SCHEME OF EXAMINATION

&

SYLLABI

for

Bachelor / Master of Technology (Dual Degree)
Computer Science & Engineering

Offered by

University School of Information Technology

1ST SEMESTER TO 8TH SEMESTER

Guru Gobind Singh Indraprastha University
Kashmere Gate, Delhi – 110 403 [INDIA]

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## First Semester

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GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY  
KASHMERE GATE, DELHI  
Bachelor / Master of Technology (Dual Degree)  
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*NUES
GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY
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GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY
KASHMERE GATE, DELHI
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Computer Science & Engineering

Fourth Semester

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**Total** 18 14 28

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**GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY**  
**KASHMERE GATE, DELHI**  
**Bachelor / Master of Technology (Dual Degree)**  
**Computer Science & Engineering**  

**Sixth Semester**

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<td>15456</td>
<td>Seminar and progress report</td>
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<td>IT458</td>
<td>15458</td>
<td>Laboratory work for electives</td>
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**Total** 8 4 22

*NUES

Note:
1. ‘*’ Marked papers are NUES papers.
2. Total number of credits in BTECH(CSE) = 210
3. The minimum number of credits to be earned for the award of the degree is = 200
I. Remedial Grammar
   (a) Simple sentences – their phrase structure
   (b) Parts of speech
   (c) Tense and concord
   (d) Gerunds, Participles & Infinitives
   (e) Complex and Compound sentences (Use of connectives)
   (f) Conditional clauses
   (g) Question tags & short responses
   (h) Common errors

II. Vocabulary and Usage
   (a) Synonyms & Antonyms
   (b) One word substitutions
   (c) Words often confused
   (d) Idioms / Idiomatic expressions
   (e) Foreign Phrases (Greek and Latin)

III. Presentation of Technical Information:
    Technical description of
   (a) Simple objects, tools, appliances
   (b) Processes and operations
   (c) Scientific principles

IV. Composition:
   (a) Comprehension – Unseen passages
   (b) Dialogues – Creation of mock situations.
   (c) Debates – Discussing the pros and cons of a given topic.
   (d) Thematic Appreciation Exercises / Development of situational outlines.

V. Prose
   Selected prose pieces from prescribed texts.

2. **Fuels:** Definition and classification, combustion and chemical principles involved in it. Calorific value: Gross and Net Calorific values and their determination by Boy's Gas Calorimeter and Bomb Calorimeter.
   i) Solid fuels: Proximate and ultimate analysis of coal and their importance. Carbonization: High and Low temperature carbonization, coke, its manufacture by the Otto Hoffman Oven and uses.
   ii) Liquid fuels: Conversion of coal into liquid fuels (Bogius process & Fischer Tropsch process and mechanism, Petroleum: its chemical composition and Fractional distillation, Cracking of heavy oil residues: thermal cracking and catalytic cracking, Knocking-chemical structure and knocking: Octane and Cetane number and their significance, Power alcohol.
   iii) Gaseous Fuels: Natural gas, producer gas, carburetted water gas, coal gas and oil gas, fuel and fuel gases and their analysis by Orsat's apparatus.
   iv) Numerical on calorific value, combustion, Proximate and ultimate analysis of coal and fuel gas analysis.
   v) Nuclear Fuels: Nuclear reactions, nuclear fission and nuclear fusion, Nuclear reactor.

3. **Polymers:** Basic concepts & Terminology, such as monomers, Polymers, functionality, Thermoplastics, Thermosets, Linear, Branched, cross linked polymers etc. Different definitions of molecular weight's viz. Mw, Mn, Mv and then determinations, Industrial applications of polymers, Addition, condensation and Ionic polymerization's solutions of polymers, good solvents, & bad solvent, solubility parameter, solutions viscosity and determination of intrinsic viscosity.

4. **Corrosion:** Definition and types of corrosion, Laws of oxide film 'growth (Linear, parabolic and logarithmic), different theories of corrosion, Atmospheric corrosion, Stress corrosion, water-line, pitting and soil corrosion.

**Protective measures against corrosion:**

i) Modification of environment
ii) Modification of the properties of the metal
iii) Use of protective coatings
iv) Cathodic Protection
v) Material selection and design
I. Introduction: Overview of computer organization and historical perspective computer applications in various fields of science and management. Data representation: Number systems, character representation codes, Binary, hex, octal codes and their inter conversions. Binary arithmetic, Floating point arithmetic, signed and unsigned numbers. Data Storage: Primary and Secondary storage, Introduction to various computer devices such as keyboard, mouse, printers, disk files, floppies etc. Concept of computing, contemporary, Operating Systems such as DOS, Windows’95, UNIX etc. (only brief user level description). Introduction to organization and architecture of mainframe, mini and micro systems. Introduction to E-mail, ftp, login and other network services, world wide web, MS-Office.

II. Introduction to Programming: Concept of algorithms, Flow charts, Example of Algorithms such as how to add ten numbers, roots of a quadratic equation. Concept of sequentially following up the steps of a algorithm. Notion of program, programmability and programming languages, Structure of programs, Object codes, compilers. Introduction to the Editing tools such as vi or MS-VC editors. Concepts of the finite storage, bits, bytes, kilo, mega and gigabytes, Concepts of character representation.

III. Programming using C: The emphasis should be more on programming techniques rather that the language itself. The C programming language is being chosen mainly because of the availability of the compilers, books and other reference materials. Example of some simple C program. Dissection of the program line by line, Concepts of Variables, program statements and function calls from the library (printf for example)

- C data types, int, char, float etc.
- C expressions, arithmetic operations, relational and logic operations.
- C assignment statements, extension of assignment to the operations. C primitive input output using getchar and putchar, exposure to the scanf and printf functions.
- C statements, conditional executing using if, else. Optionally switch and break statements may be mentioned.
- Concepts of loops, example of loops in C using for, while and do-while, Optionally continue may be mentioned.
- One dimensional arrays and example of iterative programs using arrays, 2-d arrays. Use in matrix computations.
- Concept of Sub-programming, functions, Example of functions, Argument passing mainly for the simple variables.
- Pointers, relationship between arrays and pointers, Argument passing using pointers, Array of pointers, Passing arrays as arguments.
- Strings and C string library
  Structures and Unions. Defining C structures, passing strings as arguments, programming examples.
- File I/O, Use of fopen, fscanf and fprintf routines
I. Properties of Conductors and Insulators
   Basic laws of Electrical Engineering
   Temperature Resistance Coefficients

II. D.C. Circuits
   Network theorems and applications
   Division of Current
   Potentiometer
   Circuit Parameters
   Energy and Power
   Superposition
   Thevenin and Reciprocity theorems
   Star Delta Formations

III. Alternating Currents
   Peak, Average and RMS values for alternating currents
   Power and Power factor
   Resistance, Inductance and Capacitance
   Resonance
   Q Factor

IV. Electromagnetism
   Magnetic Induction
   Permeability
   Hysteresis

V. Measuring Instruments
   Moving Coil and Moving Iron Instruments
   Construction of Instruments
   Attraction and Repulsion type
   Permanent Magnet and Eletrodynamics, Dynamometer type

VI. D.C. Generators & Motors
   Principle of operation of Generators & Motors
   Speed Control of shunt motors
   Flux control, Rheostatic control, voltage control
   Speed control of series motors

VII. A.C. Generators & Motors
   Principle of operation
   Removing Magnetic field
   Squirrel cage and phase wound rotor
   Starting of Induction motors
   Direct on line and Star Delta starters
   Synchronous machines

VIII. Transformers
   Construction
   Regulation and efficiency calculations
   Open and short circuit tests
Paper Code: BA-109
Paper ID: 99109
Paper : Mathematics – I

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**I(a) Calculus of functions of One variable**

(i) Successive Differentiation, Leibnitz’s theorem (without proof), Lagrange’s Theorem, Cauchy Mean value theorems, Taylor’s theorem (without proof), Remainder term, Asymptotes, Curvature, Curve Tracing.

14 hrs

(ii) Infinite Series: Convergence, divergence, Comparison test, Ration Test, Cauchy $n^{th}$ root test, Leibnitz’s test (without proof), Absolute and Conditional Convergence, Taylor and Meclaurin series, Power Series, Radius of Convergence.

5 hrs

(iii) Integral Calculus: Reduction Formulae of trigonometric functions, Properties of definite Integral, Applications to length, area, volume, surface of revolution, Definition of improper integrals, Beta-Gamma functions.

