**Diploma 1st SEM Syllabus**

**Hu-101: Communication in English-I**

1.0 Contents: Revision of the basic language skills

 (Grammar, punctuation and vocabulary)

1.1 Task: Grammar-

· Subject-verb agreement

· Tense-present, past and future

· Voice-active and passive

· Relative clauses for sentence contraction

· Prepositions of time and place

· Modes-making polite statements

· Discourse markers

· Comparing x with y

· Cause and effect

 Punctuation- Full stop, Comma, Semicolon, Colon, Inverted Commas, Note of Interrogation

 Vocabulary- Technical, Semi-technical and general words

Word formation-verbs to nouns, adjectives to nouns

Suffixes and Prefixes

Nominal compounds

2.0 Content: Reading (Comprehension)

2.1 Tasks: Pre-reading activities for

 Scanning- requiring the students to locate, as fast as they can a specific fact or a single word

Skinning-(reading to get overall information)-

Requiring students to glance quickly and locate facts which are expressed in sentences rather than in single words, or to say briefly what a text is all about

Detailed reading activities or intense reading for guessing the meanings of unknown difficult words from the context

Understanding the main information in the text

Structuring important information

Throwing away the non-required words or information

Using non-text information

Inferencing and Evaluating

3.0 Content: Listening

3.1 Tasks: Listening for specific information (the date and time of Joint Entrance Examination)

 Listening for general understanding (topic, purpose, major idea, supporting ideas)

Intense listening (take class- notes, identify topic, topic development, key lexical items, function of intonation pitch, pitch, volume, pace, repetition)

 Predictive listening

Inferential listening

4.0 Content: Speaking

4.1 Tasks: Eliciting-information, directions, clarification, help

Expressing-thanks, requirements, opinions, confirmation, apology, want/need, information, complaints, reasons/justifications

Reporting-description, decisions

Narrating-sequence of events

Facing-job interviews

**Sc-103: Chemistry – I**

Unit-1: States of matter, Gas laws, Ideal gas equation, Gas constant, Dalton’s law of partial pressure, Grahm’s law of diffusion, Avogadro’s hypothesis and its applications, Mole concept and problems.

Unit-2: Chemical equation-definition, qualitative and quantitative Significance, limitations, balancing by partial and ion-electron method, electronic concept of oxidation and reduction, Stoichiometric calculations, weight, weight-volume.

Unit-3: Acids, bases and salts, Theories of acids and bases- Arrhenius, Bronsted-Lowry, Lewis theory, Strong acids and strong bases, conjugate acid-base pair, classification of salts, hydrolysis of salts and its effect.

Unit-4 : Atomic structure: Discovery of sub-atomic particles, Rutherford’s Model, Bohr’s Model, Quantum theory, Atomic spectra, Dual nature of electron, uncertainty principle, Quantum number, Aufbau principle, Hund’s rule, Pauli’s exclusion principle, electronic configuration.

Unit-5: Modern Periodic table, Periodic properties, size of atoms (atomic and ionic radii), Ionization energies, electron affinity, electro-negativity, characteristics of transition metals.

Unit-6: Chemical bonding: electronic theory of valency, Ionic, covalent and co-ordinate covalent bonds, characteristics of ionic and covalent compounds, Hydrogen bonding.

Unit-7: Chemical equilibrium: Law of mass action, equilibrium constant, factors effecting equilibrium, Le-chatellier’s principle and its applications, ionic equilibrium, PH value, dissociation of acids and bases, common ion effect, buffer solution, solubility product and its applications.

Unit-8: Electrolysis: Laws of electrolysis, problems, Industrial application of electrolysis (extraction and purification of metals, electroplating and galvanization).

Unit-9: Acidimetry and alkalimetry, equivalent weights of acids and bases, standard solution, normal solution and molar solution, concentration terms-normality, molarity, gm/l, ppm, normality equation, acid-base titration, choice of indicators.

Unit-10: Catalysis: definition, type of catalyst, industrial applications in manufacture of NH3, H2SO4 by contact process, cracking.

Unit-11: Water: Causes of hardness of water, removal of hardness by permutite process, de-ionisation of water, effect of water in boiler preparation of boiler-feed water, preparation of Municipal water with block-diagram, Estimation of hardness of water by EDTA-method.

**Sc-104: Applied Physics-I**

1. **UNITS & DIMENSION**
	1. Fundamental and derived units with particular reference to S.I. units, illustration.
	2. Explanation of dimension: Dimensional equation of physical quantities with examples.
2. **BASIC MECHANICS**
	1. Introduction to scalar and vector quantities, victor addition, subtraction, multiplication and resolution of victor (details not necessary).
	2. Numerical problems on equation of motion (deduction of equation of motion not necessary).
	3. Newton’s Law of motion, definition of force momentum, mass and weight, impulse, principle of conservation of linear momentum.
	4. Circular motion, angular velocity, centripetal and centrifugal force motion round a curve track.
	5. Work, power and Energy: Definition, dimensions, mathematical relation, potential and kinetic energy, their mathematical relations, principle of conservation of energy and its proof in case of free falling body.
	6. Simple harmonic motion and it geometrical representation, derivation of its equation, definition of amplitude, time period, frequency, phase etc. mathematics relations, unit simple pendulum and second pendulum.
3. **GRAVITY AND GRAVITATION**
	1. Newton’s Law of Gravitation; gravity; acceleration due to gravity, relation between G & g and their units, center of gravity and center of mass

**4.0 PROPERTIES OF SOLID**

4.1 Elasticity, explanation of stress strain Hook’s Law, Elastic limit and modulus of elasticity, poison’s ration, their units and numerical problems.

**5.0 PROPERTIES OF LIQOUIDS**

5.1 Thrust and pressure, Law of liquid pressure, Pascal’s law and Hydraulic press. Specific gravity and density, Archimedes’ principle, Determination of specific Gravity and Volume, numerical problems.

 **6.0 PROPERTIES OF GAS**

6.1 Atmospheric pressure, Torricelli’s Experiment, Barometer, Fortin’s barometer. Concept of pump and siphon.

**7.0 HEAT & THERMODYNAMICS**

7.1 Concept of heat and temperature, measurement of Temperature, basic criteria. Thermometer its interval and fixed points, different scales and their relationship.

7.2 Thermal Expansion, Expansions of solids: linear, superficial and cubical expansion, their co-efficient. With their relationship, expansion of liquid, anomalous expansion of water (experimental determination not necessary)

7.3 Measurement of Heat: quantity of heat, unit of heat: joule and calorie, specific heat, water equivalent measurement of specific heat, principle of calorimetry, numerical problems.

7.4 Change of State of Matter: melting and freezing point, latent heat, freezing point of solutions, melting and boiling point, difference between evaporation depends.

7.5 Hygrometry: Moisture in the atmosphere, relative humidity.

7.6 Transmission of Heat: Conduction, convection and radiation; thermal conductivity, Searle’s experiment, thermopile.

7.7 Joule’s law of Heating, mechanical equivalent of heat and its determination.

**8.0 SOUND**

8.1 Wave Motion: Transverse and longitudinal wave, relation between wavelength and frequency and time periods.

8.2 production and propagation of sound wave, Expression of velocity of sound in air, Newton’s formula and Laplace’s correction, Effect of temperature, pressure etc. On velocity of sound.

8.3 Reflection of sound and its application of sound, echo, reverberation.

8.4 Musical Sound and noise, characteristics of musical sound, Doppler’s effect (Mathematical expression not necessary).

**Sc-102: Mathematics-I**

1. Laws of indices, problems
2. Imaginary and complex numbers
	1. Definition, geometrical representation of complex numbers (Argand Diagram/Z-plane/Complex plane).
	2. Complex numbers in different forms, Conjugate of a complex number
	3. Algebraic operations on complex numbers under any form.
	4. Cube root of unity and their properties.
3. Variation:
	1. Direct, indirect and joint variation, Mathematical problems of variation.
4. Progressions:
	1. Arithmetic and geometric progressions
	2. A.P. and G.P. series and their sum to n terms.
	3. Sum of infinity of G.P. series
5. Theory of Quadratic Equations and Expressions
	1. Nature of roots, Sum and product of roots, Formation of quadratic equation
6. Graphs
	1. Graphical solution of simultaneous equation
	2. Graphical solution of linear and a quadratic equation
7. Permutation and Combination
	1. Permutation and combination definition, Fundamental principle, Factorial notation
	2. Deduction of formula on permutation and combination
	3. Permutation and combination under different conditions (simple cases)
8. Logarithm:
	1. Definition and illustration of logarithm
	2. Laws of logarithm
9. Exponential Series
	1. Introduction of $e^{x}$ and problems.
10. Determinant of third order:
	1. Introduction and definition, Minors and cofactors of a determinant, Properties of determinants.
	2. Solutions of simultaneous linear equations by Cramer’s Rule.
11. Trigonometry:
	1. Measurement of an angle and its definition: definition of a radian, relationship between degree and radian; simple problems (revision).
	2. Compound angles: Practice on compound angles.
12. Associated angles: Practice on associated angles.
13. Transformation of product and sum:
	1. Transformation of sum and difference
	2. Transformation of sum or difference into products
14. Multiple angles and sub-multiple angles.
	1. Deduction formulae on multiple and sub-multiple angles.
15. Mensurations:
	1. Polygons: its concept and applications
	2. Area of regular figures and polygons of n sides
	3. Area of regular hexagon and octagon
16. Curvilinear and rectilinear figures:
	1. Area of Curvilinear figures under Simpson’s one third rule.
17. Volume and Surface area of regular solid figures such as Prism, Cylinder, Sphere, Cone, Pyramid
	1. Frustum of cone and pyramid

**W-101: Basic Workshop Practice-I**

1. CARPENTRY SHOP
	1. Shop Talk
		1. Introduction
		2. Safety Precautions
		3. Classification of wood
		4. Grain of wood
		5. Carpentry tools and their uses

Marking tools: Pencil, scratch awl, short blade knife, marking gauge

Measuring tools: bench rule, steel tape, try square, combination square, protractor

Cutting tools; handsaw, chisel (firmer, dovetail, moruse), jack plane, files (half round and flat), hand drill, borer.

Working tables & Vices, mallet, hammer, nails, screws, screw drivers.

* + 1. Methods of marking.
		2. Carpentry joints:

Butt joint with nail (for making box)

Dado joint (for making shelves etc.)

Lap joint (for frames, legs etc.)

Mortoise & Tenon joint (chair, table etc.)

Dovetail joint (for drawer, box, furniture corner)

* 1. Practice
		1. Marking, sawing, planning, squaring, filing, chiseling, nailing.
		2. Making of lap joint
		3. Making a through Mortoise and Tenon joint.
		4. Making of Dovetail joint
	2. Test and Viva Voce
* Identify soft and hard wood
* List the common shapes and sizes of timber
* Select and use proper marking and measuring tools for a job.
* Use of holding tool for a job
* Use of planning tool for a job
* Select proper cutting tools for a job
* Select and use proper drilling and boring tools
* Select proper joints for various furniture / jobs.
* Perform marking for various joints
* Make any join following proper steps.

2.0.0 FITTING SHOP

2.1.1 Introduction and its importance

2.1.2 Safety procedures

2.1.3 Common marking equipment and tools and their uses:

Scale, marking gauge, try-square, calipers (outside and inside), spring divider, surface plate, V-block, centre punch.

2.1.4 Fitting shop tools and equipment – their uses & specifications: files, hack-saw and blades, chisels, hammer, bench vice.

2.1.5 Hand Drill, machine drill; different drill bits; coolants, description, uses and specifications.

2.1.6 Common engineering materials, like cast iron, cast steel, mild steel and high carbon steel – how to identify them.

2.1.7 Introduction to other common metals and alloys like copper, brass/gunmetal, aluminium and its alloys, stainless steel etc.

2.1.8 Familiarization with various forms and shapes of materials like sheet, plate, bars (round, square), flats, wires, angle, channel, beam, tubes, pipes, hollow section, extruded sections, casting, forging, machined components etc.

