloud storage access, Storage location and tenancy, encryption, and auditing and Compliance Identity management (awareness of Identity protocol standards)  Module4:Conceptsof Services and Applications(Lectures: 8)  Service Oriented Architecture: Basic concepts of message-based transactions, Protocol stack for an SOA architecture, Event-driven SOA, Enterprise Service Bus, Service catalogs  3.Applications in the Cloud: Concepts of cloud transactions, functionality mapping, Application attributes, Cloud service attributes, System abstraction and Cloud Bursting, Applications and Cloud APIs  4. Cloud- based Storage: Cloud storage definition–Manned and Unmanned  5. Webmail Services: Cloud mail services including Google Gmail, Mail2 Web, Windows Live Hotmail, Yahoo mail, concepts of Syndication services</p>
<p>Books Recommended:  1.Cloud Computing Bible by Barrie Sosinsk , Christian Vecchiola, S. Thamarai Selvi ,McGraw Hill Edu.  2. Cloud computing: A practical approach, Anthony T. Velte,Tata Mcgraw-Hill  3. Cloudm Computing, Miller, Pearson  4. Buildingapplicationsincloud:Concept,PatternsandProjects,Moyer,Pearson</p> <p>References:  1. Cloud Computing–Second Edition by Dr.Kumar Saurabh, Wiley India</p>

Paper Name:-	Parallel Computing
Paper Code:-	CS-703C
Contacts:-	3-1-0-4
Credit Point:-	4
<p>Module I  Introduction.-ParallelProcessingEnvironment-  PipeliningandDataParallelism,Scalability,Flynn’sTaxonomy,.(3L)  ParallelProcessingorganization-Mesh,Hyper-tree,Pyramid,Butterfly,Hyper cube network (4L)  ModuleII  Parallel Algorithms–Structure, cost, Analysis; Elementary Algorithms: Broadcast, Prefix sums, All sums(4L)  Algorithms on Selection problem, Merging-Odd-even merging network, CREW Merging, N-ary searching 6L  Matrix Transposition, Matrix Multiplications-2D Mesh SIMD, Hypercube SIMD, Shuffle-Exchange SIMD models. Discrete Fourier Transform, Fast Fourier Transform(6L)  ModuleIII  Linearsystemofequations-GaussianElimination,Gauss-Seidelalgorithm,Jacobialgorithm(3L)  Sorting–Enumeration sort, Odd-even transposition sort, Bitonic merge Ellis’s Algorithm(3L)  ModuleIV  Graph Algorithms, Spanning Tree Algorithms,(4L)  Parallel Programming Languages –FORTRAN90, OCCAM(4L)</p>	
<p>Books for reference:  1. Parallel Computing–Theory and Practice-Michael J.Quinn (McGraw Hill Inc.)  2. Design and Analysis of Parallel Algorithms-S.G.Akl (PH)</p>	