8 hrs

**I(b) Calculus of Functions of several variables:**

Partial derivatives, Chain rule, Differentiation of Implicit functions, Exact differentials. Maxima, Minima and saddle points, Method of Lagrange multipliers. Differentiation under Integral sign, Jacobians and transformations of coordinates. Double and Triple integrals. Simple applications to areas, Volumes etc.

12 hrs

**II Vector Calculus:**

Scalar and vector fields, Curves, Arc length, Tangent, normal, Directional Derivative, Gradient of scalar field, divergence and curl of a vector field. Line integral (independent of path), Green’s theorem, Divergence theorem and Stoke’s theorem (without proofs), Surface Integrals.

12 hrs

**Suggested Text Books & References**

I  OPTICS
Polarization
Types of polarization, elliptically and circularly polarized light Brewsters law, Malu's law, Nicol prism, double refraction, quarter-wave and half-wave plates, optical activity, specific rotation, Laurent half shade polarimeter.

Interference
Coherence and coherent sources, interference by division of wave front (young's double slit experiment, Fresnel's biprism), interference by division of amplitude (thin films, Newton's rings, Michelson's interferrometer, Fabry Perot interferrometer)

Diffraction
(Fresnel and Fraunhofer types of diffraction) Fraunhofer diffraction: Single slit, double slit, circular aperture and N-slit, diffraction grating wavelength determination, resolving power and dispersive power, Fresnel Diffraction: Zone plate, circular aperture, opaque circular disc, narrow slit.

II  LASER AND FIBRE OPTICS
Lasers

Fibre Optics:
Introduction to optical fibre, types of optical fibres and their characteristics, (Attenuation and dispersion step index and graded index fibres, principle of fibre optic communication-total internal reflection, numerical aperture, fibre optical communication network (qualitative)-its advantages.

III  Theory of relativity
Absolute and Inertial frames of reference, Galenlian transformations, Michelson-Morley experiment, the postulates of the special theory of relativity, Lorentz transformations, time dilation, length contraction, velocity addition, mass energy equivalence.

Recommended Books
1.  Concepts of Modern Physics: A. Beiser
2.  Modern Physics: Kenneth Krane
3.  Fundaments of Optics: Jenkins and White
4.  Optics: Ghatak
5.  Fundamental of Physics by RESNICK & HALLIDAY
Practicals:

Code: BA151
Paper ID: 99151
Paper: Chemistry – I Lab. 0 2 1
Practicals based on BA103.

Code: BA153
Paper ID: 99153
Paper: Physics– I Lab. 0 2 1
Practicals based on BA109.

Code: IT155
Paper ID: 15155
Paper: Computer Lab. 0 2 1
Practicals based on IT105.

Code: IT157
Paper ID: 15157
Paper: Engineering Graphics –I 0 2 1

1. General
   Importance, Significance and scope of engineering drawing, Lettering, Dimensioning, Scales,
   Sense of proportioning, Different types of projections, Orthographic projections, B.I.S.
   Specifications.

2. Projections of Points and Lines
   Introduction of planes of projection, Reference and auxiliary planes, projections of points and
   lines in different quadrants, traces, inclinations, and true lengths of the lines, projections on
   auxiliary planes, shortest distance intersecting and non-intersecting lines.

3. Planes Other than the Reference Planes
   Introduction of other planes (perpendicular and oblique), their traces, inclinations etc.,
   projections of points and lines lying in the planes, conversion of oblique plane into auxiliary
   plane and solution of related problems.

4. Projections of Plane Figures
   Different cases of plane figures (of different shapes) making different angles with one or both
   reference planes and lines lying in the plane figures making different given angles (with one
   or both reference planes). Obtaining true shape of the plane figure by projection.

5. Projection of Solids
   Simple cases when solid is placed in different positions, Axis, faces and lines lying in the
   faces of the solid making given angles.

6. Development of Surface
   Development of simple objects with and without sectioning.

7. Nomography
   Basic concepts and use.
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<th>Paper: Electrical Science Lab.</th>
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Practicals based on IT107.
1. Some Key Concepts:
   Communication as sharing; context of communication; the speaker/writer and the 
   listener/reader; medium of communication; barriers to communication; accuracy, brevity, 
   clarity and appropriateness in communication.

2. Writing:
   Selecting material for expository, descriptive, and argumentative pieces; business letters; 
   formal report; summarizing and abstracting; expressing ideas within a restricted word limit; 
   paragraph division, introduction and the conclusion; listing reference material; use of charts, 
   graphs and tables; punctuation and spelling; semantics of connectives, modifiers and modals, 
   variety in sentences and paragraphs.

3. Reading Comprehension:
   Reading at various speeds (slow, fast, very fast), reading different kinds of texts for different 
   purposes (e.g., for relaxation, for information, for discussion at a later stage, etc.); reading 
   between the lines.

4. Speaking:
   Achieving desired clarity and fluency; manipulating paralinguistic features of speaking (voice 
   quality, pitch, tone, etc.); pausing for effectiveness while speaking, task-oriented, 
   interpersonal, informal and semiformal speaking; making a short classroom presentation.

5. Group Discussion:
   Use of persuasive strategies including some rhetorical devices for emphasizing (for instance; 
   being polite and firm; handling questions and taking in criticism of self; turn-taking strategies 
   and effective intervention; use of body language).

6. Listening Comprehension:
   Achieving ability to comprehend material delivered at relatively fast speed; comprehending 
   spoken material in Standard Indian English, British English and American English, intelligent 
   listening in situations such as an interview in which one is a candidate.

2. Equilibrium: Force body diagram, equations of equilibrium and their applications to engineering problems, equilibrium of two force and three force member


4. Friction: Static and Kinetic friction, laws of dry friction, co-efficient of friction, angle of friction, angle of repose, cone of friction, frictional lock, friction of flat pivot and collered thrust bearings, friction in journal-bearing, friction in screws, derivation of equation.

\[ \frac{T_1}{T_2} = \lambda e A \] and its application.

5. Distributed Forces: Determination of center of gravity, center of mass and centroid by direct integration and by the method of composite bodies mass moment of inertia and area moment of inertia by direct integration and composite bodies method, radius of gyration, parallel axis theorem, Pappus theorems, polar moment of inertia., Dynamics.

6. Kinematics of Particles: Rectilinear motion, plane curvilinear motion-rectangular co-ordinates, normal and tangential coordinates

7. Kinetics of Particles: Equation of motion, rectilinear motion and curvilinear motion, work energy equation, conservation of energy, impulse and momentum conservation of momentum, impact of bodies, co-efficient of restitution, loss of energy during impact.

8. Kinematics of Rigid Bodies: Concept of rigid body, types of rigid body motion, absolute motion, introduction to relative velocity, relative acceleration (Coriolis’s component excluded) and instantaneous center of zero velocity, Velocity and acceleration polygons for four bar mechanism and single slider mechanism.

9. Kinetics of Rigid Bodies: Equation of motion, transatory motion and fixed axis rotation, application of work energy principles to rigid bodies conservation of energy.

10. Vibrations: Classification, torsional free vibrations-single rotor and two rotor system, Spring mass system-its damped (linear dash pot) and undamped free vibrations, spring in series and parallel, simple problems.

Text/Reference:
Mathematics - II

Paper Code: BA – 108

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I. **Linear Algebra:** Linear Independence and dependence of vectors, Systems of linear equations – consistency and inconsistency, Gauss elimination method, rank of a matrix, Bilinear, Quadratic, Hermitian, Skew – Hermitian Forms, Eigenvalues and Eigenvectors of a matrix, diagonalization of a matrix, Cayley – Hamilton Theorem (without proof).

10 hrs.

II. **Ordinary Differential Equations:** Formation of ODE’s, definition of order, degree and solutions. ODE’s of first order: Method of separation of variables, homogeneous and nonhomogeneous equations, exactness and integrating factors, linear equations and Bernouilli equations, operator method, method of undetermined coefficients and nonhomogenous, operator method, method of undetermined coefficients and variation of parameters. Solutions of simple simultaneous ODE’s. Power series method of solution of DE, Legendre’s Equation, Legendre’s Polynomials, Bessel’s equation, Bessel’s function.

10 hrs.


18 hrs.

IV. **Probability:** Definition of Sample Space, Event, Event Space, Conditional Probability, Additive and Multiplicative law of Probability, Baye’s Law theorem, Application based on these results.

5 hrs.