2.2.0 Practice:

 2.2.1 Marking, sawing, Chipping, filing and Fitting

 2.2.2 Marking-Drilling, Countersinking

 2.2.3 Making a key way and key.

 2.2.4 Identify proper raw material for doing a job

 2.2.5 Select and use proper holding tools for doing a job

 2.2.6 Select and use proper marking and measuring tools for doing a job.

 2.2.7 Select and use proper cutting tools for doing a job

 2.2.8 Select and use proper finishing tools for doing a job.

 2.2.9 Perform basic operations – marking, sawing, chipping, filing, drilling

 2.3.0 Perform a job according to the specification

3.0.0 SMITHY SHOP

3.1.1 Introduction to Black Smithy and Forging, difference between Black Smithy and Forging shop work.

3.1.2 Safety precautions

3.1.3 Common tools and equipment – description and uses: Anvil, swage block, sledge hammer, tong (different types), fullers flatter, swage tools, hot and cold chisels.

3.1.4 Smithy Hearth, different parts of hearth and their functions, controlling air and fuel, method of lighting a hearth.

3.1.5 Colours of steel at different temperatures.

3.1.6 Operations like drawing, upsetting, fullering, flattering, swaging, bending, twisting, cutting.

3.2.0 Practice

 3.2.1 Heating job in a hearth

 3.2.2 Drawing down of a mild steel rod to square shape and then to an octagonal shape.

 3.2.3 Upsetting & flattening of a M.S. rod to a hexagonal/square bolt.

 3.2.4 Bending of a rod to ring shape of required size.

 3.2.5 Select and use proper tools and equipment for black smithy job

 3.2.6 Heat up a job in a smith’s hearth

 3.2.7 Perform the basic forging operations – drawing, upsetting, swaging, bending, cutting.

 3.2.8 Perform a job according to the specification.

3.3.0 VIVA VOCE AND TEST

**Me-101: Engineering Drawing**

1. **INTRODUCTION**

 1.1 Drafting as medium of communication and expression in Technology and Engineering.

 1.2 Use and care of Drawing Instrument.

 1.3 Types of lines and dimensioning as per 15696/72.

**2.0** **LETTERING SCALES**

 2.1 Single stroke lettering straight and inclined by graph and free hand letters and digits as per 15696/72.

 2.2 Scale- Scale of drawing, R.F.

 2.3 Simple problems on plain, diagonal and comparative scale.

 Assignments.

**3.0 GEOMETRICAL CONSTRUCTIONS**

 3.1 Freehand curves and freehand drawing.

 3.2 Construction of triangles, perpendicular and of angle 30, 40, 60 and 90 degree.

**4.0 ORTHOGRAPHIC PROJECTION**

 4.1 Top view, front view and side view of simple objects, block and machine parts with dimensional scale.

 Assignments.

**5.0 PROJECTION OF POINTS, LINES AND PLANES**

 5.1 Plane, normal oblique persecico of lines and planes in H.P and V.P and Adial planes.

**6.0 PROJECTION OF SOLID (SIMPLE)**

 6.1 Projections of scales parallel to one and inclined to others.

 6.2 Projection of solids inclined to both.

 Assignments.

**7.0 ISOMETRIC PROJECTION**

 7.1 Isometric projection to true scale isometric scale.

**8.0 THREAD PROFILES (REF IS-2043 IS-554 etc)**

**9.0 SCREWED FASTENINGS**

 9.1 Representation of external and internal threaded assembly symbolic, Desentative of threads.

 9.2 Representation of screws, bolts, nuts and cutter.

**10.0 RIVETED JOINTS**

 10.1 Top and sectional view of lap and butt joints with single and double covers.

**11.0 SECTIONING-I**

 11.1 Sectioning front, top and side views (with dimensions and cutting plane lines) as per IS-696 for simple parts and blocks.

**Diploma 2nd SEM Syllabus**

**Hu-201: COMMUNICATION IN ENGLISH-II**

1. **Speaking**

 Eliciting – information, directions, clarification, help.

Expressing – thanks, requirements, opinions, confirmation, apology, want/ need, information,

Complaints, reasons/ justifications.

Reporting – description, decisions

Narrating – sequence of events

Facing – job interviews

1. **Writing**

Structure and integrate information into cohesive and coherent paragraphs and texts for target audience while:

Writing General – Specific paragraphs (paragraph writing)

Writing Process – Description paragraphs (essay article)

Writing Problem – Solution paragraphs, comment paragraphs (amplification)

Writing technical reports (short)

Writing letters – asking for quotation, placing orders, of complaints, of adjustments.

Writing job applications – Covering letters and Curriculum Vitae.

**Role of learner**: The learner should be motivated to actively participate in the comprehension and oral production. Their roles mostly are as presenter, receiver, thinker and negotiator of information.

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**Sc-202: MATHEMATICS – II**

GROUP – A: DIFFERENTIAL CALCULUS (Marks: 25)

1. Variables and constants:
	1. Dependent and independent variables.
	2. Absolute and Arbitrary constants.
	3. Domain of a variable.
2. FUNCTION – ITS MEANING AND APPLICATION IN ENGINEERING FIELD
	1. Function – its definition and examples.
	2. Different types of functions.
	3. Domain and range of functions.
3. LIMIT OF A FUNCTION
	1. Definition of limit of a function from both analytic and geometric concepts.
	2. Algebra of limits.
	3. Standard limits – statements only.
	4. Illustrative examples on limit.
4. CONTINUITY OF A FUNCTION AT A POINT
	1. Definition of continuity of a function from both analytic and geometric concept.
	2. Difference between limit and continuity of a function at an arbitrary point.
	3. Illustrative examples.
5. DIFFERENTIATION OR DERIVATIVE OF A FUNCTION
	1. First Principle of differentiation.
	2. Differentiation of some standard functions from first principle.
	3. Fundamental theorems on differentiation.
	4. Derivative of function of a function, implicit function and parametric function.
	5. Derivative as a rate measure.
	6. Engineering application of derivative as a rate measure.
	7. Equation of tangent and normal.
	8. Second order derivative.
	9. Engineering importance of second order derivative (acceleration etc.)
6. MAXIMA AND MINIMA OF A FUNCTION AT A POINT
	1. Concept of increasing and decreasing function.
	2. Necessary condition for maximum and minimum.
	3. Determination of maxima and minima of an arbitrary function.

GROUP – B: INTEGRAL CALCULUS (Marks: 20)

1. Integration – The Inverse process of differentiation, integrand, integral and primitive.
	1. Indefinite integration – constant of integration
	2. Some standard integrals.
	3. Method of integration.
	4. Evaluation of integrals by using methods of integration.
2. Definite Integral

2.01 Fundamental theorems of definite integral.

2.02 Practice on definite integral.

3.0 Area under curve.

 3.01 Area under the curve such as circle, parabola, ellipse and straight line. (Simple)

GROUP – C: CO-ORDINATE GEOMETRY OF TWO DIMENSIONS (Marks: 25)

1.0 Co-ordinates – Rectangular/ Cartesian Co-ordinates/ Polar Co-ordinates and their relations.

 1.01 Distance between two given points.

 1.02 Point dividing line joining two given points (externally and internally) in a given ratio.

 1.03 Practice on the above two units.

2.0 Area of Triangle.

 2.01 Area of a triangle whose vertices are given.

 2.02 Illustrative examples.

3.0 Straight line

 3.01 Standard forms of the equation of a straight line (Gradient, Intercept forms etc.)

 3.02 Point of intersection of straight lines.

 3.03 Equation of a straight line through the point of intersection of two given lines.

 3.04 Collinearity of three given lines.

 3.05 Angles between two straight lines.

 3.06 Conditions of parallelism and perpendicularity.

 3.07 Examples related to different forms of straight lines.

4.0 Circle – laws

 4.01 Equation of a circle.

 4.02 Equation of a circle through three given points.

 4.03 Tangent and normal to a circle (calculus method may be used).

 4.04 Condition of tangency.

 4.05 Practice on equations of circle under different forms.

5.0 Conic – laws

 5.01 Standard equations of conic – parabola and ellipse.

 5.02 Focus, Directrix and eccentricity of conic, Latus Rectum.

 5.03 Tangent and normal to a conic.

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**APPLIED PHYSICS - II**

1. **LIGHT**
	1. Reflection, Reflection on spherical mirror, idea of real and virtual image, mirror formula, sign conventions (mirror formula to be assumed), nature size and position of images of different positions of objects, numerical problems.
	2. Refraction, refractive index, critical angle, total internal reflection, between critical angle and refractive index, Prism, refraction through prism, minimum deviation, numerical problems. Lens, refraction through lens (lens formula to be assumed of a lens), numerical problems.
2. **MAGNETISM**
	1. Nature and artificial magnets theories, different types of magnets, induced magnetism, nature of polarities.
	2. Inverse square law, magnetic intensity at end – on and broad – side on position, uniform and non – uniform field, magnetic moment, couple on a magnet in a uniform field, Tangent law.
	3. Elements of terrestrial magnetism
3. **ELECTROSTAICS**
	1. Concept of Electric charge according to modern electron theory, unit of charge, Inverse square law, electric field, Electric line of force, electric intensity
	2. Potential at a point due to a point charge, relation between intensity and potential with deduction of the formula
	3. Capacity of a condenser, series and parallel combination, different type of condenser, numerical problems.
4. **CURRENT ELECTRICITY**
	1. potential difference and electric current with their units
	2. Simple voltaic cell; Difference type of cell; difference between e. m .f. and p. d.; internal resistance of cell. Defects of cell, local action and polarization and its removal.
	3. Storage Cell, lead and Edison accumulator, difference between primary and secondary cells, grouping of cells, series, parallel and mixed combinations of cells.
	4. Basic D.C. Circuits: Ohm’s Law and its verification, mathematical expression, Kirchoffs Law, numerical problems.
	5. Definition of resistance, conductance, effects of temperature on resistance, Series and parallel combination of resistance, resistance per unit length, numerical problems.
	6. Heating Effect of Current: joules law experimental verification of Joule’s Law, electricity energy and power, numerical problems
	7. Thermo – Electricity: See – Beck effect, Verification of thermo e. m. f., application of thermo – electricity, thermopile, Thermo electric thermometer, Peltier effect and Thomson effect.
	8. Chemical Effect of current: electrolysis theory of electrolytic dissociation, water voltammeter, Faradays’s Laws of Electrolysis, electro – Plating.
5. **ELECTROMAGNETISM**
	1. Magnetic effect of current, nature of magnetic field due to straight and circular conductor, due to solenoid, Fleming’s left hand and right hand rules, effect of current following through two parallel conductors.
	2. Electro Magnetic induction: e. m. f. induced in a coil due to magnet, Faraday’ s laws of electro – magnetic induction, Lenz Law, self and mutual induction.
6. **MODERN PHYSICS**
	1. Photo Electric Emission: Explanation and demonstration of photo electric current, deduction of equation, photo electric equation with its physical signification of photo emission (Photo – electric cell)
	2. Nuclear Energy: Atomic mass unit, mass energy equivalence, mass defect
	3. X – rays Properties and its application in industry (Production apparatus not necessary)
	4. Radio – activity, nature and artificial radioactivity, emission of alpha, beta and gamma radiation, their properties and uses.
7. **ELECTRONIC**
	1. Thermionic Emission; Vacuum tube, diode and triode, their working principal, concept of rectifier and amplifier, use of diode as rectifier.
8. **SEMI – CONDUCTOR PHYSICS**

8.1 Concept of semi conductors, properties and basic principle, intrinsic and extrinsic semi conductor, p-type and n-type semi conductor.