Paper Name:-	SoftComputing
Paper Code:-	CS-704A
Contacts:-	3-1-0-4



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Credit Point:-	4
<p>Module-I[2L]  <i>Introduction:</i> Introduction to soft computing; introduction to fuzzy sets and fuzzy logic systems; introduction to Biological and artificial neural network; introduction to Genetic Algorithm.</p> <p>Module-II[10L]  <i>Fuzzy sets and Fuzzy logic systems:</i>            Classical Sets and Fuzzy Sets and Fuzzy relations: Operations on Classical sets, properties of classical sets, Fuzzy set operations, properties of Fuzzy sets, cardinality, operations, and properties of fuzzy relations.            Membership functions: Features of membership functions, standard forms and boundaries, different fuzzification methods.            Fuzzy to Crisp conversions: Lambda Cuts for fuzzy sets, fuzzy Relations, Defuzzification methods.            Classical Logic and Fuzzy Logic: Classical predicate logic, Fuzzy Logic, Approximate reasoning and Fuzzy Implication            Fuzzy Rule based Systems: Linguistic Hedges, Fuzzy Rule based system–Aggregation of fuzzy Rules, Fuzzy Inference System–Mamdani Fuzzy Models–Sugeno Fuzzy Models.            Applications of Fuzzy Logic: How Fuzzy Logic is applied in Home Appliances, General Fuzzy Logic controllers, Basic Medical Diagnostic systems and Weather forecasting</p> <p>Module-III[10L]  <i>Neural Network</i>            Introduction to Neural Networks: Advent of Modern Neuroscience, Classical AI and Neural Networks, Biological Neurons and Artificial neural network; model of artificial neuron.            Learning Methods: Hebbian, competitive, Boltzman etc.,            Neural Network models: Perceptron, Adaline and Madaline networks; single layer network; Back-propagation and multi layer networks.            Competitive learning networks: Kohonen self organizing networks, Hebbian learning; Hopfield Networks.            Neuro-Fuzzy modeling:            Applications of Neural Networks: Pattern Recognition and classification</p> <p>Module-IV[10L]            Genetic Algorithms: Simple GA, crossover and mutation, Multi-objective Genetic Algorithm (MOGA).            Applications of Genetic Algorithm: genetic algorithms in search and optimization, GA based clustering Algorithm, Image processing and pattern Recognition</p> <p>Module-V[4L]            Other Soft Computing techniques: Simulated Annealing, Tabu search, Ant colony optimization (ACO), Particle Swarm Optimization (PSO).</p> <p>Text Books:            1. Fuzzy logic with engineering applications, Timothy J. Ross, John Wiley and Sons.            2. S. Rajasekaran and G.A.V.Pai, “Neural Networks, Fuzzy Logic and Genetic Algorithms”, PHI            3. Principles of Soft Computing, S N Sivanandam, S. Sumathi, John Wiley &amp; Sons            4. Genetic Algorithms in search, Optimization &amp; Machine Learning by David E. Goldberg            5. Neuro-Fuzzy and Soft computing, Jang, Sun, Mizutani, PHI            6. Neural Networks: A Classroom Approach, 1/e by Kumar Satish, TMH,            7. Genetic Algorithms in search, Optimization &amp; Machine Learning by David E. Goldberg, Pearson/ PHI            8. A beginners approach to Soft Computing, Samir Roy &amp; Udit Chakraborty, Pearson</p>	
Paper Name:-	Image Processing
Paper Code:-	CS-704B
Contacts:-	3-1-0-4
Credit Point:-	4



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**Syllabus:-**

Introduction[3L]

Background,DigitalImageRepresentation,FundamentalstepsinImageProcessing,ElementsofDigitalImage Processing-Image Acquisition, Storage, Processing, Communication, Display.

Digital Image Formation[4L]

A Simple Image Model, Geometric Model-Basic Transformation (Translation, Scaling, Rotation), Perspective Projection, Sampling & Quantization- Uniform& Non uniform.

Mathematical Preliminaries[9L]

Neighbourofpixels,Connectivity,Relations,Equivalence&TransitiveClosure;DistanceMeasures, Arithmetic/Logic Operations,

Fourier Transformation, Properties of The Two Dimensional Fourier Transform, Discrete Fourier Transform, Discrete Cosine &Sine Transform.

Image Enhancement[8L]

Spatial Domain Method, Frequency Domain Method, Contrast Enhancement-Linear & Nonlinear Stretching, Histogram Processing; Smoothing-Image Averaging, Mean Filter, Low-pass Filtering; Image Sharpening. High-pass Filtering, High-boost Filtering, Derivative Filtering, Homo morphic Filtering; Enhancement in the frequency domain – Low pass filtering, High pass filtering.

Image Restoration[7L]

Degradation Model, Discrete Formulation, Algebraic Approach to Restoration-Unconstrained & Constrained; Constrained Least Square Restoration, Restoration by Homomorphic Filtering, Geometric Transformation – Spatial Transformation, Gray Level Interpolation.

Image Segmentation[7L]

Point Detection, Line Detection, Edge detection, Combined detection, Edge Linking & Boundary Detection- Local Processing, Global Processing via The Hough Transform; Thresholding-Foundation, Simple Global Thresholding, Optimal Thresholding; Region Oriented Segmentation-Basic Formulation, Region Growing by Pixel Aggregation, Region Splitting & Merging.

**Books:**

1. Digital Image Processing, Gonzalves, Pearson
2. Digital Image Processing, Jahne, Springer India
- 3.Digital Image Processing & Analysis, Chanda & Majumder, PHI
- 4.Fundamentals of Digital Image Processing, Jain, PHI
- 5.Image Processing, Analysis & Machine Vision, Sonka, VIKAS
6. Getting Started with GIS- Clarke Keith. C; PE.
7. Concepts & Techniques of GIS- LoC.P, Albert, YeungK. W-PHI.