**Suggested Text Books & References**

PHYSICS - II

Paper Code: BA – 110

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I. Quantum Mechanics
Wave particle duality, deBroglie waves, evidences for the wave nature of matter – the experiment of Davisson and Germer, electron diffraction, physical interpretation of the wave function and its properties, the wave packet, the uncertainty principle

4 hrs.

The Schrodinger wave equation (1 – dimensional), Eigen values and Eigen functions, expectation values, simple Eigen value problems – solutions of the Schrodinger’s equations for the free particle, the infinite well, the finite well, tunneling effect, simple harmonic oscillator (qualitative), zero point energy.

6 hrs.

II. Quantum Statistics
The statistical distributions: Maxwell Boltzmann, Bose-Einstein and Fermi-Dirac statistics, their comparisons, Fermions and Bosons Applications: Molecular speed and energies in an ideal gas. The Black body spectrum, the failure of classical statistics to give the correct explanations – the applications of Bose-Einstein statistics to the Black body radiation spectrum, Fermi-Dirac distribution, free electron theory, electronic specific heats, Fermi energy and average energy – its significance.

10 hrs.

III Band Theory of Solids
Origin of energy bands in solids, motion of electrons in a periodic potential – the Kronig – Penny model. Brillouin zones, effective mass, metals, semiconductors and insulators and their energy band structures. Extrinsic and Intrinsic semiconductors, doping – Fermi energy for doped and undoped semiconductors, the p-n junction (energy band diagrams with Fermi energy), the unbiased diode, forward and reverse biased diodes – tunnel diodes, zener diode, photo diode its characteristics, LED, Introduction to transistors.

10 hrs.

IV Overview of Electro – Magnetism

4 hrs.
Recommended Books

1. Concept of Modern Physics: A. Beiser
2. Modern Physics: Kenneth Krane
3. Solid State Physics by Kittle
4. Electronic Principles: Malvino
5. Statistical Mechanics by Garg Bansal and Ghosh (TMH)
STATISTICS, THEORY OF PROBABILITY AND LINEAR PROGRAMMING

Paper Code: BA – 114

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I. Probability, Statistics


17 hrs.

II. Linear Programming

Mathematical Preliminaries, Formulation of the Problem and Solution by Graphical method. The simplex Method, Dual problem formulation and Solution, Application to Transportation and Assignment Problems.

17 hrs.

Suggested Text Books & References

1. Irwin Miller and John E. Freund, “Probability and Statistics for Engineers” PHI
CHEMISTRY – II

Paper Code: BA – 118

1. Atomic Structure: Introduction to wave mechanics, the Schrodinger equation as applied to hydrogen atom, origin of quantum numbers, Long form of periodic table on the basis of Electronic configuration s, p, d, f block elements periodic trends, Ionisation potential, atomic and ionic radii electron affinity & electro-negativity.

2. Chemical Bonding: Ionic bond, energy changes, lattice energy Born Haber Cycle, Covalent bond-energy changes, Potential energy curve for H2 molecule, characteristics of covalent compound, co-ordinate bond-Werner’s Theory, effective atomic numbers, A hybridization and resonance, Valence Shell Electron Repulsion theory (VSEPR), Discussion of structures of H2O, NH3, BrF3, SiF4, Molecular orbital theory, Linear combination of atomic orbitals (LCAO) method. Structure of simple homo nuclear diatomic molecule like H2, N2, O2, F2.

3. Thermochemistry: Hess’s Law, heat of reaction, effect of temperature on heat of reaction at constant pressure (Kirchoff’s Equation) heat to dilution, heat of hydration, heat of neutralization and heat of combustion, Flame temperature.

4. Reaction Kinetics: Significance of rate law and rate equations, order and molecularity, Determinations of order of simple reactions-experimental method, Equilibrium constant and reaction rates-Lindemann, collision and activated complex theories, complex reactions of 1st order characteristics of consecutive, reversible and parallel reactions-Steady state and non-steady state approach.


7. Phase rule: Derivation of phase rule, Significance of various terms involved in the definitions phase diagram of one competent system miscibility, interpolations of two component system diagrams.
Unit – 1:
Introduction to programming methodologies and design of algorithms. Abstract Data Type, array, array organization, sparse array. Stacks and Stack ADT, Stack Manipulation, Prefix, infix and postfix expressions, their interconversion and expression evaluation. Queues and Queue ADT, Queue manipulation. General Lists and List ADT, List manipulations, Single, double and circular lists.

Unit – 2:
Trees, Properties of Trees, Binary trees, Binary Tree traversal, Tree manipulation algorithms, Expression trees and their usage, binary search trees, AVL Trees, Heaps and their implementation.

Unit – 3:
Multiway trees, B-Trees, 2-3 trees, 2-3-4 trees, B* and B+ Trees. Graphs, Graph representation, Graph Traversal.

Unit – 4:
Sorting concept, order, stability, Selection sorts (straight, heap), insertion sort (Straight Insertion, Shell sort), Exchange Sort (Bubble, quicksort), Merge sort (only 2-way merge sort). Searching – List search, sequential search, binary search, hashing concepts, hashing methods (Direct, subtraction, modulo-division, midsquare, folding, pseudorandom hashing), collision resolution (by open addressing: linear probe, quadratic probe, pseudorandom collision resolution, linked list collision resolution), Bucket hashing.

Text:

Reference
### Practicals:

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Practicals based on BA110.

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Practicals based on BA118.

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<th>Paper: Data Structure Lab.</th>
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Practicals based on IT128.

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### Basic Concepts

1. **I. S. drawing conventions, line symbols, kinds of line, drawing sheet lay-out, rules of printing, preferred scales.**

2. **Projections**
   - Perspective, orthographic, isometric and oblique projections, isometric scale, isometric drawing, Technical sketching.

3. **Shape Description (External)**
   - Multiplanar representation in first- and third angle systems of projections, glass-box concept, sketching of orthographic views from pictorial views, precedence of lines.
   - Sketching of pictorial (isometric and oblique) views from Multiplanar orthographic views, Reading exercises, Missing line and missing view exercises.

4. **Shape Description (Internal)**
   - Importance of sectioning, principles of sectioning, types of sections, cutting plane representation, section lines, conventional practices.

5. **Size Description**
   - Dimensioning, tools of dimensioning, Size and location dimensions, Principles of conventions of dimensioning, Dimensioning exercises.

6. **Computer Aided Drafting**
   - Basic concepts and use.
INSTRUCTIONS TO PAPER SETTERS:
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.

Unit – 1:
Location of Roots of functions and their minimization: Bisection method (convergence analysis and implementation), Newton Method (convergence analysis and implementation), Secant Method (convergence analysis and implementation). Unconstrained one variable function minimization by Fibonacci search, Golden Section Search and Newton’s method. Multivariate function minimization by the method of steepest descent, Nelder-Mead Algorithm.

Unit – 2:
Interpolation and Numerical Differentiation: Interpolating Polynomial, Lagrange Form, Newton Form, Nested Form, Inverse Interpolation, Neville’s Algorithm, Errors in interpolation, Estimating Derivatives and Richardson Extrapolation.
Numerical Integration: Definite Integral, Riemann – Integrable Functions, Trapezoid Rule, Romberg Algorithm, Simpson’s Scheme, Gaussian Quadrature Rule.

Unit – 3:
Linear System of Equations: Conditioning, Gauss Elimination, Pivoting, Cholesky Factorization, Iterative Methods, Power Method
Approximation by Spline Function: 1st and 2nd Degree Splines, Natural Cubic Splines, B Splines, Interpolation and Approximation.

Unit – 4:
Implementation to be done in C/C++.

Text:
Reference:
Unit – 1:
Review of complex variables: Complex Numbers, Algebra of Complex Numbers, Functions of Complex Variable, Taylor and Laurent Series, Differentiation, Integration, Cauchy Theorem, Residue Theorem.

Unit – 2:
Signals, Classification of Signals, Systems, Classification of Systems, Linear Time Invariant (LTI) Systems; Laplace Transform, z-Transform, Fourier Series and Transform (Continuous and Discrete) and their properties. Laplace Transform and Continuous Time LTI systems, z-Transform and Discrete Time LTI systems, Fourier analysis of signals and systems, State Space Analysis.

Unit – 3:
Circuits: Voltage, Ideal Voltage Source, Current Ideal Current Sources, Classification of Circuits, Ohm’s Law, Resistively, Temperature Effect, Resistors, Resistor Power Absorption, Nominal Values and Tolerances, Colour Codes, Open and Short Circuits, Internal Resistance.