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**Me-201: ENGINEERING MECHANICS (End Term marks: 70; Pass Mark: 28)**

1. Introduction:
	1. Concept of Engineering Mechanics, engineering applications
	2. Units of measurement: basic units and derived units, different unit systems (FPS, CGS, MKS, SI), conversion of measurement from one system to another for density, force, pressure, work, power, velocity, acceleration.
2. System of Forces
	1. Concept and definition of force; effects of a force; graphical (vector) representation of a force; principle of physical independence of forces; principle of transmissibility of forces; system of forces.
	2. Composition and resolution of co-planar forces.
		1. Resultant force; Composition of forces; parallelogram law of forces; resolution of forces.
		2. General laws for resultant force – Triangle law, Polygon law of forces.
		3. Graphical (vector) method for the resultant force – position diagram, Bow’s notation, force diagram.
	3. Concept of moment; moment of a force; graphical representation; units of moment; Varignon’s Principle; Position of resultant force by moments; application of moments in simple lever.
	4. Co-planar non-concurrent parallel forces – resultant force of two like and unlike parallel forces; Graphical method for the resultant of parallel forces; Couple – arm of a couple; moment of a couple; resultant of coplanar couples.
	5. Equilibrium of co-planar concurrent forces – Principle of equilibrium; Lami’s theorem for the equilibrium of coplanar forces acting on a particle; Application of graphical methods for the equilibrium of forces; free body diagram.
3. Centre of Gravity – Concept and definition of CG and centroid C.G. by moments; Centre of gravity of plane figures; C.G. of symmetrical solid bodies (No deduction of formula is necessary)
4. Friction
	1. Definition of friction, types of friction – static friction, dynamic friction, sliding friction, rolling friction with examples.
	2. Laws of friction – laws of static friction, co-efficient of friction, angle of friction.
	3. Equilibrium of a body lying on a rough horizontal plane; equilibrium of a body lying on a rough inclined plane; friction in screw jack; various mechanical devices which utilizes friction (belt & pulley drive, brake, vice etc.) Calculation of minimum force required to maintain equilibrium of a body on a rough inclined plane subjected to a force acting:
5. Along inclined plane
6. Horizontally
7. At some angle with the inclined plane
8. Simple Machines
	1. Definition of a machine; types of simple machine; Mechanical advantage; velocity ration; efficiency; relation between efficiency, mechanical advantage and velocity ratio; frictional loss; law of machine.
	2. System of pulleys – First system, second system and third system of pulleys.
	3. Working principle and applications of machines – wheel, axle, differential pulley; simple screw jack, Worm and warm wheel.
9. Rectilinear Motion
	1. Motion under uniform acceleration ($S=ut+ \frac{1}{2} ft^{2}$); simple problems
	2. D’Alembert’s principle – application in single and connected bodies on horizontal plane, inclined plane and pulley system (with and without friction)
10. Curvilinear Motion
	1. Definitions – Projectile, trajectory, angle of projection, range, time of flight.
	2. Equation for the path of a projectile; velocity and direction of motion of a projectile after a given time has elapsed. Velocity and direction of motion of a projectile at a given height; Greatest height attained by a projectile and the time to reach the greatest height.
	3. Motion of Rotation – Angular displacement; Angular velocity; angular acceleration; relation between angular velocity and linear velocity in circular motion.

Centrifugal and centripetal force in circular motion.

**Diploma 3rd SEM Syllabus**

**Paper: COMPUTER APPLICATION**

**Code: Co-301 Theory: 70 marks L – T – P:**

**Total Marks: 100 Sessional: 30 2 – 0 – 6**

1. Computer Fundamentals: Brief history – Babbage machine, Von Neumann. Architecture – Block diagrams, Role of Operating Systems, concept of language and language translators, editors. Memory – different types, functions, concept of I/O devices.
2. Number System: Number system and codes: Decimal, binary, octal, hexadecimal number systems and conversion from one system to another, arithmetic operations using these numbers. Representation of a negative number in the different number systems. Complement and complement subtraction. Different codes: ASCII, 8421, Ex-3, 2421, gray, Alpha-numeric, BCD, Seven segment codes etc. and code conversion.
3. Introduction to Operating System: Concept of resource management, single user and multi user OS, Various popular OS (DOS, Windows, Unix/ Linux), elementary commands.
4. Introduction to Internet: Fundamentals of networking – need of network topology, concept of LAN, WAN, MAN, network devices – NIC, hub, bridge, switch, repeaters, gateway, modem, transmission media. Internet services, concept of global net, different browsers, search engine.
5. MS – Office: Various products, their introduction and uses.

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**COMPUTER APPLICATION PRACTICAL**

**Code: Co-301 (P) Practical: 25**

**Total Marks: 50 Sessional: 25**

1. Introduction to MS Office: Basic feature of MS Office, Overview of different Office Tools.
2. Introduction to MS Word: Creating and editing document, formatting documents, working with Tables, Spell checking, Mail Merging, Importing Graphics into word Document.
3. Introduction to MS Excel: Creating a new work book, entering labels, values and formulas, formatting the layout, working with functions, creating chart from data writing macros.
4. Introduction to Power Point: Creating a presentation, adding/ editing text, working with objects, formatting the presentation, placing the chart in slide, slide show and printing.
5. Introduction to MS Access: Creation of database. Creation of tables – field declaration, data type declaration, constraint declaration, working with records, querying the data base, joining tables, designing the form, the report.

 Reference Books:

1. DOS quick reference: Rajib Mathur
2. Learning Word for Windows : Rajib Mathur
3. Learning Windows step by step: Rajib Mathur
4. Microsoft office unleashed: Techmedia
5. ABC of Office: Han
6. Mastering Excel: Chester
7. Excel 97 Bible: John Walkenbach
8. Teach yourself MS Access in 24 hours: Eddy and Buchanan
9. Microsoft Access 2000 fast and easy: Primatech BBP
10. Unix: S. Das

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**ENGINEERING ECONOMICS & ACCOUNTANCY**

**Code: Hu-302 Theory: 70 L – T – P:**

**Total Marks: 100 Sessional: 30 3 – 0 – 0**

PART A: ENGINEERING ECONOMICS

1. Introduction to Economics and its utility and scope of study.
2. Meaning and definition of utility, consumption, want value, price of goods, national income.
3. Meaning of wealth and its characteristics, classification of wealth.
4. Basic laws of demand and supply and its limitations.
5. Meaning and factors of production, land labour, capital and organisation, factors determining efficiency of labour.
6. Scale of Industries: types, advantages and disadvantages of large and small scale industries.
7. Unemployment: causes of unemployment in India and its remedies.

PART B: ACCOUNTANCY

1. Definitions, objects and principles of double entry book-keeping.
2. Transactions, classification of accounts, rules of credit and debit.
3. Journal and Ledger: Definition, posting and balance of accounts.
4. Cash Book: Single column, double column, triple column cashbook, impress system of petty cash book.
5. Trial Balance: Object of Trial balance preparation, types of errors.
6. Final accounts: preparation of trading account, profit and loss account and balance sheet.

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**MATHEMATICS – III**

**Code: Sc-303 Theory: 70 L – T – P:**

**Total Marks: 100 Sessional: 30 3 – 2 – 0**

GROUP A: DIFFERENTIAL EQUATIONS

1. Differential Equations: Definition and classification, order and degree, importance of differential equations in Engineering Field.
	1. Formation of ordinary differential equations.
2. Equation of the first order and of first degree with reference to Engineering.
	1. Separation of variables, equations reducible to variable separable form.
	2. Homogenous equations and its special form.
	3. Exact equation.
	4. Integrating factors – definition and rules of determining integrating factors.
	5. Linear equations and its solution.
	6. Bernoulli’s equation.
3. Equations of first order but not of the first degree.
	1. Left hand side resolvable into factors
	2. Left hand side not resolvable into factors
	3. Clairaut’s equation.
	4. Practice on units 3.1, 3.2, 3.3
4. DIFFERENTIAL EQUATIONS OF SECOND ORDER WITH CONSTANT CO-EFFICIENTS
	1. Linear equations with right hand number zero: introduction to operator D. Auxiliary equation having real and distinct roots, having equal roots, having a pair of complex roots.
	2. Equations with right hand member as an algebraic expression, trigonometric and exponential functions of X. Solution of linear equations: general and particular integral, complementary functions.
	3. Engineering application of differential equations such as L-R circuit, L-R-C circuit, Simple Harmonic Motion, Rate of growth and decay etc.

GROUP B: GRAPHICS

1. INTRODUCTION AND ITS CONCEPT
	1. Graphical solution of equations.
	2. Cubic equation (one part cubic and the other part linear)
	3. Quadratic equations
	4. Trigonometric equations
2. DETERMINATION OF LAWS OF FITTING OF CURVES

Linear, Quadratic, Exponential, Binomial etc.

GROUP C: STATISTICS

1. INTRODUCTION AND ITS APPLICATIONS IN ENGINEERING FIELD
2. MEASURES OF CENTRAL TENDENCY

2.01 Mean, median and mode (with illustration)

2.02 Relation between them, the empirical formula.

3.0 MEASURES OF DISPERSION

 3.01 Range, Mean Deviation and Standard deviation (with illustration)

 3.02 Variation and coefficient of variation

4.0 CORRELATION

 4.01 Meaning of correlation as a bi-variate relation, scatter diagram.

 4.02 Karl Pearson’s correlation formula for two variables

 4.03 Determination of correlation by Karl Pearson’s formula with reference to engineering applications.

5.0 PROBALITY

 5.01 Introduction to Probability

 5.02 Events: mutually exclusive events, exhaustive events etc.

 5.03 Definition of probability

 5.04 Addition and Multiplication laws of probability

 5.05 Examples on probability.

GROUP D: ANALYTICAL GEOMETRY OF 3-DIMENSIONS AND INTRODUCTION TO VECTOR ANALYSIS

1. INTRODUCTION AND DEFINITIONS
	1. Three dimensional rectangular Cartesian co-ordinates, co-ordinates of a point in space with reference to vectors, addition and subtraction formula.
	2. Coordinates of a point which divides a straight line in a given ratio.
	3. Distance between two points.
2. DIRECTION RATIOS AND DIRECTION COSINES WITH REFERENCE TO VECTORS
	1. Definition of direction ratios and direction cosines
	2. Properties of direction ratios and direction cosines
	3. Relation between direction ratios and direction cosines
	4. Angle between two lines in vector form
	5. Condition of perpendicularity and parallelism.

Recommended books:

1. Integral calculus: Das & Mukherjee
2. Engineering Mathematics: Shanti Narayan
3. An Introduction to Statistics (Vol. I&II): L. Choudhury
4. An easy approach to statistics: S.P. Gupta
5. Analytical Solid Geometry: Misra & Misra
6. Higher Secondary Mathematics: B.S. Grewal
7. Vector & Mechanics: Mena & Mishra

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**ELEMENTS OF ELECTRONICS ENGINEERING**

**Code: Et-304 Theory: 28/70 L – T – P:**

**Total Marks: 100 Sessional: 15/30 3 – 0 – 3**

1. INTRODUCTION:
	1. Introduction to Electronics: its scope.
	2. Electronics Components – active and passive components.
	3. Passive Components – resistors, inductors, capacitors, colour coding.
2. VALVES:
	1. Types of electron emission, vacuum diode – physical construction, forward and reversed biasing, characteristics, space charge.
	2. Vacuum Triode – physical construction, characteristics, parameters: Triode as an amplifier.
	3. Tetrode & Pentode – limitations of triode and hence realisation of tetrode and pentode.
3. SEMICONDUCTOR:
	1. Review of atomic theory, electron pair bonds, energy levels, conduction band, valance band, difference between insulator, conductors and semi-conductors; impurities, intrinsic and extrinsic semiconductors, P-type and N-type semiconductors.
	2. Semiconductor Diode: P-N junction, forward and reverse biased diode, characteristics curve, half wave & full wave rectification circuits.
	3. Transistors – physical construction of P-N-P & N-P-N transistors, their biasing, circuit configurations (CB, CE & CC) their input and output characteristics.
4. TRANSISTOR AMPLIFIER:
	1. Transistor as amplifier – its principle, different classes of amplifiers – Class A, B, C and class AB amplifier; push pull amplifier.
	2. Multistage amplifier – its need, different coupling methods – DC, RC, transformer coupling, their merits, demerits and applications.
5. FEEDBACK AMPLIFIER:
	1. Types of feedback – positive & negative feedback, their comparison.
	2. Oscillators – condition for oscillations, types of oscillators (using transistor only) – Hartley, Colpitt, Clapp’s, crystal etc, their advantage, disadvantage and application.
6. ELECTRONIC INSTRUMENTS:
	1. Cathode Ray Oscilloscope – basic idea, construction, working and uses.
	2. Multi-meter – working and uses.