Paper Name:-	Pattern Recognition
Paper Code:-	CS-704C
Contacts:-	3-1-0-4
Credit Point:-	4

**Syllabus:-**

Module-I : Introduction–Definitions, datasets for Pattern Recognition, Different Paradigms of Pattern Recognition, Representations of Patterns and Classes, Metric and non-metric proximity measures

Module-II: Feature extraction, Different approaches to Feature Selection

Nearest Neighbour Classifier and variants Efficient algorithms for nearest neighbor classification

Module- III: Different Approaches to Prototype Selection, Bayes Classifier Web Technology

Decision Trees Linear Discriminant Function

Module- IV: Support Vector Machines, Clustering, Clustering Large data sets Combination of Classifiers Applications–Document Recognition

**Reference**

1. Devi V.S.;Murty,M.N.(2011)PatternRecognition:AnIntroduction,UniversitiesPress,Hyderabad.
2. R.O.Duda, P.E. Hart and D. G. Stork, Pattern Classification, Wiley, 2000.



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Paper Name:-	Web Technology
Paper Code:-	CS705
Contacts:-	3-1-0-4
Credit Point:-	4
<p>Static Web Pages[6L]: Web Pages - types and issues, tiers; comparisons of Microsoft and java technologies, WWW-Basic concepts,webclientandwebserver,httpprotocol(frameformat),universalresourcelocator(url), HTML- different tags, sections, image &amp; pictures, listings, tables, frame, frameset, form.</p> <p>Dynamic Web Pages[2L]  The need of dynamic webpages; an overview of DHTML, cascading style sheet(css),comparative studies of different technologies of dynamic page creation.</p> <p>Active Web Pages[2L]: Need of active web pages; java applet life cycle.</p> <p>Java Script[3L]: Data types, variables, operators, conditional statements, array object, date object, string object.</p> <p>Java Servlet[4L]  Servlet environment and role, HTML support, Servlet API, The servlet life cycle, Cookies and Sessions.</p> <p>JSP[15L]  JSP architecture, JSP servers, JSP tags, understanding the layout in JSP, Declaring variables, methods in JSP ,inserting java expression in JSP, processing request from user and generating dynamic response for the user, inserting applets and java beans into JSP, using include and forward action, comparing JSP and CGI program, comparing JSP and A SP program; Creating ODBC data source name, introduction to JDBC, prepared statement and callable statement.</p> <p>J2EE[7L]: An over view of J2EE web services, basics of Enterprise Java Beans, EJB vs. Java Beans, basics of RMI, JNI.</p> <p>XML[6L]: Extensible Markup Language(XML), basics of XML, elements and attributes, document type definition, XML parsers, sequential and tree approach.</p>	
<p>Reference</p> <ol style="list-style-type: none"> <li>1. Web Technologies- Godbole A. S.&amp;KahateA., TMH.</li> <li>2. Web Technology &amp; Design- Xavier C., New Age Publication.</li> <li>3. Java Server Programming, J2EE edition. (VOLI and VOL II);WROX publishers.</li> </ol>	

**PRACTICAL**

Paper Name:-	Artificial Intelligence Lab
Paper Code:-	CS-792
Contacts:-	0-0-3-3
Credit Point:-	2
Programming Languages such as PROLOG & LISP.	

Paper Name:-	Web Technology Lab
Paper Code:-	CS 795
Contacts:-	0-0-3-3
Credit Point:-	2
<ol style="list-style-type: none"> <li>1. Basic use of html tag, linking image table, frame, form design.</li> <li>2. DHTML-inline styles, creating style sheets with the style element, linking external style sheet, positioning elements, user style sheet.</li> <li>3. Creating event handler that respond to mouse and keyboard event: On load, on mouse over, on mouse out, on focus, on blur, on submit, on result, on click, on change.</li> <li>4. Structuring data with xml, xml parser, extensible style language (xsl); customizing markup language.</li> <li>5. Configuring apache-tomcat server.</li> <li>6. Building simple jsp: Declaring variables and methods in jsp, inserting java expression in jsp, processing request from user, generating dynamic response for the user. Accessing database from jsp ,inserting applet into jsp.</li> </ol>	



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Reference

1. JAVA Server Pages-Hans Bergstein–O’Reilly.
2. Web Technologies-Godbole A. S.&KahateA., TMH.
3. Web Technology & Design- Xavier C., New Age Publication.
4. Java Server Programming, J2EE edition. (VOLI and VOL II);WROXpublishers.