Unit – 4:

Text:

Reference:
UNIT – 1:
Semiconductor diodes and their applications
Construction, characteristics and working principles of semiconductor diodes: PN junction diode, zener diode, varactor diode, schottky diode, photo diodes, Light emitting diode, Laser diode.

UNIT – 2:
Transistors and Biasing
Construction, operation of NPN & PNP transistor, characteristics, Types of configurations, methods of transistor biasing and stabilization.

UNIT – 3:
Field Effect Transistor
Classification of FET’s, construction & working principles of JFET, MOSFET, biasing methods, small signal model parameters.

UNIT – 4:
Linear Integrated Circuits
Differential amplifier circuits, operational amplifiers and its applications,

Oscillators
Concept of Feedback, barkhausen criteria for sinusoidal oscillators, phase shift oscillators, wein bridge & crystal oscillator.

Text/References:
4. S.G. Burns, P.R. Bond, “Principles of Electronic Circuits, 2nd Ed., Galgotia
6. B. G. Streetman, Theory & Technology & Semiconductor Devices.
7. Millman & Halkias Electronic Devices & Circuits, TMH(ISE)
8. S. Salivahanan & other, Electronic Devices & Circuits, TMH.
9. Malvino, Electronic Principles, TMH.
10. Jacob Millman, Micro Electronics, TMH.
Unit – 1:
Objects, relating to other paradigms (functional, data decomposition), basic terms and ideas
(abstraction, encapsulation, inheritance, polymorphism).
Review of C, difference between C and C++, cin, cout, new, delete operators.

Unit – 2:
Encapsulation, information hiding, abstract data types, object & classes, attributes, methods. C++ class
declaration, state identity and behavior of an object, constructors and destructors, instantiation of
objects, default parameter value, object types, C++ garbage collection, dynamic memory allocation,
metaclass/abstract classes.

Unit – 3:
Inheritance, Class hierarchy, derivation – public, private & protected; aggregation, composition vs
classification hierarchies, polymorphism, categorization of polymorphic techniques, method
polymorphism, polymorphism by parameter, operator overloading, parametric polymorphism, generic
function – template function, function name overloading, overriding inheritance methods, run time
polymorphism.

Unit – 4:
Standard C++ classes, using multiple inheritance, persistant objects, streams and files, namespaces,
exception handling, generic classes, standard template library: Library organization and containers,
standard containers, algorithm and Function objects, iterators and allocators, strings, streams,
manipulators, user defined manipulators, vectors, valarray, slice, generalized numeric algorithm.

Text:
2. A.R.Venugopal, Rajkumar, T. Ravishanker “Mastering C++”, TMH

References:
Publication.
Unit – 1:
Basic raster graphics algorithms for drawing 2D Primitives linear, circles, ellipses, arcs, clipping, clipping circles, ellipses & polygon.

Unit – 2:
Polygon Meshes in 3D, curves, cubic & surfaces, Solid modeling. Geometric Transformation: 2D, 3D transformations, window to viewport transformations, acromatic and color models.
Graphics Hardware: Hardcopy & display techniques, Input devices, image scanners

Unit – 3:

Unit – 4:

Text:

References:
UNIT – 1:
Basic concepts: database & database users, characteristics of the database, database systems, concepts and architecture, date models, schemas & instances, DBMS architecture & data independence, database languages & interfaces, data modelling using the entity-relationship approach. Overview of hierarchical, Network & Relational Data Base Management Systems.

Relational model, languages & systems: relational data model & relational algebra: relational model concepts, relational model constraints, relational algebra, SQL- a relational database language: date definition in SQL, view and queries in SQL, specifying constraints and indexes in sql.

UNIT – 2:
Oracle Architecture, Logical Data Structures Physical Data Structure, Instances, Table Spaces, Types of Tablespaces, Internal Memory Structure, Background Processes, Data Types, Roles & Privileges, Stored Procedures, User Defined Functions, Cursors, Error Handling, Triggers.

UNIT – 3:
Relational data base design: function dependencies & normalization for relational dataases: functional dependencies, normal forms based on primary keys, (1NF, 2NF, 3NF & BCNF), lossless join and dependency preserving decomposition (4NF, 5NF), domain key normal form.

UNIT – 4:
Concurrency control & recovery techniques: concurrency control techniques, locking techniques, time stamp ordering, granularity of data items, recovery techniques: recovery concepts, database backup and recovery from catastrophic failures.

Concepts of object oriented database management systems, Distributed Data Base Management Systems.

Text:
1. Elmsari and Navathe, “Fundamentals of database systems”, Pearson Education

References:
### Practicals:

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<tr>
<th>Code</th>
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Practicals based on IT205.

Practicals based on IT201.

Practicals based on IT207.

Practicals based on IT207.

Practicals based on IT211.
INSTRUCTIONS TO PAPER SETTERS:

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Unit 1:
Overview and characteristics of Java, Java program Compilation and Execution Process, Organization of the Java Virtual Machine, JVM as an interpreter and emulator, Instruction Set, class File Format, Verification, Class Area, Java Stack, Heap, Garbage Collection, Security Promises of the JVM, Security Architecture and Security Policy, Class loaders and security aspects, sandbox model.

Unit 2:
Java Fundamentals, Data Types & Literals Variables, Wrapper Classes, Arrays, Arithmetic Operators, Logical Operators, Control of Flow, Classes and Instances, Class Member Modifiers, Anonymous Inner Class Interfaces and Abstract Classes, inheritance, throw and throws clauses, user defined Exceptions, The StringBuffer Class, tokenizers, applets, Life cycle of applet and Security concerns.

Unit 3:
Threads: Creating Threads, Thread Priority, Blocked States, Extending Thread Class, Runnable Interface, Starting Threads, Thread Synchronization, Synchronize Threads, Sync Code Block, Overriding Synced Methods, Thread Communication, wait, notify and notify all.


Unit 4:
Input/OutputStream, Stream Filters, Buffered Streams, Data input and OutputStream, PrintStream, RandomAccessFile, JDBC (Database connectivity with MS-Access, Oracle, MS-SQL Server), Object serialization, Sockets, development of client Server applications, design of multithreaded server, Remote Method invocation, Java Native interfaces, Development of a JNI based application.

Collection API Interfaces, Vector, stack, Hashtable classes, enumerations, set, List, Map, Iterators.

Text/References
1. “Java-2 the complete Reference” by Patrick Naughton and Herbertz Schidt.
2. Head first Java, Sierra & Bates, O’Reilly.
3. “Programming with Java” by E Balaguruswamy.
**INSTRUCTIONS TO PAPER SETTERS:**

<table>
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</tbody>
</table>

**Unit - 1**

Concept of Multimedia, Media & data stream, main properties of multimedia system, Data stream characteristics & for continuous media Multimedia Applications, Hardware Software requirements, Storage Technologies: RAID, Optical Media.

**Unit - 2**

Text, Basic sound concepts, MIDI, Speech, Basic concept of Images, Graphics format, Basic concepts of Video & animation, Conventional system, Computer based animation, Authoring Tools, Categories of Authoring Tools.

**Unit - 3**

Lossless and Lossy compression, Run length coding, Statistical Coding, Transform Coding, JPEG, MPEG, Text compression using static Huffman technique, Dynamic Huffman Technique, Arithmetic Technique.

Introduction, Basic Terminology techniques, tweening & morphing, Motion Graphics 2D & 3D animation.

**Unit - 4**

Introduction to MAYA (Animating Tool):
Fundamentals, Modeling: NURBS, Polygon, Organic, Animation: Key frame animation, reactive animation, path animation, Skeleton animation etc., deformers.
Dynamics: soft bodies, Rigid bodies and its usages in the scene etc.,
Rendering: soft, Hard rendering, IPR rendering, Line and box rendering etc.,
Special Effects: Shading & Texturing Surfaces, Lighting, Special effects.
Working with MEL: Basics & Programming

**Text Books:**

3. Andleigh and Thakarar “Multimedia System Design” PHI

**Reference**

3. Maya manuals.
INSTRUCTIONS TO PAPER SETTERS:

Maximum Marks : 60

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.

Unit – 1:
Analog & Digital signals, AND, OR, NOT, NAND, NOR & XOR gates, Boolean algebra.

Standard representation of Logical functions, K-map representation and simplification of logical functions, Quinn-McClusky’s Algorithm, Don’t care conditions, X-OR & X-NOR simplification of K-maps.