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**ELEMENTS OF ELECTRONICS ENGINEERING LAB**

**Code: Et-304(P) Practical: 12/25**

**Full Marks: 50 Sessional: 12/25**

1. Valve characteristics of a diode and computation parameters.
2. Characteristics of a semiconductor diode.
3. Input and output characteristics of a transistor.
4. Method of biasing of a transistor & their effect.
5. Characteristics of a Zener diode.
6. Study of Hartley & Collpit Oscillator circuits and advantage and disadvantages.
7. Study of single stage amplifier and measurement of its parameters.

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**PROGRAMMING USING C**

**Code: Co-304 Theory: 28/70 Sessional: 15/30**

**L – T – P: 3-0-6**

**Total Marks: 100 Practical: 12/25 Practical Sessional: 12/25**

1. **Introduction to Programming**: The basic model of computation, Algorithms, Flow-characters, Programming languages, Compilation, Linking and Loading, Testing & Debugging, Documentation.
2. **Algorithms for Problem Solving**: Exchanging values of two variables, summation of a set of numbers, Decimal base to binary base conversion, Reversing digits of an integer, GCD or Greatest Common Divisor of two numbers, Test whether a number is prime, Organise numbers in ascending order, Finding square root of a number, factorial computation, Fibonacci sequence, Evaluation of Sinx as sum of a series, Reverse order of elements of an array, Finding largest number in an array, elements of upper triangular matrix, multiplication of two matrices, evaluate a polynomial.
3. **Introduction to C Language**:
	1. Character set, variables and identifiers, built-in data types, variable definition.
	2. Arithmetic operators and expressions, constants and literals.
	3. Simple assignment statement, basic input output statement.
	4. Simple C programs.
4. **Conditional statement and Loops**:
	1. Decision making within a program.
	2. Conditions, Relational Operators, Logical Connectives.
	3. If Statement, if-else statement.
	4. Loops: while loop, do while loop, for loop, nested loops, infinite loops, Switch statement, Struck Statement. Programming with loops.
5. **Arrays**: One dimensional array: manipulation; searching, insertion, deletion of a n element from an array. Finding the largest/ smallest element in an array; Two dimensional array, addition and multiplication of two matrices, Transpose of a square matrix; Null terminated strings as array of characters, Representation of sparse matrix.
6. **Functions**: Top-down approach of problem solving, Modular programming and functions, standard library of C functions, Prototype of a function: formal parameter list, Return type, Function call, Block structure, passing arguments to a function: call by value, Recursive functions, arrays as function arguments.
7. **Structure and Unions**: Structure variables, initialisation, structure assignment, nested structure, structures and functions, structures and arrays; arrays of structures, structures containing arrays, unions.
8. **Pointers**: Address operators, pointer type declaration, pointer assignment, pointer initialisation, pointer arithmetic, functions and pointers, Arrays and Pointers, pointer arrays.
9. **Self Referential Structure and Linked Lists**: Creation of a singly connected linked, traversing a linked list, insertion into a linked list, deletion from a linked list.
10. **File Processing**: Concept of files, File opening in various modes and closing of a file, reading from a file, writing into a file.

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**COMPUTER ARCHITECTURE AND ORGANISATION**

**Code: Co-305 Theory: 28/70**

**Total: 100 Sessional: 15/30**

1. **Number Representation**: Singed numbers, signed-magnitude 1’s complement, 2’s complement and excess notations, fixed and floating point numbers and operations, Booth’s Algorithm, Common errors in arithmetic, truncation errors, round-off errors. Codes: weighted and non-weighted, BCD, ASCII, EBCDIC.
2. **Central Processing Unit**: Components of ALU (in block diagram only), different types of instructions, instruction format, addressing modes, different CPU registers – accumulator, flag, program counter, instruction register and general purpose registers. Hardware control unit, its different functions – Micro-programmed control unit design.
3. **Microprocessors**: Intel 8085 architecture and simple assembly language programming concept, Brief introduction to Intel 8086/ 8088 and Pentium processor (relative study), Brief introduction to RISC processor.
4. **Memory**: Concept of bits, bytes and words; storage of numbers and characters, RAM, ROM, EPROM; concept of cache memory – its role in performance improvement, memory hierarchy.
5. **Input Output Devices**: Printers – Dot matrix, Inkjet, Line, Laser; Visual display unit – alpha-numeric and graphic; Keyboard, Graphics devices – mouse, joy-stick, scanners and digitizers, Auxiliary storage devices – floppy and hard disk: sectors, tracks and cylinders, accessing mechanisms (brief idea). Magnetic tapes – description and accessing mechanisms, CD ROM.
6. **Input Output Organisation**: Addressing of I/O devices, transfer, concept of DMA, Synchro-nisation, polling and interrupts, interrupt handling.
7. **PC Architecture**.

References: 1. Computer Organisation by (i) Stailings, PHI, (ii) Hamacher, Vranesic & Zaki, MGH

 2. Computer Architecture & Organisation, JP hayers, MGH

 3. Computer Organisation & Design, Pal Choudhuri, PHI

 4. Computer System Architecture, Mano, PHI

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**Diploma 4th Semester**

**ELECTRICAL CIRCUIT AND NETWORK**

**Code: EL-401 L-T-P: 3-0-3**

**Total marks: 100 Theory: 28/70 Sessional: 15/30**  Hours

1. Fundamental Concept: Concept of current, voltage, resistance, capacitance, inductance and circuit parameters. 2
2. Circuit Theorem: Statement and applications of Ohm’s law, Kirchhoff’s law, Thevenin’s theorem, Norton’s theorem, Maximum power transfer theorem, Reciprocity theorem, superposition theorem, star-delta transformation. 9
3. Direct current circuit: Series, parallel, series-parallel circuit of resistance with problems. Division of current in parallel circuit and problems. 6
4. A C Series circuit: Alternating current fundamentals, equations of alternating voltages & currents, R-L, R-C, R-L-C series circuits, Resonance in R-L-C series circuits. Polar and Cartesian representation (J-operation). 7
5. A C Parallel circuit: Solving parallel circuit by vector methods, admittance method and complex algebra method. Resonance in parallel circuits. 7
6. Three phase circuits: Operational characteristics of 3-phase system, principle of 3-phase generation of power. Star-delta connection. Relations of current, voltage and power. 7
7. Transients: Fundamental concept of transients, Oscillating circuit, natural frequency, forced frequency. 4
8. Class Test. 3

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**ELECTRICAL CIRCUIT & NETWORK LAB**

**Code: EL-401(P) Total Marks: 50**

**Practical: 12/25 Sessional: 13/25**

1. Verification of Kirchhoff’s Law.
2. Verification of Superposition Theorem.
3. Verification of maximum power transfer Theorem.
4. Study of A C parallel circuit.
5. Study of resonance in A C series circuit.
6. Study of resonance in A C parallel circuit.
7. Measurement of single phase power and power factor.
8. Measurement of 3-phase power.

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**DATA STRUCTURE USING C**

**L – T – P**

**3 – 1 – 3**

**Code – Co – 401 Total Marks - 100**

**Total Hours – 45 Theory – 70 P.M. – 28**

**(Inclusive of 3 hrs of class test) Sessional – 30 P.M. – 15**

**Units**

1. **Introduction and Overview:**

Introduction, Basic Terminology, Elementary Data Organization, Data Structures, Data Structure Operation, Algorithms; Complexity; Time-space Tradeoff.

1. **Preliminaries:**

Introduction, Mathematical notation and Functions, Algorithmic Notation, Control Structure, Complexity of Algorithms, Sub algorithms, Variables, Data Types.

1. **String Processing:**

Introduction, Basic Terminology, Storing Strings, Character Data type, String Operation, Work Processing, Pattern matching Algorithms.

1. **Arrays, Records and Pointers:**

Introduction, Linear Arrays, Representation of Linear Arrays in Memory, Traversing Linear Arrays, Insertion and Deleting, Sorting: Bubble Sort, Search: Linear Search, Binary Search, Multidimensional Arrays, Pointers: Pointer Arrays, Records; Record Structures, Representation of Records in Memory; Parallel Arrays, Matrices, Spares Matrices.

1. **Linked Lists:**

Introduction, Linked Lists, Representation of Linked Lists in memory, Traversing a Linked List, Searching a Linked List, Memory Allocation Garbage Collection, Insertion into a linked list, Deletion from Linked Lists, Header Linked Lists, Two-Ways Lists.

1. **Stacks, Queues, Recursion:**

Introduction, Stacks, Array Representation of Stacks, Arithmetic Expression; Polish Notation, Quick sort an Application Stacks, Recursion, Towers of Hanoi, Implementation of Recursive Procedures by Stacks, Queues, Defuse, Priority Queues.

1. **Trees:**

Introduction, Binary Tree, Representing Binary Trees in Memory, Traveling Binary Tree, Traversal Algorithms using Stacks, Header Nodes; Threads, Binary Search Trees, Trees; Searching and Inserting in a Binary Search Tree, Deleting in a Binary Search Tree, Heap; Heap Sort, Path Lengths; Huffman’s Algorithm, General Trees.

1. **Graphs and Their Application:**

Introduction, Graph Theory Terminology, Sequential Representation of Graphs; Adjacency matrix; Path matrix, Warshall’s Algorithm; Shortest Paths, Linked Representation of a Graph, Operations on Graphs, Traversing a Graph.

1. **Sorting and Searching:**

Introduction, Sorting, Inserting Sort, Selection Sort, Merging, Merge-sort, Radix Sort, Linear Searching, Binary Searching, Interpolation Searching, Hashing.

1. **Introduction to File Organization:**

Sequential, Index-sequential and Direct File Organization.

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**DATA STRUCTURE USING C (PRACTICAL)**

**Code – Co – 401(P) Total Marks - 100**

**Total Hours – 90 Practical/Viva – 25 P.M. – 12**

**(Inclusive of 3 hrs of class test) Sessional – 25 P.M. – 13**

**Units**

**Program Related to:**

1. Creation of singly & doubly linked list.
2. Insertion, deletion and updation of (1) above.
3. Creation of stack, queue and insertion/deletion operation on Stack/Queue.
4. Conversion among infix, prefix & postfix expressions.
5. Creation of tree and insertion/deletion of a node.
6. Tree traversal problems.
7. Graph search algorithms.
8. Searching & Sorting Algorithm.

**REFERENCE BOOKS:**

1. Data Structures: Seymolur Lipschutz (Schaum Series).
2. Fundamentals of Computer Algorithms – by Horowitz, E. N. Sahani, S. Galgotia.
3. Data Structures Theory Applications: Trembly & Sorenson (TMH).

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**SYSTEM PROGRAMMING**

**L – T – P: 3 – 0 – 0**

**Code – Co – 402 Total Marks - 100**

**Total Hours – 45 Theory – 70 P.M. – 28**

**(Inclusive of 3 hrs of class test) Sessional – 30 P.M. – 15**

**Units**

1. **Assembly Language: (6 hrs.)**

Introduction to assembly language, Description of functional characteristics; addressing modes, Data types and instruction structure, Registers, Indexing, Instruction set description.

1. **Macros: (4 hrs.)**

Recursive macros, Sub-routines, Stacks; Procedures; Exception handling.

1. **Assemblers: (8 hrs.)**

Overview of assembly process, Processing of imperative; declarative and assembler directive statements, Relocation; linking and loading concepts, One and two pass assembler, Symbol table organization; program sections; output forms.

1. **Macro-assembler: (7 hrs.)**

Macro definitions and parameters, Macro call expansion, Macro definition and macro call within a macro, Conditional assembly macro-processor.

1. **Loaders: (6 hrs.)**

Review of loading; linking and relocation, Absolute; dynamic and direct loading schemes, Program linking schemes and resolution of external references, Optional features in loaders and linking editors, Overlay structures and dynamic loading.