CS-781 Industrial Training Evaluation 0-0-3-3-2:

Student has to deliver a seminar on Industrial Training conducted after 6<sup>th</sup> semester

Internships offer students a hands-on opportunity to work in their desired field. They learn how their course of study applies to the real world and build a valuable experience that makes them stronger candidates for jobs after graduation.

An internship can be an excellent way to "try out" a certain career. For instance, you may think you want a fast-paced job in advertising after college, but after an internship, you may find that it's not for you; that's valuable insight that will help you choose your career path.

CS-782: Project-I 0-0-3-3-2:

A preliminary / short project to be carried out after discussions with project supervisor. Four clusters are formed among the students on the basis of their respective results. Four students are chosen at random , one from each cluster, and a group is formed. The main focus is to form a balanced group , so that each and every student gets equal opportunity.

Then , the projects are made available on the portal and a choice filling mechanism is used for the distribution of the topics. Based on their respective projects, each group needs to conduct survey.

Based on their survey , a report is to be generated which is then submitted to the respective mentors.

The mentor then assigns new task to the groups. Each task is divided into sub task by the project leader and then duties are assigned to the respective team members.

**FOURTH YEAR SECOND SEMESTER**

Paper Name:-	Financial Management & Audit/Accounts
Paper Code:-	HU801
Contacts:-	3-0-0-3
Credit Point:-	3
<p>Introduction: Financial Management, Financial Planning and Capitalization- definitions, objectives, changing roles and functions, Financial Decision.</p> <p>Capital Budgeting: Nature of Investment decision, Importance of Capital Budgeting, The Capital. Budgeting Process - Investment Criterion, Pay-back period, Accounting, ROR (Rate of Return) Method, Discounting Cash flow method, Net - present value method, IRR (Internal Rate of Return) method, The benefit-Cost Ratio method.</p> <p>Management of Working Capital: Various concepts, Elements, Classification, Financing and importance of working capital, Investment analysis, Cash flow determination, cost of capital, capital budgeting methods.</p> <p>Budgeting Control Technique: Concepts of Budget, budgeting and budgetary control, Objectives, Functions, Uses, Advantages, Limitations; Master Budget and Report.</p> <p>Cost - Volume - Profit Analysis: Classification of costs, Allocation, apportionment and absorption, Cost centers, different costing systems, Cost analysis for managerial decisions, Meaning of Linear CVP analysis, Objectives, Assumptions, Break- Even analysis, determining the Break-Even point profit, Volume graph profit, Volume ratios margin of Safety.</p> <p>Introduction to Accounting: Basic accounting concepts, important definitions, uses, limitations, advantages; types of Accounting, Financial statements, introduction to Journal Accounting; different types of Vouchers, double entry bookkeeping, different types of transactions related to Financial Accounting.</p> <p>Financial Control: Posting of Ledgers and preparation of Trial Balance; preparation of Balance Sheet and Profit</p>	





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and Loss Accounts; Controlling other departments by Financial Accounting (A practical Approach).

**Reference**

1. Financial Management and Accounting - P. K. Jain, S. Chand & Co.
2. Management & Accounting: Principles and Practice- R. K. Sharma & Shashi Kumar Gupta, Kalyani
3. Advanced Management Accounting - Kaplan & Atkinson, PHI.
4. Fundamentals of Financial Management - Van Home, PE.
5. Financial Mgmt Accounting, Gupta, Pearson
6. Financial Mgmt, I.M. Pandey, Vikas
7. Financial Mgmt., Khan & Jain, TMH
8. Financial Mgmt, Mcmenamin, OUP
9. Financial Mgmt & Policy, Van Horne, PHI
10. Financial Mgmt, Kulkarni & Satyaprasad, Himalaya