Unit – 2:
Combinational circuits: Multiplexers, demultiplexers, Decoders & Encoders, Adders & Subtractors, Code Converters, comparators, decoder/drivers for display devices


Unit – 3:
Sequential circuits: Shift registers, Ripple counter, Design of Synchronous counters and sequence detectors.


Unit – 4:
Bipolar-Transistor Characteristics, RTL and DTL circuits, TTL, ECL and C MOS Logic families.

Logic Implementations using ROM, PAL & PLA., Semiconductor Memories: Memory organization & operation, classification and characteristics of memories, RAM, ROM and content addressable memory.

Text/References:

1. R.P. Jain, “Modern Digital Electronics”, TMH, 2nd Ed,
2. Malvino and Leach, “Digital principles and applications”, TMH
Introduction: Meaning and nature of management; management systems and processes, Tasks and responsibilities of a professional manager; Managerial skills.

Organization Structure and Process: Organizational climate and culture, Management ethos; Organizational Structure and Design: Managerial Communication; Planning process; Controlling.

Behavioural Dynamics: Individual determinants of Organization Behaviour; Perceptions, Learning, Personality, Attitudes and Values, Motivation; Stress and its management.

Interactive Aspects of Organizational Behaviour; Analysing inter-personal relations; Group Dynamics; Management of Organizational Conflicts; Leadership Styles.


References:
INSTRUCTIONS TO PAPER SETTERS:

Maximum Marks : 60

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2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.

Unit – 1:

Unit – 2:
Lattices: definition, sublattices, direct product, homomorphism, definition of Boolean algebra, properties, isomorphic structures (in particulars, structures with binary operations) subalgebra, direct product and homo-morphism, Boolean function, Boolean expression, representation & minimization of Boolean function.

Unit – 3:
GCD, LCM, Fundamental Theorem of Arithmetic, primes, Congruences, Euler \( \phi \) function, Fermat’s Little Theorem, Euler’s Generalization of FLT, Wilson’s Theorem, The functions \( \tau \) and \( \sigma \), Mobius \( \mu \) function, Arithmetic Functions, primitive roots, Quadratic congruences and quadratic reciprocity law, Primality and Factoring, Simple Cryptosystems, RSA Cryptosystem. Groups, Group identity and uniqueness, inverse and its uniqueness, isomorphism and homomorphism, subgroups, Cosets and Lagrange’s theorem, Permutation group and Cayley’s theorem (without proof), Error Correcting codes and groups, Normal subgroup and quotient groups.

Unit – 4:
Graph Terminology, Isomorphism, Isomorphism as relations, Cut-Vertices, Menger’s Theorem, Planar graphs, Euler’s formula (proof), four color problem (without proof) and the chromatic number of a graph, Euler graphs, Hamiltonian graphs, five color theorem, Vertex Coloring, Edge Colouring. Trees terminology, in order, preorder & post order trees traversal algorithms, directed graphs, Computer representation of graphs, Shortest path and minimal spanning trees and algorithms, Depth-first and breadth first searches, trees associated with DFS & BFS, Connected components. Complexity Analysis and proof of correctness of the graph MST, traversal and Shortest path algorithms.

Text/Reference:

UNIT – 1:
Introduction:
Software Crisis, Software Processes, Software life cycle models: Waterfall, Prototype, Evolutionary and Spiral models, Overview of Quality Standards like ISO 9001, SEI-CMM.

Software Metrics:
Size Metrics like LOC, Token Count, Function Count, Design Metrics, Data Structure Metrics, Information Flow Metrics.

UNIT – 2:
Software Project Planning:

Software Requirement Analysis and Specifications:

UNIT – 3:
Software Design:
Cohesion & Coupling, Classification of Cohesiveness & Coupling, Function Oriented Design, Object Oriented Design, User Interface Design.

Software Reliability:
Failure and Faults, Reliability Models: Basic Model, Logarithmic Poisson Model, Calendar time Component, Reliability Allocation.

UNIT – 4:
Software Testing:
Software process, Functional testing: Boundary value analysis, Equivalence class testing, Decision table testing, Cause effect graphing, Structural testing: Path testing, Data flow and mutation testing, unit testing, integration and system testing, Debugging, Testing Tools & Standards.

Software Maintenance:

Text:

Reference:
### Practical Courses

<table>
<thead>
<tr>
<th>Code</th>
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<th>T/P</th>
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<td>IT254</td>
<td>Paper: Multimedia Lab.</td>
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<td>IT256</td>
<td>Paper: Switching Theory and Logic Design Lab.</td>
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<td>IT258</td>
<td>Paper: Software Engineering Lab.</td>
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Practicals based on IT202, IT204, IT206, and IT212.
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Maximum Marks : 60

UNIT I
Automata and Language Theory: Chomsky Classification, Finite Automata, Deterministic Finite Automata (DFA), Non-Deterministic Finite Automata (NFA), Regular Expressions, Equivalence of DFAs, NFAs and Regular Expressions, Closure properties of Regular grammar, Non-Regular Languages, Pumping Lemma.

UNIT II
Context Free Languages: Context Free Grammar (CFG), Parse Trees, Push Down Automata (deterministic and non-deterministic) (PDA), Equivalence of CFGs and PDAs, Closure properties of CFLs, Pumping Lemma, Parsing, LL(K) grammar.

UNIT III
Turing Machines and Computability Theory: Definition of Turing Machine, Extensions of Turing machines, Non – deterministic Turing machines, Equivalence of various Turing Machine Formalisms, Church – Turing Thesis, Decidability, Halting Problem, Reducibility, Recursion Theorem.

UNIT IV
Complexity Theory: Time and Space measures, Hierarchy theorems, Complexity classes P, NP, L, NL, PSPACE, BPP and IP, complete problems, P versus NP conjecture, quantiers and games, provably hard problems, relativized computation and oracles, probabilistic computation, interactive proof systems.

Text:

References:
INSTRUCTIONS TO PAPER SETTERS: Maximum Marks : 60
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2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.

Unit I
Introduction: Block diagram of Electrical communication system, Radio communication: Types of communications, Analog, pulse and digital, Types of signals, Fourier transform for various signals, Fourier spectrum, Power spectral density, Auto correlation, convolution.
Amplitude Modulation: Need for modulation, types of AM Methods (AM,DSBSC, SSBSC), power and bandwidth requirements, generation and demodulation of AM: Diode detector, product detector, product demodulation for DSBSC&SSBSC.

Unit II

Unit III
Digital communication: Advantages, Block diagram of PCM, Quantization, Effect of Quantization, Quantization error, Base band digital signal, DM,ADM,ADPCM and comparison.
Digital modulation: ASK,FSK,PSK,DPSK,QPSK and QAM demodulation, coherent and incoherent reception, Modems.

Unit IV
Information theory: Concept of Information, Rate of information and entropy, Source coding for optimum rate of information, Coding efficiency, Shannon_Fano and Huffman coding, noise, noise temperature, S/N ratio & Noise figure.S/N trade off.
Error control coding: Introduction, Error detection and correction codes, block codes and convolution codes.

Text:

Reference:
INSTRUCTIONS TO PAPER SETTERS:  
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2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit 
should have two questions. However, student may be asked to attempt only 1 question from each unit. 
Each question should be 10 marks

Unit I
Computer Arithmetic and Register transfer language:
Unsigned notation, signed notation, binary coded decimal, floating point numbers, IEEE 754 floating 
point standard, Micro-operation, Bus and Memory Transfers, Bus Architecture, Bus Arbitration, 
Arithmetic Logic, Shift Micro operation, Arithmetic Logic Shift Unit.

Unit II
Instruction set architecture & computer organization
Levels of programming languages, assembly language instructions, 8085 instruction set architecture, 
Instruction Codes, Computer Registers, Computer Instructions, Timing & Control, Instruction Cycle, 
Memory Reference Instructions, Input-Output and Interrupts

Unit III
Control Design:
Instruction sequencing & interpretation, Hardwired & Micro Programmed (Control Unit), 
Micrprogrammed computers, Micro coded CPU: Pentium processor

CPU Design
Specifying a CPU, Design & implementation of simple CPU, General Register 
Organization, Stack Organization, Instruction Formats, Addressing Modes, Internal 
architecture of 8085 microprocessor.