1. **Compiler Construction: (4 hrs.)**

Introduction to Compiler, Phases and passes; Bootstrapping; Lexical analysis, Syntax analysis, Syntax analysis, Bottom-up and top-down parsers, Translation, Code optimization, Code generation.

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**MICROPROCESSOR**

**L – T – P**

**3 – 0 – 3**

**Code – Co – 403 Total Marks - 100**

**Total Hours – 45 Theory – 70 P.M. – 28**

**(Inclusive of 3 hrs of class test) Sessional – 30 P.M. – 15**

**Units**

1. **Introduction to Microprocessor: (2 hrs.)**

Evolution of Microprocessors – Specific features of Microprocessors, Application in our daily life (a few examples).

1. **Internal architecture of a microprocessor (using block diagram): (8 hrs.)**

Explanation of each block in brief, Concept of bus structure, Register-to-register transfer, Communication with I/O and memory (This part can be explained using the specific microprocessors like 8085 or 8086/8088). Pin details of 8085 and 8086/8088 CPU and their functions in brief.

1. **Addressing modes in general (may be limited to 8085 and 8086/8088 CPU): (6 hrs.)**

Instruction cycles, Instruction set, timing diagram (may be limited to 8085 and 8080/8088 CPU), Concept of assemblers and compilers.

1. **Interfacing of Memory and I/O devices: (5 hrs.)**

Concept of address space, address/data bus demultiplexing, address and data bus buffering, address and data bus buffering, address decoding, I/O concepts, memory interfacing concept of I/O, mapped I/O and memory mapped I/O, Interrupts – Types of interrupts, Hardware and software data transfer schemes – Synchronous, asynchronous and interrupt driven.

1. **Assembly Language Programming: (10 hrs.)**

(This part may be limited to use assembly language of 8085 and 8086/8088 CPU)

1. Example for register to register, register to memory, memory to register, block of data movement from one area of memory to another, merging of two blocks of data, data block exchange.
2. Examples of arithmetic addition, subtraction, multiplication and division.
3. Examples of searching and sorting (simple).
4. Examples using of lookup tables.
5. Use subroutines and delay programme.
6. **Peripheral chips and their Interfacing: (4 hrs.)**

Brief description of 8255, 8253, 8251, 8237 and 8259. Interfacing of these chips with some standard CPU.

1. **PC Interfacing: (10 hrs.)**

Simple interfacing of Input/Output peripherals like LED, 7-segment LED display modules, stepper motor, relays through digital I/O card or through the parallel port, Serial link between microprocessor trainer kit and PC serial port, EPROM programming using PC port.

**MICROPROCESSOR LAB**

**Code Co - 403(P) Total Marks - 50**

**Total Hours – 60 Practical/Viva – 25 P.M. – 12**

**(Inclusive of 3 hrs of class test) Sessional – 25 P.M. – 13**

**Units**

EXPERIMENTS WITH MICROPROCESSOR

1. Acquaintance with the microprocessor trainer kit hardware and the user’s commands (Dynalog/Vinyties/ALS).
2. Assembly language programme development:

Data transfer programme – Register to Register, Register to Memory and vice-versa.

Arithmetic Operation – 8 bit addition and subtraction, multibyte addition and subtraction, BCD addition and subtraction, multiplication using repeated addition, multiplication using shift-add process, signed multiplication, Binary division, BCD division.

1. Array processing – Adding one entry to an array, checking of an ordered list, replacing of one or more entries in a list, sorting and searching, block movement, block exchange and data insertion.
2. Look up table – finding squares, cubes etc., of a number using look-up table, code conversion using look-up table.
3. Delay program, use of subroutine (use the above programme as a subroutine in main programme)
4. Data Input/Output – Programming 8255 with the basic I/O modes, programming 8253, Interfacing 7-segment display, bar graph display, multiplexed display programming 8253, in different modes, waveshape generation using 8253, Interfacing of ADC and DAC with microprocessor/ microcontroller, keyboard interfacing (using interrupt or polling) to microprocessor/ microcontroller, relay interfacing, stepper motor interfacing.
5. PC Interfacing: Experiments on ADC/DAC interfacing, to stepper motor interfacing and display interfacing and display interfacing. Other interfacing problems may be repeated using PC interfacing and run by using High Level Language.

REFERENCE BOOKS:

1. Microprocessor Architecture programming & application – R.S. Goankar.
2. Introduction to microprocessor – R. Mathur.
3. Microprocessor – Hall.

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**ELEMENTS OF MULTIMEDIA**

**L – T – P: 3 – 0 – 3**

**Code – Co – 404 Total Marks - 100**

**Total Hours – 45 Theory – 70 P.M. – 28**

**(Inclusive of 3 hrs of class test) Sessional – 30 P.M. – 15**

**Units**

1. **Overview of Multimedia: (5 hrs.)**

Introduction to Multimedia, Background of Multimedia, Need for Multimedia, Present market and future potential, Dimensions of Multimedia, Multimedia Product Possibilities, Multimedia Contents, Multimedia in Education.

1. **Introduction to Sound & Audio: (8 hrs.)**

Basics of Acoustics; Psycho Acoustics, Musical Sound and Noise, Elementary Sound System, Microphones; Amplifiers; Digital representation – PCM; ADC; DAC of Sound; Audio Compression; Digital Audio Formats.

1. **Introduction to Image and Graphics: (12 hrs.)**

Introduction to Image, Perception of Human Eye, Vector & Raster Graphics, Digital representation of image, colour, 16 bit, 24 bit colour depth, Basic Colour Theory, Colour Characteristics – Hue; Saturation; Luminance, Colour Palette, Monitor and Print Display, Basic Image Processing Criteria, Image Compression – JPEG; BMP; TIFF; GIFF; Glossy and Non-Glossy, Image Evaluation, Layers, Filters, Image Manipulation – Scaling; Cropping; Rotation, Colour Printer – Basics, Image Capture – Scanning Basics, Digital Still Camera.

1. **Motion Video Technology: (18 hrs.)**

Introduction to Video, Video in Multimedia, Basics of Motion Video, Sources for Motion Video Objects, Video Formats; Lines; Frames; Fields, Synchronization Aspect Ratio etc., TV Broadcast Standard – PAL; NTSC; SECAM etc., Horizontal and Vertical Resolution, Analog Video Camera Principle – Monochrome; Colour Video Concepts, Types of Cameras – Luma; Chrome, Component and Composite Video, Digitization Basics, Spatial Resolution & Bandwidth, Sampling & SyQuest Theorem, Sampling RGB; Composites, Magnitude domain discretization, Colour bitmap encoding, Video compression lossless and lossy.

1. **Class Test: (2 hrs.)**

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**ELEMENTS OF MULTIMEDIA LAB**

**Code – Co – 404 (P) Total Marks - 50**

**Total Hours – 60 Practical/Viva – 25 P.M. – 12**

 **Sessional – 25 P.M. – 13**

**Units**

1. **Sound Forge:**

Sound recording and editing through sound forge XP –

The Main Screen, The Data Window, Opening an existing file – playing a sound file, Playing a section of a file, Copying data to a new file, Saving a file, Simple editing, Advanced editing, Editing sound formats, Applying sound processing functions, Recording sound using sound forge.

1. **Adobe Premiere:**

Creating desktop video with Adobe Premiere, Creating an Adobe Premier movie, Starting a new project importing clips; assembling the clipping construction window; previewing the movie; changing duration of a cell; creating a transition; adding other clips and transitions, Applying filter to a clip, Changing the time unit in the construction window, Using preview command to preview the transition and filter effects, Adding sound to movie, Connecting and capturing source video through broadway cord, Editing and compressing video.

1. **Adobe Photoshop:**

Scanning image, Creating new images, Changing foreground and background colours, Creating and using paths, Editing and retouching, Duplicating images, Layers – linking with layers, Grouping images, Rubber stamp and pattern stamp tool, Painting – paintbrush tool; air-brush tool; pencil tool; eraser tool; gradient tools, Photoshop filters.

1. **Authorware 5 Attain:**

Introduction – system requirements; installing; general features; Knowledge objects – introduction to knowledge objects; choosing a knowledge objects; adding a knowledge objects; adding a knowledge objects file; authorware knowledge objects, Authoring basics – icon based authoring what each icon does in the toolbar,; working with icons on the flow line; authoring – step by step; distribution requirements; packaging an AW piece; packaging an AW piece for the web, Creating interactions – components of an interaction; How an interaction works; tracing the flow through an interaction; setting up an interaction step by step, Directing the flow – Decision structure; frameworks; navigation structures – step by step, Transitions; Positioning and motion – using transition for special effects; positioning objects using the motion icon; making objects move step by step.

1. **Director – 7**

Introduction – system requirements; installing director; Basic – Overview; work-area; adding interactivity with lingo; using the score; using markers; selecting and editing frames in the scores using xtras, Sprites – creating; selecting and layering sprites; positioning; splitting and joining sprites; Working with cast members and casts – using the cast window; creating cast members, Behaviours – attaching behaviour; creating and modifying behaviour, Colour; Tempo and transitions – animation; navigation and user interaction; movies in a new window; sound; video and synchronization; distributing movies.

1. **Toolbook II Instructor:**

Introduction – system requirements and installing instructor, Understanding Instructor concepts – planning the project; building an application; using open script, Exploring the Instructor interface – about the Instructor; Visual interface using tools in Instructor, Using the book specialist – working with books and pages; working with Toolbook II catalogues; working with objects; setting object properties; adding buttons; working with list boxes and combo boxes; adding graphics; using multimedia; hiding; showing and animating objects; creating a quiz using question objects.

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**DIGITAL ELECTRONICS**

**L – T – P: 3 – 1 – 0**

**Curriculum ref: EL/CO/It - 403 Total Marks - 100**

**Total Contact Hours – 75 Theory – 70 P.M. – 28**

**(Inclusive of 3 hrs of class test) Sessional – 30 P.M. – 15**

**Unit**

1. **Logic Gates: (8 hrs.)**

AND;OR; INVERTER; BUFFER; NAND; NOR (universal gate) Exclusive OR (XOR) and Exclusive NOR and their truth table, Realization of digital circuit for a given logic equation; examples of IC gates; Block diagram.

1. **Boolean Algebra: (8 hrs.)**

Boolean Algebra theorems; simplification of Boolean expression; universal gates; formulation and implementation of logic expressions; D’ Morgans theorem and application.

1. **Combination Logic: (6 hrs.)**

Applications involving developing of combinational logic circuits; combinational logic circuit analysis; design and optimization; special logic gates; characteristics of auto AOI; Tristate devices; expandable gates.

1. **Number System: (12 hrs.)**

Binary; octal; hexadecimal number systems; conversion from one number system to another; binary arithmetic; one’s & two’s complement subtraction; exclusive-OR gate and implementation of arithmetic circuits of Half Adder; Full Adder; subtractor; serial/parallel binary adders & parallel/adder/subtractor circuits, Digital comparator: Arithmetic codes; 8421; Excess – 3 Code; gray code; hamming code: addition of BCD and excess-3 coded numbers; ASCII and EBCDIC codes.

1. **Displays: (10 hrs.)**

Construction; working and operation principles of LED; LCD; seven segment; Dot-Matrix & Alphanumeric displays.

1. **Logic Families: (10 hrs.)**

TTL logic; open collector and totem-pale output; 74 & 54 series of IC’s and their number coding; MOS circuits & compression with TTL ckts.

1. **Flip Flop: (10 hrs.)**

Basic principles of flip-flop operation of RS; RSI; D; J-K; and M/S; J-K flip-flop.

1. Introduction to LSI; VLSI; Chip-function wise; their uses. (8 hrs.)
2. **Class test: (3 hrs.)**

The following Demonstration will be done –

* Logic gates.
* Half-adder, Full-adder.
* LED & LCD.
* Flip-Flops.