Paper Name:-	Cryptography and Network Security
Paper Code:-	CS 801A
Contacts:-	3-1-0-4
Credit Point:-	4
<p>Introduction To Security [5L]: Need for security, Security approaches, Principles of security, Types of attacks. Cryptographic Techniques [5L]: Plaintext, Cipher text, Substitution &amp; Transposition techniques, Encryption &amp; Decryption, Types of attacks, Key range &amp; Size.</p> <p>Symmetric &amp; Assymmetric Key Cryptography [10L]: Algorithm types &amp; Modes, DES, IDEA, Differential &amp; Linear Cryptanalysis, RSA, Symmetric &amp; Assymmetric key together, Digital signature, Knapsack algorithm.</p> <p>Internet Security Protocol[2L]: SSL, TLS, SHTTP, Email Security, WAP Security.</p> <p>User Authentcattion Mechanism [5L]: Authentication basics, Passwords, Authentication tokens, Certificate based &amp; Biometric authentication, Kerberos, X.509, PKI – Electronic Mail security – PGP, S/MIME – Firewall System security[2L]: Intruders – Malicious software – viruses – Firewalls – Security Standards.</p> <p>Case Studies Of Cryptography [5L]: Deniel of service attacks, IP spoofing attacks, Secure inter branch payment transactions. Cookies and privacy.</p>	
<p><b>Books:</b>            Cryptography &amp; Network Security: Atul Kahate, TMH.            William Stallings, “Cryptography and Network security Principles and Practices”,            Pearson/PHI, 4th ed, 2006.</p>	

Paper Name:-	Bio Informatics
Paper Code:-	CS 801B
Contacts:-	3-1-0-4
Credit Point:-	4
<p>Introduction to Genomic data and Data Organization: Sequence Data Banks- Introduction to sequence date banks-protein sequence data bank. NBFPR-PIR, SWISSPROT, Signal peptide data bank, Nucleic acid sequence data bank-Gen Bank, EMBL nucleotide sequence databank, AIDS virus sequence data bank. RRNA data bank, structural data banks – protein Data Bank(PDB), The Cambridge Structural Database(CSD):Genome databank-Metabolic path way data: Microbial and Cellular Data Banks.</p> <p>Introduction to MSDN (Microbial Strain Data Network): Numerical Coding Systems of Microbes, Hibridoma Data Bank Structure, Virus Information System Cell line information system; other important Data banks in the area of Biotechnology /life sciences/ biodiversity.</p> <p>Sequence analysis: Analysis Tools for Sequence Data Banks; Pairwise alignment-NEEDLEMAN and Wunsch algorithm, Smith Waterman, BLAST, FASTA algorithms to analyze sequence data: Sequence patterns b motif sand profiles.</p>	



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Secondary Structure predictions; prediction algorithms; Chao-Fasman algorithm, Hidden-Markov model, Neural Networking. Tertiary Structure predictions; prediction algorithms; Chao-Fasman algorithm, Hidden-Markov model, Neural Networking.  
 Applications in Biotechnology: Protein classifications, Fold libraries, Protein structure prediction: Fold recognition (threading), Protein structure predictions: Comparative modeling (Homology), Advanced topics: Protein folding, Protein-ligand interactions, Molecular Modeling & Dynamics, Drug Designing.

**Reference**

1. Lesk, Introduction to Bio Informatics, OUP
2. Introduction to Bioinformatics, Atwood, Pearson Education
3. Developing Bioinformatics Computer Skills, Cynthia Gibas and Per Jambeck, 2001 SPD
4. Statistical Methods in Bioinformatics, Springer India
5. Beginning Perl for Bio-informatics, Tisdall, SPD
6. Biocomputing: Informatics and Genome Project, Smith, D.W., 1994, Academic Press, NY
7. Bioinformatics: A practical guide to the analysis of genes and proteins, Baxevanis, A.D., Quellerie, B.F.F., John
8. Murty CSV, Bio informatics, Himalaya