Unit IV
Memory organization
Memory Technology, Main Memory (RAM and ROM Chips), Virtual memory, High-
speed memories

Input/Output organization
Asynchronous Data Transfers, Programmed I/O, interrupts, Direct memory Access, 
Serial communication, UART's, RS-232-C & RS-422 standard

Text:

Reference:
1. J. L Hennessy and D. A. Patterson, “Computer Architecture: A 
   2005.
INSTRUCTIONS TO PAPER SETTERS: Maximum Marks : 60

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2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.

Unit I
Signals and signal Processing: Characterization & classification of signals, typical Signal Processing operations, example of typical signals, typical Signals Processing applications.

Time Domain Representation of Signals & Systems: Discrete Time Signals, Operations on Sequences, the sampling process, Discrete-Time systems, Time-Domain characterization of LTI Discrete-Time systems.

Unit II
Transform-Domain Representation of Signals: Discrete Fourier Transform (DFT), DFT properties, computation of the DFT of real sequences, Linear Convolution using the DFT. Z-transforms, Inverse z-transform, properties of z-transform.

Unit III
Computation of the Discrete Fourier Transform: Computational complexity of the direct computation of the DFT, different approaches for reducing the computations, Decimation-in-Time FFT algorithms, Decimation-in-frequency FFT algorithms.

Unit IV
Digital Filter Structure: Block Diagram representation, Signal Flow Graph Representation, Signal Flow Graph Representation, FIR Digital Filter Structure, IIR Filter Structures, Parallel all pass realization of IIR Filter design based on Frequency Sampling approach.

Text / Reference:
INSTRUCTIONS TO PAPER SETTERS:

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Unit I

Object Methodology & Requirement Elicitation: Introduction to object Oriented Methodology, Overview of Requirements Elicitation, Requirements Model-Action & Use cases, Requirements Elicitation Activities, Managing Requirements Elicitation.

Unit II
Architecture: Model Architecture, Requirements Model, Analysis Model, Design Model, Implementation Model, Test Model

Unit III
Modeling with UML: Basic Building Blocks of UML, A conceptual Model of UML, Basic Structural Modeling, UML Diagram

System Design: Design concepts & activities, Design Models, Block design, Testing

Unit IV

Case Studies

Text Books:


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2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks

Unit I
Introduction to HDLs, Design Flow, Synthesis, VHDL Basics, Data types, Operators, concurrent coding, Structural and Behavioral Modeling, Design of Adder, Subtractor, Decoder, Encoder, Code converter, Multiplexer, VHDL for Combinational Circuits Blocks

Unit II
Sequential Code, Control Structure, Attributes, VHDL for Flip – Flops, Registers, Counters, Signals and Variable, Bus Structure, Implementation of Bus Structure using Multiplexer, Implementation of simple processor

Unit III
State Machine, State diagram, state table, state assignment, RTL for state Machine Design Styles, Mealy State Model, Specification of Mealy FSM using VHDL, VHDL for Moore type FSM, Specify the state assignment in VHDL code, Design of Serial adder using FSM

Unit IV
Design and Implementation of Arbiter Circuit, Algorithm State Machine Charts, VHDL for SRAM, VHDL Design for Shift–and–add Multiplier, VHDL Design of Floating point Adder circuit, VHDL timing, modeling with Delta time Delays, Inertial/Transport Delay

Text:
2. V. A. Pedroni, “Circuit Design with VHDL”, PHI, 2005

References:
4. S. Ghose, “Hardware Description Languages”, PHI 2005
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Unit I
Introduction – Microprocessors Evolution and types (Intel 4004 – Pentium IV and road maps), Overview of 8085, 8086, 80286, 80386, 80486, Pentium processors and Micontrollers.

Unit II
Architecture of 8086 – Register Organization, Execution unit, Bus Interface Unit, Signal Description, Physical Memory Organization, General Bus Operation, I/O addressing capabilities, Minimum mode and maximum mode timing diagrams, Comparison with 8088

Unit III
8086 programming – Assembly language program development tools (editor, linker, loader, locater, Assembler, emulator and Debugger), Addressing modes, Instruction set descriptions, Assembler directives and operators, Procedures and Macros. (Writing programs for use with an assembler MASM)

Unit IV

Text:

References:
INSTRUCTIONS TO PAPER SETTERS:  Maximum Marks : 60
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Unit I
Physical Layer: Data and signals, Transmission impairments, Data rate limits, performance factors, Transmission media, Wireless transmission, Telephone system (Structure, trunks, multiplexing & Switching)

Unit II
Data Link Layer: Design issues, Error detection & correction, Data Link Protocols, sliding window protocols, HDLC,WAN Protocols.

Unit III
Medium Access Sub layer: Channel allocation problem, multiple access protocols, IEEE standard 802.3 & 802.11 for LANS and WLAN, high-speed LANs, Network Devices-repeaters, hubs, switches bridges.

Unit IV
Network Layer: Design issues, Routing algorithms, congestion control algorithms, Internetwork protocols, Internetwork operation

Text :

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</table>

Unit I


Unit II

Matrix Chain Multiplication, Strassen’s algorithm for matrix multiplication, LCS, Optimal Binary Search Tree, General Greedy approach Vs Dynamic Programming approachm Case studies: Knapsack problem, Huffman Coding Problem, Matroids

Unit III

Representation of Graphs, Breadth First Search, Depth First Search, Topological Sort, Strongly Connected Components, Algorithms of Kruskal’s and Prim’s, Dijkstra’s and Bellman ford algorithm, All pair shortest path, Flyod Warshall Algorithm

Unit IV


NP-Complete Problems: Polynomial Time Verification, NP-Completeness and Reducibility, NP Completeness proof, NP-Complete Problems.

Text:

References:
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Unit I
Compiler Structure: Analysis-synthesis model of compilation, various phases of a compiler, tool based approach to compiler construction.
Lexical analysis: Interface with input parser and symbol table, token, lexeme and patterns, difficulties in lexical analysis, error reporting and implementation. Regular grammar & language definition, Transition diagrams, design of a typical scanner using LEX of Flex.

Unit II
Syntax Analysis: Context free grammars, ambiguity, associability, precedence, top down parsing, top down parsing, recursive descent parsing, transformation on the grammars, predictive parsing LL(1) grammar, Nor LL(1) grammar, Bottom up parsing, operator precedence grammars, LR parsers (SLR, LALR, LR), Design of a typical parser using YACC or Bison.

Unit III
Syntax directed definitions: Inherited and synthesized attributes, dependency graph, evaluation order, bottom up and top down evaluation of attributes, L- and S-attributed definitions. Type checking: type: type system, type expressions, structural and name equivalence of types, type conversion, overloaded function and operators, polymorphic function. Run time system: storage organization, activation tree, activation record, parameter passing symbol table, dynamic storage allocation. Intermediate code generation: intermediate representation, translation of declarations, assignments, Intermediate Code generation for control flow, Boolean expressions and procedure calls, implementation issues.

Unit IV
Code generation and instruction selection: Issues, basic blocks and flow graphs, register allocation, code generation, DAG representation of programs, code generation from DARGS, peep hole optimisation, code generator generators, specification of machine.
Code optimisation: source of optimisations, optimisation of basic blocks, loops, global dataflow analysis, solution to iterative dataflow equations, code improving transformations, dealing with aliases, data flow analysis of structured flow graphs.

Text Book:

References:
4. Vinu V. Das, “Compiler Design using FLEX and YACC” PHI, 2005
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Unit I

Unit II
Kernel Design Concepts,
Process Synchronisation: Critical Section Problem, Race Condition, Synchronisation hardware, Semaphores, Classical Problems of Synchronisation.
Deadlocks: Characterisation, Methods for Handling Deadlocks Avoidance, Recovery and Detection.

Unit III
Design of Mini OS: MINIX
Memory Management: contiguous Allocation, External Internal Fragmentation, Paging Segmentation, Segmentation with Paging.

Unit IV
Case study on DOS, Windows 2000, Windows XP, Vista, Linux
Device Management: Disk Structure, Disk Scheduling Algorithms, Disk Management,

Text:

References:

Syllabus for B. Tech/M. Tech (dual degree) - CSE program approved in the BOS on 12th Jan, 09 and 26th AC Meeting on 19th Jan, 09 w.e.f for batch 2006-07
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Maximum Marks: 60

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.

Unit-I
Review of Physical, Data link layer, TCP/IP: Datalink Protocols; ARP and RARP.

Unit-II

Unit-III

Application layer: Security, DNS, SNMP, RMON, Electronic Mail, WWW.