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**Diploma 5th Sem**

**5. THIRD YEAR (ODD TERMS) – LEVEL V**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Sl.No | Code | Course | Study Scheme | Evaluation Scheme | TotalMarks | Credit |
| Pre-Requisite | Contact Hour/Week | Theory | Practical |
| L | T | P | EndExam | InternalAssessment | EndExam | InternalAssessment  |
| ClassTest  | Assignment | Sessionnal | Viva |
| 1 | COM501 | Data BaseManagement System |  | 3 | 0 | 4 | 70 | 15 | 15 | 20 | 20 | 10 | 150 | 5 |
| 2 | COM502 | GUI programmingLab |  | 0 | 1 | 4 |  |  |  | 50 | 30 | 20 | 100 | 3 |
| 3 | COM503 | ComputerMaintenance  |  | 2 | 0 | 5 | 35 | 10 | 5 | 50 | 30 | 20 | 150 | 5 |
| 4 | COM504 | ComputerCommunication &Networking  |  | 3 | 0 | 0 | 70 | 15 | 15 |  |  |  | 100 | 3 |
| 5 | COM505 | Operating System |  | 3 | 0 | 4 | 70 | 15 | 15 | 20 | 20 | 10 | 150 | 5 |
| 6 | COM506 | Object OrientedMethodology  |  | 2 | 1 | 4 | 35 | 10 | 5 | 20 | 20 | 10 | 100 | 5 |
| 7 |  | Seminar  |  | 0 | 0 | 2 |  |  |  |  |  | 50 | 50 | 1 |
|  |  |  |  | 13 | 2 | 23 | 280 | 65 | 55 | 160 | 120 | 120 | 800 | 27 |

**Database Management Systems**

**Curriculum Reference Number: Com 501 L T P Credit**

Theory: 100 3 - 4 5

End Term Exam: 70

I.A: 30

Practical:

End Term Exam: 20

I.A: 30

Total Contact Hours: 105

Theory: 45

Practical: 60

Theory : 45 hrs.

1. Introduction to Database Management System 5

 1.1 Database System environment

 1.2 File oriented Approach

 1.3 Database Approach

 1.4 Users of DBMS

 1.5 Intended use of DBMS

 1.6 Benefit of using database approach

 1.7 Concepts of Client Server Architecture and distributed system

2. Database System Concept and Application 5

 2.1 Date Models, Schemes and instances

 2.2 DBMS architecture and Independence

 2.3 Database Languages and Interfaces

 2.4 The Database system environment

 2.5 Classification of DBMS

3. E-R diagram 2

 3.1 Defining relations, Entity Set

 3.2 E-R Model concept with examples

4. SQL 12

 4.1 Data definition in SQL

 4.2 Queries in SQL

 4.3 Create, Update, Insert statements in SQL

 4.4 Views in SQL

 4.5 Specifying additional constraints as assertions

 4.6 Specifying indexes

5. Functional Dependencies and Normalization for Relational Database 4

 5.1 Functional dependencies

 5.2 Normal forms based on primary keys

 5.3 General definitions of second and third normal forms

 5.4 Boye Codd normal form

6. Transaction Processing Concepts 3

 6.1 Introduction to transaction processing

 6.2 `Transaction and System concept

 6.3 Desirable properties of transactions

 6.4 Schedules and recover ability

7. Concurrency Control Techniques 3

7.1 Basic Concepts; Concepts of Locks:live lock, dead lock; Serializability

8 Security and Integrity 5

 8.1 Security and integrity violation

 8.2 Authorization

 8.3 Authorization and Views

 8.4 Granting of Privileges

 8.5 Security specification and SQL

 8.6 Encryption

9 Distributed Databases: 6

9.1 Principles of distributed database; data fragmentations, transparency, Integrity, allocation of fragments, translation of global query to fragment query; concurrency control-elementary ideas.

Code- CO-501(P) Total Marks - 50

Total Hours- 60 Practical/Viva-25 P.M.-12 sessional-25 P.M.-13

1. **Oracle**
	1. Introduction to Oracle
	2. Data types and attributes constraints, primary key, unique, foreign key, check, not null
2. **Introduction to Structured Query Language(SQL)**
	1. Data definition language(DDL)-Create, alter, drop table
	2. Data manipulation language(DML)-Select, insert, update, delete
	3. Data control language-Grant,revoke
	4. Creating and deleting views, index
3. **Introduction to PL/SQL**
	1. Block structure, variable and types, looping constructs, expression and operators, functions
	2. Cursor variable, cursor fetch, loops
	3. Procedure, functions, triggers
	4. Error handling and exceptions
	5. Composite datatypes
4. **Developer 2000**
	1. Oracle forms- Form modules, blocks, items, windows, canvas views, triggers, master detail forms, menu, alert, LOV
	2. Oracle reports- report generation with parameters
5. **DBA function**
	1. Installation of Oracle & D2K
	2. Creation of database
	3. Routine Maintanance of Database
	4. Backup & Recovery of database
	5. Concept of inet.ora

**REFERENCE BOOKS:**

1. Fundamentals of Database System- by Elmasri and Navathe
2. Database Management- by CJ Date
3. Principles of Database Systems- by John E. Hoperoft & Jeffrey D. Ullman
4. Developing personal oracle 7 applicaions- by David Lockman
5. Oracle8 DBA handbook- by Kevin Loney

**GUI Programming Lab**

**Curriculum Reference Number: Com 502 L T P Credit**

Theory: - 1 4 3

End Term Exam:

I.A:

Practical:

End Term Exam: 50

I.A: 50

Total Contact Hours: 90

Practical: 90

Practical

Tutorial Periods : 90

Classes : 6 P/W

1.0 Introduction to Visual Basic 05

 1.1 Introduction to Windows programming

 1.2 Introduction to events and event driven programming

 1.3 Available packages for event driven windows programming

 1.4 Role of Visual Basic

 1.5 Introduction of Visual Basic IDE

1.6 Introduction of code window, property editor, project window, toolbar etc.

2.0 Basic Programming Constructs of Visual Basic 05

Declaring variables, Data types, User-defined data types, Conditional statements –If-then-else, Select-case, Looping constructs- do while, for-next etc., Array handling, Branching(go sub), with-end with

3.0 Introduction to common controls of Visual Basic 05

Label control, command button, textbox, checkbox, option button, frame, list box, combo box, scrool bars, timer, shape, line, concept of focus and tab order

4.0 Introduction to File System Control 05

 Dirlist box, dDrivelist box, filelist box, synchronization of above controls

* 1. Introduction to Common Dialog Controls

Open dialog control, save dialog control, Print dialog control, Help dialog control, Color dialog control, Font dialog control

6.0 Introduction X Graphics Programing in Visual Basic 08

Co-ordinate- system, default coordinate system, custom coordinate system

Drawing shapes (line, box, circle, ellipse, arcs), color functions(RGB, QBcolor, System color)

Graphics controls- Picture box control, Image control, loading image(Loadimage())

7.0 Introduction to Database 10

ADODC, ADO, cursor, bound controls, DB combo control, DB list, joining two tables using ADODC, concept of master detail relationship, concept of ODBC, JET Database, Connectivity with other RDBMS e.g., Oracle

8.0 Object Orientation in Visual Basic 10

 Creation of classes, creation of property procedure-let,Set,Get

Creation of methods, creation of Events, calling the class from other visual basic application, persistence of objects

9.0 ActiveX control in Visual Basic 05

Creation of activeX controls, expositing properties of activeX controls, readproperty(), writeproperty()

10.0 ActiveX documents 05

Creation of active documents, launching the active documents in Internet

11.0 COM technologies in Visual Basic 10

Concept of COM, creation of COM client application, concept inprocess and out process servers, implementing inprocess and outprocess servers, implementing inprocess and outprocess servers-ActiveX DLL, ActiveX exe

12.0 Porting Active X control in Internet 05

 Visual Basic deployment wizard

13.0 Crystal Report 03

14.0 Introduction to MM application development in Visual Basic 03

 Incorporation of Movie, incorporation of Sound

15.0 Using Windows API in Visual Basic 02

**REFERENCE BOOKS:**

1. Programming in Visual Basic- McBridge P.K., BPB
2. Mastering in Visual Basic – Evangelos Petroutsos, BPB
3. Teach yourself Visual basic – Nathan Gurewich
4. Visual Basic 5 development- J.D.Conley

**Computer maintenance**

**Curriculum Reference Number: Com 503 L T P Credit**

Theory: 50 3 - 4 5

End Term Exam: 35

I.A: 15

Practical:

End Term Exam: 50

I.A: 50

Total Contact Hours: 90

Theory: 30

Practical: 90

Theory: 30 hrs.

Tools

 Screw drivers flat blade

 Screw drivers Phillips

 Long nose plier

 Wire cutters/cutting pliers

 Hard disk

 File

 Torch

 Chip extractors

 Chip inserter

 Tweezers

 Soldering iron

 Solder sucker

 Meters-analogue and digital

 Logic probe/pulser

Outlet tester

English and metric system

Oscilloscope

Physical configuration

 Record physical configuration

 Desktop

 Tower

 Laptop

 Remove cover

 Remove disk drives, mark connectors

 Remove power supply

 Remove mother board

Locate primary system components

 Mother boards

 Bus slots and I/O cards

 Processor types

 Memory

 Power supply

Assemble a new PC

 Components required

 Casing and cover

 Mother board

 I/O cards

 Disk drive (HDD)

 Floppy drive (FDD)

 Keyboard

 Bootable floppy

 Cables

Locate different sections of an SMPS

 Observe signals

Troubleshoot power supply (created problem)

Check resistance, diodes, transistors, capacitors, etc. Offline

Locate communication ports

Observe signals

Configure ports

Locate different sections of keyboard and mouse signals

Locate different sections of monitor

 Observe signals

Check power supplies

Locate different sections of a printer

 Observe main signals

 Check power supplies

Locate different parts of a floppy drive

Install a floppy drive

Note cables and jumpers

Locate different sections of a printer

 Observe main signals

 Check power supplies

Locate different parts of a floppy drive

 Install a floppy drive

 Note cable and jumpers

Locate different parts of a hard disk drive

 Install HDD (simple)

 Install HDD (master slave)

 Install SCSI HDD

Install MM kit

Observe and note booting sequence

Note and setup CMOS

Trouble shoot crated faults (10 problems)

Observe different parts of a CVT

Connect a CVT and study the supply with oscilloscope

Observe different parts of UPS

Connect a UPS and observe functions in different conditions

Observe the components of a LAN

 Workstations

 File servers

 LAN cables- twisted pair, co-axial, fibre-optic Network adapters

**REFERENCE BOOKS:**

1. Upgrading and repairing of PC’s- Scott Mueller
2. ABC’s of Upgrading your PC- Dan Gookin
3. PC tools

**Computer Communication & Networking**

**Curriculum Reference Number: Com 504 L T P Credit**

Theory: 100 3 - - 3

End Term Exam: 70

I.A: 30

Practical:

End Term Exam:

I.A:

Total Contact Hours: 45

Theory: 45

Practical:

Theory: 45 hrs.

1 Introduction 6

 1.1 The uses of Computer Network

 1.1.1 Network Goals

 1.1.2 Application of Network

 1.2 Network Structures

 1.3 Network Architecture

 1.3.1 Protocol Hierarchies

 1.3.2 Design Issues for the Layers

 1.4 The O.S.I Reference Model

 1.5 Services

 1.5.1 OSI Terminology

 1.5.2 Connection-oriented and Connectionless services

 1.5.3 Service primitives

 1.5.4 The Relationship of services to protocols

 1.6 Example Network

 1.6.1 Public Networks

 1.6.2 ARPANET

 1.6.3 Novell Netware

2 The Physical Layer ` 6 2.1 Transmission Median

 2.2 Wireless Transmission

 2.3 Telephone System

 2.4 ISDM

 2.5 Transmission and switching

3 The Medium Access Sub Layer 5 3.1 ALOHA

 3.2 CSMA

 3.3 Collision Free protocols

 3.4 IEEE Standard 802 for LAN

 Ethernet, Token Bus, token ring

* 1. Bridges

4 The Data Link Layer 4

 4.1 Data Link Layer Design Issue

 4.2 Error Detection and Correction

 4.3 Elementary Data Link Protocols

 4.4 Sliding windows protocols

5 The Network Layer 4

 5.1 Network Layer Design Issues

 5.2 Ponting Algorithms

 5.3 Congestion Control Algorithm

6 The Transport Layer 4

 6.1 The Transport Services

 6.2 Elements of Transport Protocols

 6.3 A simple Transport Protocols

7 The session Layer 4

 7.1 Design Issues

7.1.1 Concept of Data exchange dialog management, activity management

 7.2 Remote Procedure Call

 7.2.1 Client-server model

 7.2.2 Semantics of R.P.C

8 The Presentation Layer 4

 8.1 Design Issue

 8.2 Data Compression Techniques

 8.3 Elementary idea of cryptography

9 The Application Layer 3

 9.1 Design Issue

 9.2 File Services

 9.3 E Mail

10 Concepts of internet and www, HTML, TCP/IP 5

**REFERENCE BOOKS:**

1. Computer Network- A.S. Tanenbaum, PHI
2. Data Communication & Computer Networks- W. Stallings, PHI
3. Introduction to digital and data communication – M.A. Miller
4. Telecommunication & the computer-James Martin, PHI
5. Data Communication & distributed network- U.D. Black
6. Cabling the complete guide top networking- Groth McBee

**Operating System**

**Curriculum Reference Number: Com 505 L T P Credit**

Theory: 100 3 - 4 5

End Term Exam: 70

I.A: 30

Practical:

End Term Exam: 20

I.A: 30

Total Contact Hours: 105

Theory: 45

Practical: 60

Theory: 45 hrs.