Paper Name:-	Natural Language Processing
Paper Code:-	CS-801C
Contacts:-	3-1-0-4
Credit Point:-	4
<p><b>Module I</b>          Regular Expressions and Automata: Recap [2L]: Introduction to NLP, Regular Expression, Finite State Automata          Tokenization [5L]:          Word Tokenization, Normalization, Sentence Segmentation, Named Entity Recognition, Multi Word Extraction, Spell Checking–Bayesian Approach, Minimum Edit Distance          Morphology [4L]          Morphology – Inflectional and Derivational Morphology, Finite State Morphological Parsing, The Lexicon and Morphotactics, Morphological Parsing with Finite State Transducers, Orthographic Rules and Finite State Transducers, Porter Stemmer</p> <p><b>Module II</b>          Language Modeling [4L]          Introduction to N-grams, Chain Rule, Smoothing–Add-One Smoothing, Witten-Bell Discounting; Back off, Deleted Interpolation, N-grams for Spelling and Word Prediction, Evaluation of language models.          Hidden Markov Model and POS Tagging [4L]          Markov Chain, Hidden Markov Models, Forward Algorithm, Viterbi Algorithm, Part of Speech Tagging–Rule based and Machine Learning based approaches, Evaluation</p> <p><b>Module III</b>          Text Classification [4L]          Text Classification, Naïve Bayes’ Text Classification, Evaluation, Sentiment Analysis–Opinion Mining and Emotion Analysis, Resources and Techniques          Context Free Grammar [5L]          Context Free Grammar and Constituency, Some common CFG phenomena for English, Top-Down and Bottom-up parsing, Probabilistic Context Free Grammar, Dependency Parsing</p> <p><b>Module IV</b>          Computational Lexical Semantics [4L]          Introduction to Lexical Semantics –Homonymy, Polysemy, Synonymy, Thesaurus–Word Net, Computational Lexical Semantics–Thesaurus based and Distributional Word Similarity          Information Retrieval [5L]          Boolean Retrieval, Term-document incidence, The Inverted Index, Query Optimization, Phrase Queries, Ranked</p>	



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Retrieval–Term Frequency–Inverse Document Frequency based ranking, Zone Indexing, Query term proximity, Cosine ranking, Combining different features for ranking, Search Engine Evaluation, Relevance Feedback

Reference

1. Speech and Language Processing, Jurafsky and Martin, Pearson Education
2. Foundation of Statistical Natural Language Processing, Manning and Schutze, MIT Press

Paper Name:-	E -Commerce
Paper Code:-	CS-802A
Contacts:-	3-1-0-4
Credit Point:-	4

Syllabus:-

Introduction to E-Commerce[6L]: Definition, Scope of E-Commerce, Hardware requirements, E-Commerce and Trade Cycle, Electronic Markets, Electronic Data Interchange and Internet Commerce.

Business to Business E-Commerce [7L]: Electronic Markets, Electronic Data Interchange (EDI):

Technology, Standards (UN/EDIFACT), Communications, Implementations, Agreements, Security, EDI And Business, Inter-Organizational E-commerce.

Legal issues[5L]: Risks: Paper Document vs. Electronic document, Authentication of Electronic document, Laws, Legal issues for Internet Commerce: Trade marks and Domain names, Copyright, Jurisdiction issues, Service provider liability, Enforce able online contract.

Security Issues[6L]:S ecurity Solutions: Symmetric and Asymmetric Crypto systems, RSA, DES, and Digital Signature, Protocols for secure messaging, Secure Electronic Transaction(SET) Protocol, Electronic cash over internet, Internet Security.

Business to Consumer E-Commerce[8L]:Consumer trade transaction, Internet, Page on the Web, Elements of E-Commerce with VB, ASP, SQL.

E-business[7L]:Internet bookshops, Software supplies and support, Electronic Newspapers, Internet Banking, Virtual Auctions, Online Share Dealing, Gambling on the net, E-Diversity, Case studies through internet.

Reference

1. E-Commerce- Strategy, Technologies & Applications by David Whitley, TMH
2. E-Commerce-The cutting edge of business by Kamlesh K. Bajaj, TMH
3. E-Commerce through ASP by W Clarke- BPB
4. Beginning E-Commerce with VB,ASP,SQLServer7.0&MTS by Mathew Reynolds, Wrox Publishers
5. Global Electronic Commerce-Theory and Case Studies by J.Christopher Westland and Theodore H.K Clark, University Press

Paper Name:-	Internet Technology
Paper Code:-	CS 802B
Contacts:-	3-1-0-4
Credit Point:-	4

Syllabus:-

Module I (6L)

Introduction (1L):

Overview, Network of Networks, Intranet, Extranet and Internet.