Unit -IV

Text:

References:
Unit -I
Introduction: What is software testing and why it is so hard?, Error, Fault, Failure, Incident, Test Cases, Testing Process, Limitations of Testing, No absolute proof of correctness, Overview of Graph Theory.

Unit-II
Functional Testing: Boundary Value Analysis, Equivalence Class Testing, Decision Table Based Testing, Cause Effect Graphing Technique.
Structural Testing: Path testing, DD-Paths, Cyclomatic Complexity, Graph Metrics, Data Flow Testing, Mutation testing.

Unit-III
Reducing the number of test cases:
Prioritization guidelines, Priority category, Scheme, Risk Analysis, Regression Testing, Slice based testing


Unit-IV


Text:

Reference:
INSTRUCTIONS TO PAPER SETTERS:

Maximum Marks : 60

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.

Unit-I
Fundamentals of Distributed Computing:
Architectural models for distributed and mobile computing systems, Basic concepts in distributed computing.

Distributed Operating Systems:
Overview, network operating systems, Distributed file systems, Middleware, client/server model for computing.

Unit-II
Communication:

Process Concepts:
Threads, Clients and Servers, Code migration, Agent based systems, Distributed objects, CORBA, Distributed COM.

Unit-III
Synchronization:
Clock synchronization, Logical clocks, Election algorithms, Mutual exclusion, Distributed transactions, Naming concepts, Security in distributed systems

Distributed Databases:
Distributed Data Storage, Fragmentation & Replication, Transparency, Distributed Query Processing and Optimization, Distributed Transaction Modeling and concurrency Control, Distributed Deadlock, Commit Protocols.

Unit-IV
Parallel Processing:
Basic Concepts: Introduction to parallel processing, Parallel processing terminology, Design of parallel algorithms, Design of Parallel Databases, Parallel Query Evaluation.

Text Books:

Reference Books:
INSTRUCTIONS TO PAPER SETTERS:  Maximum Marks : 60

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks

Unit-I
Introduction:
Introduction to intelligent agents

Problem solving:
Solving problems by searching: state space formulation, depth first and breadth first search, iterative deepening

Unit-II
Intelligent search methods:
A* and its memory restricted variants

Production systems:
Design implementation and limitations, case studies

Unit-III
Game Playing:
Minimax, alpha-beta pruning

Knowledge and reasoning:
Propositional and first order logic, semantic networks, building a knowledge base, inference in first order logic, logical reasoning systems

Planning:
STRIPS partial order planning, uncertain knowledge and reasoning, probabilistic reasoning systems, Baysian networks

Unit-IV
Learning from observations:
Inductive learning, learning decision trees, computational learning theory, Explanation based learning

Applications:
Environmental Science, Robotics, Aerospace, Medical Science etc.

Text Book:

Reference Books:
1. "Neural Networks in Computer Intelligence" by KM Fu, McGraw Hill
2. "AI: A modern approach" by Russel and Norvig, Pearson Education
INSTRUCTIONS TO PAPER SETTERS:

Maximum Marks : 60
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks

Unit-I
Introduction to Simulation
Definitions of modeling & simulation, Concept of systems & system environment, components of a system, discrete & continuous systems, model of a system, types of models & simulation, Advantages, disadvantages, & pitfalls of simulation

General principles
Concepts in discrete-event simulation, event-driven simulation, world views, list processing

Unit-II
Simulation software
History, Selection process, simulation in high level language(c,c++),desirable software features, general purpose simulation packages

Basic Probability & statistics
Terminology & concepts, Statistical modeling & probability distributions.

Random-Number generation
Properties of random numbers, generation of pseudo-random numbers, techniques for generating random numbers, test for randomness

Unit-III
Random-variate generation
Inverse transform, Direct transform, convolution, Accept-Reject

Queuing models
Characteristics, performance measures, steady-state behaviour, Networks of queues

Input Modeling
Data collection, Identifying distribution, parameter estimation, goodness-of-fit, multivariate & time series input models

Unit-IV
Verification & Validation of simulation models
Model building, verification & validation, verification of simulation models, calibration & validation of models

Techniques for increasing model validity & credibility

Output analysis
Types of simulations with respect to output analysis, stochastic nature of output data, measures of performance & their estimation, output analysis for termination simulations & steady state simulations

Brief overview of discrete & continuous simulation languages and applications of simulation.

Text:

Reference:
Paper Code: IT-411       L:3 T/P:1 C:4

INSTRUCTIONS TO PAPER SETTERS:

Maximum Marks : 60
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.

UNIT – I
Introduction And Digital Image Fundamentals

Image Enhancement in the Spatial Domain
Some basic Gray Level Transformations, Histogram Processing, Enhancement Using Arithmetic and Logic operations, Basics of Spatial Filters, Smoothening and Sharpening Spatial Filters, Combining Spatial Enhancement Methods.

UNIT – II
Image Enhancement in the Frequency Domain
Introduction to Fourier Transform and the frequency Domain, Smoothing and Sharpening Frequency Domain Filters, Homomorphic Filtering.


UNIT – III
Image Compression

Image Segmentation: Detection of Discontinuities, Edge linking and boundary detection, Thresholding, Region Oriented Segmentation, Motion based segmentation.

UNIT – IV
Representation and Description
Representation, Boundary Descriptors, Regional Descriptors, Use of Principal Components for Description, Introduction to Morphology, Some basic Morphological Algorithms.

Object Recognition: Patterns and Pattern Classes, Decision-Theoretic Methods, Structural Methods.

TEXT BOOKS:

REFERENCES:
INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.

UNIT-I:
History of the Internet and World Wide Web – HTML 4 protocols – HTTP, SMTP, POP3, MIME, IMAP. HTML Common tags- List, Tables, images, forms, Frames; Cascading Style sheets, , Introduction to Java Scripts, Objects in Java Script, Dynamic HTML with Java Script

UNIT-II

UNIT-III

UNIT IV:

TEXT BOOK
1. “Internet and world wide web – How to Program”, Deitel & Deitel, Goldberg, Pearson Education
3. “Java Server Pages “,Hans Bergsten, SPD O’Reilly

REFERENCES
3. The complete Reference Java 2 Fifth Edition by Patrick Naughton and Herbert Schildt. TMH
4. Programming world wide web-Sebesta, Pearson
5. Jakarta Struts Cookbook , Bill Siggelkow, S P D O’Reilly
INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.

Unit 1: Distributed Systems for Enterprise and Web-Based Applications, The Challenges of Scalability, Heterogeneity, Security, & Failure, Multi-Tiered Architectures, Messaging & Interfaces, JDBC: Java Database Connectivity, Messaging, Interfaces, RMI: Remote Method Invocation

Unit 2: MVC Architecture, Servlet, Servlet life cycle, web application structure, request response model, JSP pages and its elements JSP Architecture, JSP Page life cycle, Page directive attributes, JSP Tag libraries, JSTL Expression Language (EL), Writing a Custom Tag Library

Unit 3: Struts, Struts architecture, Struts classes - ActionForward, ActionForm, ActionServlet, Action classes, Understanding struts-config.xml, Struts Tiles, Combining Struts and Tiles, Tiles file structure, Understanding Tiles Definitions and Attributes, Creating a Definition in XML file and deploying, Creating a small application using Tiles

Unit 4: Distributed System Models, J2EE: JNDI, EJB Entity Beans & Deployment Descriptors, J2EE: EJB Session Beans, Transactions, Web Services, Replication, Localization

Text Books:
1. Ivan Bayross, sharanam shah Java Server Programming, shroff Publishers
2. Holzner, Struts: Essential skills, TMH

References:
2. Joe wigglesworth, McMilan Paula, Java Programming: advanced topic, Thomson
Paper Code: IT-451 L:0 T/P:2 C:1
Paper ID: 15451 Paper: Advanced Computer Network Lab

Paper Code: IT-461 L:0 T/P:2 C:1
Paper ID: 15461 Paper: Software Testing Lab

Paper Code: IT-455 L:0 T/P:2 C:1
Paper ID: 15455 Paper: Lab assignments

This lab will be based on elective paper(s).

Paper Code: IT-457 L:0 T/P:0 C:5
Paper ID: 15457 Paper: Minor Project

Paper Code: IT-459 L:0 T/P:0 C:1

Students will undergo summer training/industry visit/In-house training/In-house project during the summer break after the completion of sixth semester. Report of the same is required to be submitted to the school. Viva-voce examination will be conducted based on the report submitted by the student. A panel of examiner will be appointed by the Dean, USIT.
INSTRUCTIONS TO PAPER SETTERS:  
Maximum Marks : 60
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.