1 Introduction 2

 1.1 Definition of O.S.

 1.2 History of O.S

 1.3 Concepts

 1.4 Structure

2 Processes 4

 2.1 Definition of process & thread

 2.2 Interprocess communication

 2.3 Classical I.P.C problems

 2.4 Process Scheduling

3 Process Scheduling Algorithm 5

 3.1 Resident Monitor (single user)

 3.2 multi user system

 3.3 Time sharing system

 3.4 FIFS

 3.5 Round Robin Fashion/Time quantum Concept

 3.6 Multiple queues

 3.7 Priority queues

 3.8 Shortest job first

4 Memory Management 7

 4.1 Resident Monitor

 4.2 Multiple Partition

 4.3 Garbage collection and compaction

4.4 Paged memory management

 4.5 Page Replacement Algorithms

 4.6 Swapping

 4.7 Segmentation

 4.8 Segmented paged memory management

 4.9 Demand paged memory management

 4.10 Virtual Memory

5 File Systems 5

 5.1 Concept of Files & Directories

 5.2 File System Implementation

 5.3 Security Issues in Files

 5.4 Protection Mechanisms

 5.5 Case studies of UNIX file systems

6 Input / Output 4

 6.1 Principles of I/O Hardware

 6.2 Principles of I/O Software

 6.3 Disk

 6.4 Clocks

 6.5 Serial and Parallel port access

 6.6 Terminal Access

7 Device Management 3

 7.1 Techniques for Device Management- Dedicated, shared, virtual

7.2 Device allocation considerations I/O traffic control & I/O Schedule, I/O Device handlers

8 Dead Locks 5

 8.1 Concept of deadlock

 8.2 Rersources

 8.3 Dead lock Prevention: Banker Algorithm & Safety Algorithm

 8.4 The Ostrich Algorithm

 8.5 Deadlock Detection and Recovery

 8.6 Deadlock Prevention

9 Distributed O.S 5

 9.1 Definition

 9.2 Types of Distributed O.S.

 9.3 Workstation server model

 9.4 The processor pool model

 9.5 The hybrid model

 9.6 Case study SUN NFS File Server

10 Case Studies 5

 10.1 UNIX O.S.

 10.2 MS-DOS

 10.3 WINDOWS –NT

**Practical**

Total Period : 30

Period : 2 P/W

**UNIX**

1. Overview of UNIX

UNIX as an Operating system, Kernel, Shell and User, UNIX File System, Files and Directories, Access permission, File system hierarchy

2. Basic UNIX Commands

Listing of files and directories, Copying, Deletion, Renaming and comparing files, Creation, Navigation and Removing directories, Access permission of files and directories, Editors in UNIX, Status of users, terminals, date and time, Displaying blown-up message, Paging and printing of files, Background jobs

3. Advance Features of UNIX

I-nodes, trees, Pipes and Filters, Cutting, Pasting and Sorting of files, searching for a pattern in a string

1. Programming with the Shell

System variables and shell variables, Interactive shell scripts, shell termination, Conditional statements, Looping statements, Special parameters in shell Computation and string handling

**REFERENCE BOOKS:**

1. Operating System – Madnick and Donovan – MGH
2. Operating System Concepts - A. Silberschatz and P. Galvin- ADP
3. The UNIX Programming Environment-by Kernighan & Pike- PHI
4. UNIX- Concepts & Application – by Sumitabha Das

**Object Oriented Methodology**

**Curriculum Reference Number: Com 506 L T P Credit**

Theory: 50 2 1 4 5

End Term Exam: 35

I.A: 15

Practical:

End Term Exam: 20

I.A: 30

Total Contact Hours: 90

Theory: 30

Practical: 60

1 Overview 5

 Introduction to object oriented approach

 Need of object oriented programming

 Identifying objects

 Characteristics of object oriented language

 Definition objects

2 Introduction to Object Oriented Methodology

 Object oriented development

 Object oriented theme

Comparison of object oriented language and procedure oriented language

Basic concepts of OOPs objects, classes, data encapsulation, inheritance

Polymorphism and overloading

3. Object Oriented Analysis & Design 5

 Introduction to software engineering paradigms

Requirement analysis and problem statement – Identifying objects, specifying attributes, defining operation & inter object communication

Object oriented analysis & prototyping

Object oriented design concepts

Object oriented design methods

Object & classes definition

4. Object Oriented Language C++ Features 2

 Common statement

 Basic data types

 Operators

 Arithmetic, relational, logical operators

 Manipulators, assignment and conditional operators

 New and delete operators

 Control structure

 FOR loop

 WHILE loop

 If-else statement

 Switch statement

 Break and continue statement

5. Arrays and Pointers 4

 Defining an array and accessing it’s elements

 Array as class member data

 Array of objects

 Addresses and pointers

 Pointers and functions

6. Structure and Functions 3

Specifying the structure

 Defining a structure variable

**Practical**

**Total Periods: 60**

**Periods : 4 P/W**

Problems on:-

Objects and classes

Declaring and creating objects

Constructors

Modifiers

Passing objects to methods

Instance variables and class variables

Instance method & class method

Scope of variables interface and packages

Introductory Problems on Class Inheritance Super classes and sub class

Calling super class constructors

Calling super class methods

Object class

Number class

Processing date and time

Class Templates and Exceptional handling

**REFERENCE BOOKS:**

1. Object oriented Programming – by E. Balaguruswamy, TMH
2. Object Oriented Programming in Microsoft C++ - by Robert Lafore
3. Software Engineering – by Roger S. Pressman, PHI
4. Object Oriented Modeling & Design – by James Rumbaugh, Michael Blaha, William Premerlani, Frederick Eddy, William Lorensen
5. Teach Yourself C++ - by AI Stevens
6. Programming with C++ - Radhaganesan- Scitech Publications.

**Diploma 6th SEM**

THIRD YEAR (EVEN TERMS) – LEVEL VI

Note: Students will be allowed to take one course from 4a & 4b and one course from 5a & 5b.

Business Data Processing

 Curriculum Reference Number: Com 601 L T P Credit

 Theory: 100 3 - 4 5

 End Term Exam: 70

 IA: 30

 Practical:

 End Term Exam: 20

 IA: 30

 Total Contact Hours: 105

 Theory: 45

 Practical: 60

 Theory: 45 hrs.

1. Introduction:

Introduction to Information – Time, Relevant, Precision 1

1. Information Systems and Business Context:

Organisation, Technology, Management 2

1. Information Systems in Management: 10

Types of information system – Transaction processing system,

Management information system, Decision support system, Executive

information system, Office information system/knowledge work system

1. Categories of Information Systems on the Basis of Processing: 2

Batch, On-line, Real-time

1. Data and File Concepts: 3

File structures and data access – Sequential access, Direct access,

Indexed sequential access

1. Data Management : 5

The requirement- Data redundancy, Maintaining consistency within the data

Collection, Program-data interdependence, Flexibility in use of data and sharing

Data, Data management trends

1. Applications of IS : 12

Inventory management, Sales management, Personnel management

1. Management Information System : 5

MIS services – Routine performance reports, Excepting reports, On-demand

Reports, Predictive reports Implementing an MIS

1. Installing an MIS : 3

Crash or direct installation, Parallel installation, Pilot installation,

Phased installation

1. Limitation of Information Systems : 2

Unsuitability for certain tasks, Unrealistic expectations, Information not

tailored to user needs

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 45

Practical

Total Periods : 60

Periods : 4 P/W

FOXPRO – 30 hrs.

(Instead of FOXPRO, other equivalent package may be used)

Introduction to FOXPRO

Introduction, Special features of FoxPro, Starting FoxPro, Terminologies used in FoxPro File/ Table-Record-Fields, Conventions used for naming fields, Data types

Understanding Databases

Introduction, Opening a Table/Database, Adding records in a table, Close a file

Retrieving and Editing the Data

Introduction, List, Display, Record pointer, Moving the record pointer – Goto –Skip, Modifying data-Edit-Browse

Removing the Data

Introduction, Delete record, Recall, Pack, Zap, Replace

Managing Databases

Introduction, Sorting, Indexing, Searching for record within the database –Locate-Find-Seek

Working with Reports

Introduction, Creating a report format, Generating a report, Previewing the Report-Grouping of data-Subtotals-Grand total

Working with Multiple Files

Introduction, Work area, Linking up related databases, Updating a database(s) using key field(s), Memory variables-Working with memory variables-Set commands

Functions

Introduction, In-built function-Character functions-Data functions, General functions, Some special functions in FoxPro

Arrays

Introduction, Arrays, Sorting and retrieving a record-Scatter-Gather, Array functions – Copy From/ To array – Copy to – Append from

Programming Techniques

Introduction, Pseudocode – Preliminaries for pseudocode,

Algorithms – Algorithm definition, Data dictionary – General facilities available in data dictionary – Organisation and management of data dictionary, Program specifications – Input specifications – Processing specifications – Output specification, System development – System development life cycle – Structured analysis – Structured design

Getting Started with Programming

Introduction, Commands for writing programs – Say – Get-Read – Valid – Range, Picture, Input accept – Cancel, Branching concepts – If-endif – Do case Otherwise.

Programming Structures

Introduction, Looping commands – Do while – For- Endfor Scan-End Scan

Working with Functions and Procedures

Introduction, Function, Procedure

Menu Builder

Introduction – Define Menu – Define Pad – Clear Menu Popup – Define popup – Define Bar, Working with Menus – Read Menu – Prompt- Menu To Sample program

Function for use with GUI tools – Working with Windows – Define Windows – Activate Window – Deactive Window – Clear Window Release Window – Hide Window – Show Window – Show Window All.

Screen Builder

Introduction, Screen based commands Create screen – Modi screen – Set format to

File Heading Commands

Introduction, Basic file handling commands Fopeno – Fereateo – Freado – Fwriteo – Fgetso – Fputs – Fseeko – Fflusho – Fcloseo

Working with Queries

Introduction, Working with queries, Catalog manager – creating a Catalog manager

REFERENCE BOOKS:

1. Management Information System – by Sadagopan – PHI
2. Manual for FOXPRO
3. Introduction to Computer data processing and system analysis – V.K.Kapoor
4. Foxpro 2.5 made simple for DOS and Windows – R.K.Taxali (BPB Pub)
5. Mastering Foxpro 2.5 – Siegel (BPB Pub)

Internet & Web Technology

Curriculum Reference Number: Com 602 L T P Credit

Theory: 100 3 - 6 6

End Term Exam: 70

I.A.: 30

Practical:

End Term Exam: 50

I.A.: 50

Total Contact Hours: 135

Theory: 45

Practical: 90

Theory: 45 hrs.