World Wide Web(1L):

Domain and Subdomain, Address Resolution, DNS, Telnet, FTP,HTTP.

Review of TCP/IP(1L):

Features,Segment,Three-WayHandshaking,FlowControl,ErrorControl,Congestion control, IP Datagram, IPv4and

IPv6.

IP Subnetting and addressing(1L):

Classful and Classless Addressing, Subnetting. NAT, IP masquerading, IP tables.

Internet Routing Protocol(1L):

Routing-Intra and Inter Domain Routing, Unicast and Multicast Routing, Broadcast.



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Electronic Mail(1L): POP3,SMTP.  
Module II (9L)  
HTML(3L):  
Introduction,Editors,Elements,Attributes,Heading,Paragraph.Formatting,Link, Head, Table, List, Block, Layout, CSS. Form, I frame, Colors, Color name, Color value.  
Image Maps(1L):  
map, area, attributes of image area.  
Extensible Markup Language(XML)(4L):  
Introduction, Tree, Syntax, Elements, Attributes, Validation, Viewing. XHTML in brief.  
CGI Scripts(1L):  
Introduction, Environment Variable, GET and POST Methods.  
Module III (10L)  
PERL(3L):  
Introduction,Variable,Condition,Loop,Array,Implementingdatastructure,Hash,String,Regular Expression, File handling, I/O handling.  
JavaScript(4L):  
Basics,Statements,comments,variable,comparison,condition,switch,loop,break.Object –string, array,Boolean,reg-ex.Function, Errors,Validation.  
  
Cookies(1L):  
Definitionofcookies,Create andStorea cookiewith example.  
Java Applets(2L):  
Container Class,Components,Applet LifeCycle, Updatemethod;Parameterpassingapplet, Applications.  
ModuleIV (4L)  
Client-ServerprogrammingIn Java(2L):  
JavaSocket,JavaRMI.  
Threats(1L):  
Maliciouscode-viruses,Trojanhorses,worms; eavesdropping,spoofing,modification,denialofservice attacks.  
Networksecuritytechniques(2L):  
Password andAuthentication;VPN, IPSecurity,securityinelectronictransaction,SecureSocketLayer(SSL), Secure  
Shell (SSH).  
Firewall(1L):  
Introduction,Packetfiltering,Stateful,Application layer,Proxy.  
Module V (5L)  
Internet Telephony(1L):  
Introduction, VoIP.  
Multimedia Applications (2L):  
Multimedia over IP: RSVP, RTP, RTCP and RTSP. Streaming media, Codec and Plugins, IPTV.  
Search Engine and WebCrawler(2L):  
Definition, Metadata, Web Crawler, Indexing, Page rank, overview of SEO.

Paper Name:-	Modeling &Simulation
Paper Code:-	CS-802C
Contacts:-	3-1-0-4
Credit Point:-	4



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Module-I: Introduction to Modeling and Simulation: [6L]  
 Nature of Simulation. Systems, Models and Simulation, Continuous and Discrete Systems, system modeling, Components of a simulation study, Introduction to Static and Dynamic System simulation, Application areas, Advantages, Disadvantages and pitfalls of Simulation.

Module-II: System Dynamics & Probability concepts in Simulation: [10L]  
 Exponential growth and decay models, Generalization of growth models, Discrete and Continuous probability functions, Continuous Uniformly Distributed Random Numbers, Generation of a Random numbers, Generating Discrete distributions, Non-Uniform Continuously Distributed Random Numbers, Rejection Method.

Module-III: Simulation of Queuing Systems and Discrete System Simulation: [14L]  
 Poisson arrival patterns, Exponential distribution, Service times, Normal Distribution Queuing Disciplines, Simulation of single and two server queue. Application of queuing theory in computer system. Discrete Events, Generation of arrival patterns, Simulation programming tasks, Gathering statistics, Measuring occupancy and Utilization, Recording Distributions and Transit times.

Module-IV: Analysis of Simulation output : [6L]  
 Sensitivity Analysis, Validation of Model Results.

Text Books:  
 1. Jerry Banks, John Carson, B.L. Nelson and D.M.Nicol“ Discrete Event System Simulation”, Fifth Edition,  
 2.Narsingh Deo, 1979, System Simulation with Digital Computers, PHI.  
 3. Geoffrey Gordon, “System Simulation”, PHI.  
 4. Averill M. Law and W.David Kelton, “Simulation Modeling and Analysis”, Third Edition, McGraw Hill  
 5. J. N. Kapoor. Mathematical Modeling, Wiley eastern Limited.