Unit-I
Writing Skills: Descriptive, Narrative, Argumentive and Discursive, Reflective and Literary-Evaluative Writing.

Technical Writing: Definition, Purpose and Characteristics of Technical Writing.

Unit-II
The Technical Writing Process: Prewriting Stage, The Writing Stage and the Post-writing stage.

Technical Writing Skills: Researching, Summarizing and Outlining, Visual Aids, Definition, Description, Set of Instructions.

Unit-III

Unit-IV

Presentation and Meetings.

Text/References:
Unit-I
Parallel computer models:
The state of computing, Classification of parallel computers, Multiprocessors and
multicomputers, Multivector and SIMD computers.

Program and network properties:
Conditions of parallelism, Data and resource Dependences, Hardware and software
parallelism, Program partitioning and scheduling, Grain Size and latency, Program
flow mechanisms, Control flow versus data flow, Data flow Architecture, Demand
driven mechanisms, Comparisons of flow mechanisms

Unit-II
Pipelining:
Linear pipeline processor, nonlinear pipeline processor, Instruction pipeline Design,
Mechanisms for instruction pipelining, Dynamic instruction scheduling, Branch
Handling techniques, branch prediction, Arithmetic Pipeline Design, Computer
arithmetic principles, Static Arithmetic pipeline, Multifunctional arithmetic pipelines

Unit-III
Arithmetic for computers
Signed and unsigned Numbers, Addition and Subtraction, Multiplication, Division,
Floating Point.
CPU Performance and Its factors, Evaluating performance of CPU.

Unit – IV
Memory Hierarchy
Introduction, The basics of Cache, Measuring and Improving of Cache Performance,
Virtual Memory, Common framework for memory hierarchies
Case study of PIV and AMD opteron memory hierarchies

Text Books:
2. D. A. Patterson and J. L. Hennessy, “Computer organization and design”, Morgan
  Kaufmann, 2nd Ed. 2002

Reference Books:
  Publications, 2003
  Publishing. 1998
  Kaufmann feb,2002.
INSTRUCTIONS TO PAPER SETTERS:

Maximum Marks : 60

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.

Unit I
Definitions of Control Systems, Closed Loop and Open Loop Control, Examples of Control Systems; Laplace Transformation and Solution of Differential Equations; Concept of Mathematical model, Linear and Non-Linear Systems, Transfer Function with Simple Examples; Deriving transfer function of physical systems (Mechanical Translational Systems), Armature controlled and field controlled DC servomotors; AC servomotors and deriving their transfer functions; Block Diagram representation and Simplification.

Unit II
Signal Flow graph, Mason gain formula; Basic Control Actions: Proportional, integral and Derivative controllers, effect of feedback on control system; Transient and steady state response of first order system; Second order system, transient; Routh’s Stability criterion, relative stability analysis; Static error co-efficients, position, velocity and acceleration error co-efficients.

Unit III
Root Locus Techniques Bode Diagram, Minimum and Non-Minimum phase systems; Determination of Transfer from Bode Diagram; Polar Plots; Nyquist Plot; Stability Analysis using; Constant M & N Ioci.

Unit IV
Introduction to Compensators; Definitions of state, state variables, state space, representation of systems; Solution of time invariant, homogeneous state equation, state transition matrix and its properties; Z transform and solution of different equation; Transducers, synchro-transmitter; Stepper Motor, Tachogenerators; Rotating Amplifiers and Magnetic Amplifiers.

Text Books:

References:
Unit-I
Relational Databases
Integrity Constraints revisited, Extended ER diagram, Relational Algebra & Calculus, Functional, Multivalued and Join Dependency, Normal Forms, Rules about functional dependencies.

Unit-II
Query Processing and Optimization
Valuation of Relational Operations, Transformation of Relational Expressions, Indexing and Query Optimization, Limitations of Relational Data Model, Null Values and Partial Information.

Objected Oriented and Object Relational Databases
Modeling Complex Data Semantics, Specialization, Generalization, Aggregation and Association, Objects, Object Identity, Equality and Object Reference, Architecture of Object Oriented and Object Relational Databases

Unit-III
Parallel and Distributed Databases
Distributed Data Storage – Fragmentation & Replication, Location and Fragment Transparency Distributed Query Processing and Optimization, Distributed Transaction Modeling and concurrency Control, Distributed Deadlock, Commit Protocols, Design of Parallel Databases, Parallel Query Evaluation.

Advanced Transaction Processing

Unit -IV
Data Mining
Knowledge Representation Using Rules, Association and Classification Rules, Sequential Patterns, Algorithms for Rule Discovery

Data Warehousing
Data Warehousing Architecture, Multidimensional Data Model, Update Propagation

Case Study: Oracle Xi

Text Books:

References:
Unit-I
Neural Networks:

Unit-II
Fuzzy Logic:

Unit-III
Fuzzy Arithmetic:

Unit-IV
Introduction of Neuro-Fuzzy Systems:
Architecture of Neuro Fuzzy Networks.
Application of Fuzzy Logic:
Medicine, Economics etc.
Genetic Algorithm:
An Overview, GA in problem solving, Implementation of GA

Text Books:

Reference:
**INSTRUCTIONS TO PAPER SETTERS:**

Maximum Marks : 60

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.

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**UNIT-1**

Introduction to NLP

Achievement and brief history, open problems, major goal, characteristic of Language, Language structure, Language analyzer

**UNIT 2**

Study of grammar and semantics

Morphology, word formation, theory of semantics, componential theory of meaning, truth conditional theory of meaning, pragmatics and discourse

**UNIT 3**

Machine translation


**UNIT 4**

Lexical; functional grammar (LFG) and Indian languages

Overview of LGF, LFG formalism, well formedness conditions, computational aspects, CFG and Indian languages, functional specification., tree adjoining grammar.

**BOOKS-**

1. Natural language processing by akshar Bhartati, Sangal and Chaitanya, Eastern Economy Edition
INSTRUCTIONS TO PAPER SETTERS:  

Maximum Marks : 60

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.


Unit II: Introducing C# Programming, introduction, basic language constructs, types (reference and value, relations between types), delegates, generics, collections, strings, exceptions, threads, Networking.

Unit III: Windows Forms, Adding Controls, Adding an Event Handler, Adding Controls at Runtime.

Attaching an Event Handler at Runtime, Writing a Simple Text Editor, Creating a Menu Adding a New Form, Creating a Multiple Document Interface, Creating a Dialog Form Using Form Inheritance, Adding a Tab-Control, Anchoring Controls, Changing the Startup Form, Connecting the dialog, Using ListView and TreeView controls, Building an ImageList and add them to the Listview, Using details inside the Listview, Attaching a Context Menu, Adding a TreeView, Implementing Drag and Drop, Creating Controls at runtime, Creating a User Control, Adding a Property, Adding Functionality, Writing a Custom Control, Testing the Control.

Unit IV: ADO.NET Architecture, Understanding the ConnectionObject, Building the Connection String, Understanding the CommandObject, Understanding DataReaders, Understanding DataSets and DataAdapters, DataTable, DataColumn, DataRow, Differences between DataReader Model and DataSet Model, Understanding the DataViewObject, Working with System.Data.OleDb, Using DataReaders, Using DataSets, Working with SQL.NET, Using Stored Procedures, Working with OleDb.NET, Using DSN Connection, Introducing the ASP.NET Architecture, ASP.NET Server Controls, Working with User Controls, Custom Controls, Understanding the Web.config File, Using the Global.asax Page.

Text book and References:

1. "Programming C#, 3rd Edition" Jesse Liberty, O’really
2. C# for Programmers, Deitel and Deitel, Pearson
Paper Code: IT-452       L:0 T/P:0 C:8
Paper ID: 15452       Paper: Major Project (Report)

Paper Code: IT-454       L:0 T/P:0 C:2
Paper ID: 15454       Paper: Viva-voce (on Major Project)

Paper Code: IT-456       L:0 T/P:0 C:1
Paper ID: 15456       Paper: Seminar and Progress report

This paper will be based on project work (IT-452). Seminar will be held in the school for the purpose of evaluation of the progress of the project work.

Paper Code: IT-458       L:0 T/P:0 C:1
Paper ID: 15458       Paper: Lab assignment

Lab will be based on elective paper(s).