1. Internet Fundamentals 3
	1. Motivation for internetworking
	2. History and scope of internet
	3. Internet protocol and standardization
	4. Role of ISP & Factors for choosing an ISP
	5. Internet service providers in India
	6. Types of connectivity such as Dial Up, Leased, VSAT etc.
	7. Internet server and client modules on various operating systems
2. TCP/IP 12
	1. TCP/IP internet layering model
	2. Reliable stream transport service (TCP)
		1. Need for stream delivery
		2. Properties of reliable delivery service
		3. Providing reliability
		4. Idea behind slide windows
		5. Ports connections and end points
		6. Segment, stream, sequence number
		7. TCP segment format
		8. TCP header
		9. TCP Checksum computation
		10. Acknowledgement and retransmission
		11. Time out and retransmission
		12. Response to congestion
		13. Establishment of a TCP connection
		14. Source and destination address
		15. Protocol number
		16. Checksum
		17. Closing TCP connection
		18. TCP connection reset
	3. Connection less data gram delivery (Internet Protocol)
		1. Concept of unreliable delivery
		2. Connection less delivery system
		3. Purpose of internet protocol
		4. IP header
		5. Source and destination address
		6. Protocol number
		7. Checksum
		8. Routing in an internet
		9. Direct and indirect delivery
		10. Table driver IP rooting
		11. Default roots
		12. Post specific roots
		13. Rooting with IP address
		14. Obtaining a subnet mask
		15. Benefits of TCP/IP
	4. Subnet Address Extension
		1. Introduction to subnet address extension
		2. Minimizing network numbers
		3. Transparent routers
		4. Subnet Addressing
		5. Flexibility in subnet address assignment
		6. Implementation of subnet with mask
		7. Subnet mask representation
		8. Routing in the presence of subnet
	5. User Data gram protocol
		1. Introduction to UDP
		2. Identifying the ultimate destination
		3. Format of UDP message
	6. Domain Name System
		1. Internet addressing
		2. IP address/domain name address; why both
		3. Mapping of domain name to address
		4. Domain name resolution
		5. Efficient translation
		6. Abbreviation of domain name
		7. Obtaining authority for a sub domain
3. Internet Applications and Services 4
	1. Email
		1. Email networks
		2. Email protocols
		3. Format of an email message
		4. Email routing
		5. Email clients, POP3, IMAP
	2. FTP
		1. Public domain software
		2. Types of FTP servers
		3. FTP clients
	3. Telnet
		1. Telnet protocol
		2. Server domain
		3. Telnet clients
		4. Terminal emulation
	4. Internet Relay Chat
		1. IRC network and servers
		2. Channels
4. Internet Security 3
	1. Overview of Internet Security threats & Vulnerability
	2. The need for computer security
	3. Firewalls: introductory concepts & its necessity
	4. Specific intruder approach
	5. Security strategies
	6. Security tools
	7. Encryption
	8. Enterprise networking & access to Internet
	9. Antivirus programs
5. E – Commerce 10
	1. Electronic Commerce Environment & Opportunities
		1. Background
		2. Electronic commerce environment
		3. Electronics market place technologies
		4. Medes of electronic commerce
	2. Overview
		1. Electronics data interchange
		2. Migration to OPEN EDI
		3. Electronic commerce with www/Internet
	3. Electronics Payment System
		1. Types of electronics payment system
		2. Digital token based electronics payment system
		3. Smart cards & electronics payment system
		4. Credit card based electronics payment system
		5. Risk and electronics payment system
		6. Designing electronics payment system
	4. Electronic Cash & Electronics Payment Scheme
		1. Internet momentary payment & security requirements
		2. Payment & purchase order process
		3. On-line Electronic cash
	5. Master Card / Visa secure Electronics Transaction
		1. Business requirements
		2. Concepts
		3. Payment processing
6. HTML & Interactive tools 5
	1. Document overview
	2. Header elements
	3. Section headings
	4. Block oriented elements
	5. Lists
	6. Inline elements
	7. Visual markup
	8. Hypertext links
	9. Uniform Resource Locator
	10. Imagers
	11. Tables
	12. Special characters
	13. CGI (Common Gateway Interface)
	14. Active X
	15. VB Script
	16. Java Script and java./C#
	17. PERL
7. Introduction to ASP 5
	1. Concepts of ASP
	2. Benefits of using ASP
	3. Creating ASP pages
	4. Generating web pages dynamically with ASP
8. Search Engines 3
	1. Technology overview
	2. Popular search engines
	3. Registration of web site in a search engines \_\_\_\_\_\_\_\_\_\_

45

 Practical

 Total Periods : 60

 Periods : 4 P/W

1. Installation of network components under NT or 95/98/LINUX
2. Installation of TCP/IP
3. Installation of Intranet
4. Configuration of one web server
5. Deployment of HTML files in Intranet servers
6. Creation of simple HTML pages, using the following tags.

<Hn> …… </Hn>

<P> …… </P>

<Br>

<A HREF> ….. </A>

<Img>

<FONT>

1. Creation of tables and lists using HTML
2. Creation of simple forms incorporating GUI components (command button, text box, radio button, check box, combo box) in HTML pages
3. Practical on different Internet services (WWW, Mail, FTP, Chat)
4. Simple application using conditional statements
5. Develop application using loop constraints
6. Creation of classes, interfaces and packeges
7. Simple application using threads and runable interface
8. Simple application using thread synchronization methodology
9. Creating application to create user defined exception
10. Simple application to handle inbuilt exceptions
11. Write application to incorporate simple I/O classes
12. Creating application for text file handling
13. Creating application for random file handling
14. Writing applet and embedding it into HTML file
15. Create applet to display different graphical shapes (line, circle, ellipse, arcs, rectangle) and incorporate colour in those shapes
16. Create applet to incorporate GUI components (command button, text box, text area, list box, combo box, check box, frame, check box group)
17. Create applet-using layout manager
18. Write applet to incorporate events
19. Create multi threaded applet
20. Elementary problems on CGI
21. Elementary problems on Active X
22. Elementary problems on VBscript
23. Elementary problems on Java Script
24. Elementary problems on PERL

REFERENCE BOOKS:

1. Internet working with TCP/IP Vol- I : principles, protocols and architecture – by Douglas E. Comer – PHI
2. Internet working with TCP/IP Vol –II : design, implementation and internals –by Douglas E. Comer & David L. Stevens –PHI
3. Internet working with TCP/IP Vol –III: client server programming and applications – by Douglas E. Comer & David L. Stevens –PHI
4. HTML: the definitive guide – by Chuck Musciano & Bui Kennedy
5. E-MAIL security: how to keep your electronic messages private – by Bruce Schneier – John Wiley
6. Dynamic HTML : the definitive reference – by Danny Goodman
7. Dynamic HTML in Action – by Schurman & Pardi – PHI/Microsoft Press
8. Programming in Java – Rajaram – Scitech Publications
9. C# - C. Xavier – Scitech Publication.

Software Engineering

Curriculum Reference Number: Com 603 L T P Credit

Theory: 100 3 - - 3

End Term Exam: 70

I.A.: 30

Practical:

End Term Exam:

I.A.:

Total Contact Hours: 45

Theory: 45

Practical:

Theory: 45hrs.

1.0 Introduction to Software Engineering 4

 1.1 The evolving role of software

 1.2 Software crisis-problems and causes

 1.3 Software engineering paradigms

 1.4 Classic life cycle

 1.5 Prototyping

 1.6 Spiral Model

 1.7 Generic view of software engineering

2.0 Software Requirement Analysis 6

 2.1 Requirement analysis fundamentals

 2.2 Structured analysis: Basic notation and its extension, object oriented analysis and data modeling, process modeling

3.0 Software Design 5

 3.1 Evolution of software design

 3.2 Design fundamentals: Abstraction, refinement, modularity, software architecture

 3.3 Flow oriented design and object-oriented design

4.0 Quality Assurance 4

 4.1 Software quality factor

 4.2 Software quality Assurance (SQA)

 4.3 SQA activities

 4.4 Software reliability, errors and faults

 4.5 Software reliability models

5.0 Verification and Validation 3

 5.1 Software testing strategies & techniques

 5.2 Elementary ideas of black box & white box testing

6.0 Software Evaluation 2

7.0 Software Documentation 3

8.0 Software Project Management 18

 8.1 Basic concepts of software project management process objectives, scope, estimation, COCOMO model

 8.2 Project planning

 8.3 Project scheduling, Gantt chart, pert chart

 8.4 Managing people, project staffing, group working, working environment

 8.5 Project monitoring, milestone, methods of project monitoring

 8.6 Risk analysis, tracking and control, version management \_\_\_\_

 45

Parallel Processing

Curriculum Reference Number: Com 604 L T P Credit

Theory: 100 3 - - 3

End Term Exam: 70

I.A.: 30

Practical:

End Term Exam:

I.A.:

Total Contact Hours: 45

Theory: 45

Practical:

Theory: 45 hrs.

1. Introduction to Parallel Processing
	1. Evolution of Computer Systems
	2. Parallelism in Uniprocessor Systems
	3. Parallel Computer Structure
		1. Pipeline Computers
		2. Array Computers
		3. Multiprocessor Systems
	4. Architectual Classification schemes
		1. Serial Vs Parallel Processing
		2. Parallelism Vs Pipelining
	5. Parallel Processing Applications
	6. Memory System Design
		1. Cache Memory
		2. Virtual Memory
2. Pipeline Design Techniques
	1. Principles of linear pipelining
	2. Classification of Pipeline Processor
	3. Instructions and Arithmetic Pipelines
		1. Design of Pipeline Instruction Unit
		2. Arithmetic Pipeline Design
	4. Vector Processing Requirements
3. Structure and Algorithm for Array Processors
	1. SIMD Array Processor
	2. SIMD Interconnection Networks
		1. Static Vs Dynamic Networks
		2. Mesh, Cube, Shuffle Exchange and Omega Network
	3. Parallel Algorithms for Array Processor
		1. SIMD Matrix Multiplication
		2. Parallel Sorting on Array Processor

REFERENCE BOOKS:

1. Computer Architecture & Organisation – by Hayes – McGrawHill
2. Computer Architecture & Parallel Processing – by Hwang & Briggs – McGrawHill
3. Design Efficient Algorithms for Parallel Computers – by Quinn – McGrawHill

VLSI & Embedded System

Curriculum Reference Number: Com 605 L T P Credit

Theory: 100 3 - - 3

End Term Exam: 70

I.A.: 30

Practical:

End Term Exam:

I.A.:

Total Contact Hours: 45

Theory: 45

Practical:

Theory: 45 hrs.

1. VLSI Design

1.1 Introduction to VLSI design, design styles and parameters, popular technologies 3

1.2 Logic implementation with nMOS, CMOS & PLAs 4

1.3 Pass vs. transistor logic, transit time, clocking, scaling, PLA minimization & folding 4

1.4 Testing & testability issues 3

 1.5 Physical design Algorithms : partitioning, floor planning & placement, routing, compaction, gate arrays, FPGAs 4

 1.6 Data structures for layout design magic 3

 1.7 Design rule checking, symbolic layout, complexity of layout algorithms 5

 2. Embedded Systems

 2.1 Introduction to embedded system, architecture of embedded systems, specifications of embedded systems, design methodologies 4

 2.2 Real time issues – modeling, specification, communication, scheduling, protocols etc. 5

 2.3 Hardware software partitioning, approaches to software and code generation, operating issues, memory and low power issues, validation approaches, distributed embedded systems 10

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 45

REFERENCE BOOKS:

1. Introduction to VLSI Systems – by C. Mead & L. Conway – Addition Wesley
2. Introduction to VLSI Design – by Fabricus – Prentice Hall
3. Layout Design & Verification – by T. Ohtsuki – North Holland
4. Algorithms for VLSI Physical Design Automation – by N. Sherwani
5. An Introduction to VLSI Physical Design – by M. Sarafzadeh & C. K. Wong – MHI
6. Hardware Software Co-design of Embedded Systems – by Falf Niemann – Kluwer Academic
7. Design Principles of Distributed Embedded Applications – by Hermann Kopetz – Kluwer Academic
8. Real Time System Design – by Levi & Agrawal - MH