Reference Books:  
 1. Sankar Sengupta, “System Simulation and Modeling”, Pearson.  
 2. C. Dennis Pegden, Robert E. Shannon and Randall P.Sadowski, 1995, Introduction to Simulation using SIMAN, 2<sup>nd</sup> Edn., Tata McGraw-Hill.  
 3. A. M. Law and W.D. Kelton..Simulation Modeling and Analysis, T.M.H. Edition.

Paper Name:-	E-Commerce Lab
Paper Code:-	CS-892A
Contacts:-	0-0-3-3
Credit Point:-	2

Syllabus:-  
 Following E-Commerce experiments are to be implemented using either VB, ASP, SQL or JAVA, JSP, SQL.

- Creating E-Commerce Site[3P]: Designing and maintaining Web Pages. Advertising in the Website, Portals and Vortals.
- E-Commerce Interaction[6P]: Comparison Shopping in B2C, Exchanges Handling in B2B, Interaction Examples: Virtual Shopping Carts.
- E-Commerce Applications[6P]: Online Store, Online Banking, Credit Card Transaction Processing.

Paper Name:-	Internet Technology lab
Paper Code:-	CS-892B
Contacts:-	0-0-3-3
Credit Point:-	2



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**Syllabus for UG Classes effective from First July,2013**

**Syllabus:-**

Week-wise Schedule

Week 1:Hyper Text Mark up Language (HTML) Tags

Week 2:C# Programming –variables, operations, conditional logics, functions

Week 3:C# Programming –arrays, classes, inheritance, polymorphism

Week 4:Web Forms and Web Controls

Week 5:State Management

Week 6:Validation & Rich Controls

Week 7:Styles, Themes and Master Pages

Week 8 & 9:Mini Project -Phase 1

Week 10:Working with Data

Week 11 & 12:Mini Project -Phase 2

Week 13 & 14:Test

Paper Name:-	Modeling & Simulation(M)
Paper Code:-	CS-892C
Contacts:-	0-0-3-3
Credit Point:-	2
Syllabus:-	
<ol style="list-style-type: none"> <li>1. FPGA Implementation of Simple Alarm System</li> <li>2. FPGA Implementation of Parity Checker</li> <li>3. FPGA Implementation of Scrolling Display</li> <li>4. FPGA Implementation of Multimode Calculator</li> <li>5. FPGA Implementation of Multimode Calculators</li> <li>6. Modeling and Prototyping with Simulink and Code Composer Studiowith DSK</li> <li>7. Graphical Simulation and Modeling using MATLAB</li> <li>8. Simulation of Delta Modulation, Adaptive Delta Modulation and QPSK Constellation</li> </ol>	

**CS- 881: Grand - Viva : 0-0-0-0-4:** Each student has to appear for final viva.

A panel of teachers set up a interview system , where every student is asked questions based on every subject taught in the course. Every student is supposed to give a set of subjects as choice. Questions are asked from those subject to evaluate the depth of knowledge of every student. A failure in this paper would lead to a year lag.

**CS- 882: Project-II: 0-0-9-9-6:** A final / detailed project to be completed, a Thesis on that topic to be submitted and to be appeared in a seminar to defend the submitted final project. With the respective group leaders , being involved in their respective tasks , all the projects develop at a rapid rate. The respective mentors assign different agenda to the group leaders. The group leader then conveys the information to the respective group members. It's the group leader's responsibility to assign task to every group member. This gives a brilliant opportunity to every group leader to show their leadership qualities and gives every member a chance to show their co-ordination skills.

This phase is followed by a systematic evaluation of the real world problem , i.e , the project topic and then representation of it in terms of programming language. Projects are mostly research based.

They are completed in a defined deadline and then is presented in front of a panel of teachers.

**CS-883: Group Discussion: 0-0-3-3-2:** Student has to appear in Group Discussions as assigned.

- a) Teaching Strategies of Group Discussion
- b) Introducing Different Models & Topics of Group Discussion
- c) Exploring Live /Recorded GD Sessions for mending students' attitude/approach & for taking remedial measure