CURRICULUM FOR

DIPLOMA IN

COMPUTER ENGINEERING

SEM I, II, III, IV,

V & VI

Directorate of Technical Education, Goa State

PROGRAMME STRUCTURE

SET II

Semester - I

Course code	Name of Course	TEACHING SCHEME				EXAMINATION SCHEME				Total marks
		L	T	P	C	Theory Marks		Practical Marks		
						TH	TM	PR/OR	TW	
GN101	Communication Skills	-	-	2	2	-	-	50	50	100
GN102	Engg. Maths-I	4	2	-	6	75	25	-	-	100
GN103	Applied Physics-I	4	-	2	6	75	25	-	50	150
GN104	Applied Chemistry	3	-	2	5	75	25	-	50	150
GN204	Engg. Drawing	2	-	4	6	-	-	50	50	100
	Total	**13**	**2**	**10**	**25**	**225**	**75**	**100**	**200**	**600**

Semester - II

Course code	Name of Course	TEACHING SCHEME				EXAMINATION SCHEME				Total marks
		L	T	P	C	Theory Marks		Practical Marks		
						TH	TM	PR/OR	TW	
GN201	Engg. Maths-II	4	2		6	75	25	-	-	100
GN202	Applied Physics-II	4	-	2	6	75	25	-	50	150
GN203	Environmental Studies	3	-	-	3	75	25	-	-	100
GN205	Engg. Materials	4	-	-	4	75	25	-	-	100
GN105	Computer Fund. & App.	-	-	4	4	-	-	50	50	100
GN106	Basic Engg. Skills	-	-	6	6	-	-	50	100	150
	Total	**15**	**2**	**12**	**29**	**300**	**100**	**100**	**200**	**700**

GN 101 COMMUNICATION SKILLS

1.   RATIONALE

This course deals with Student's proficiency in English by developing their skills in reading, writing and speaking. They will be able to appreciate the usage of grammar. Acquiring proficiency in English is absolutely essential for effective communication while serving on the job. It also deals with applications of the concepts and principles learnt. Using visuals in written communication and body language in oral communication highly enhances the effectiveness of the communication process. These and some other important aspects are discussed in this course. The practice-feedback-practice cycle is of utmost important for developing the communication competencies/skills.

2.   TEACHING AND EXAMINATION SCHEME

Course Code & Course Title	Periods/ Week (In Hours)			Total Credits	Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
GN-101 Communication Skills	**L**	**T**	**P**	**C**	**TH**	**TM**	**TW**	**PR/OR**	**100**
		-	2	2	-	-	50	50	

Minimum passing % : Practical 40%
Legends:

***L**-Lecture; **T** - Tutorial; **P** - Practical; **C**- Credit;   **TH**- End Semester Theory; **TM** – Test Marks:*

***PR/OR** - End Semester Practical / Oral Examinations; **TW-** Term Work*

3.   DETAILED COURSE CONTENTS

Unit 1 - Fundamental of Communication skills

Definition, components (message, sender, receiver, transmission medium and protocol), types(verbal & no-verbal, technological & non-technological, etc), importance of communication skills, effective communication skills (phatic stage, personal stage and intimate stage), barriers in effective communications(verbal, non-verbal), barriers while speaking, other barriers (individual's viewpoints, emotional block, etc.) methods of and hint to increase communication skills, body language.

Unit 2 – Presentation Skills

Methods and styles of presentations (seminars, speeches, etc), the plan, objectives, audience, structure (sequential, hierarchical, question oriented pyramid, meaty sandwich), tips for good beginning and end, aids to presentation (visual, verbal), delivery style (eyes, voice, expression, appearances, stance, etc), techniques for a good speech (repeat, draw (signs, pictures), jokes, etc).

Unit 3 - Technical Reports, Letter Writing, CVs

Functions of Reports (information, initiate action, recommend new procedures, recording, coordinating project), techniques (basic format, steps, appendices), types of reports (emphasis on progress reports, industrial visit reports, inspection reports, accident reports, survey report, report on seminars, workshop, technical gathering, etc).

Types of letters, format function, qualities of a good letter, examples of job applications, leave applications, complaints, purchase orders, enquiries replies etc.

Brief mention of importance of etiquette in email communication, importance of careful proofing the documents sent.

Curriculum Vitae – definition, sample, tips for a good CV, covering letter

Unit 4 - Soft Skills

Importance of values, attitude and etiquettes in communication, ethics and manners, courtesy, honesty and reliability; personal integrity, flexibility – adaptability, team skills – cooperation; ability to follow regulations; willingness to be accountable; Ability to relate to co workers in a close environment, non verbal communication, leadership skills – self directed, ability to direct and guide others, self-supervising; ability to relate to co workers in a close environment; positive attitude; positive work ethic, written communication Skills- basic spelling and grammar; reading and comprehension, personal hygiene and energy, interpersonal skills – communication skills with public, fellow employees, supervisors, and customers, motivation – willingness to learn; caring about seeing the company succeed; understanding what the world is all about; commitment to continues training and learning; critical thinking skills, grooming – good personal appearance.

Unit 5 - Language Workshop

The Reading, Listening, Writing, Speaking Skills will be tested

1. **Reading Skills:**

    Articles from the newspapers, magazines, journals etc. will be given to the students to read aloud thus checking their pronunciation, clarity and their style of reading.

2. **Listening Skills:**

    Passages, Topics, Stories, Speeches of eminent people will be read or played. The students have to listen and their listening skills will be tested.

3. **Writing Skills:**

    a) Students to write on any given topic

    b) Students to compose their own stories

    c) Students will be given a particulars situation i.e. accident, college gathering etc. and asked to write a report

> **4. Speaking Skills:**
>
>   a) Students to speak on any given topic
>
>   b) Narrate a story written by them.
>
> Group discussions in the classroom. This could include debates, discussion on current issues, role-playing.

4. List of Experiments :

- Oral presentation about technical products for five minutes.
- Seminar Presentation/Report writing and presentation on identified topics from science and technical subjects for short duration.
- Group discussion on science and technical topics.
- Organise mock interviews.
- Organise debates.
- Extempore speech for three minutes on a topic.
- Observe a process and reproduce orally in own words for three to five minutes.
- Arrange video recording of presentations for self-feedback.

5.   SUGGESTED LEARNING RESOURCES

S.No.	Author	Title of Books	Year of Publication
1	Wren and Martin	Practical English Grammar	1992
2	John Sinclair (ed.),	Collins Cobuild English Grammar	William Collins & Sons Cp., London 1990
3	Krishna & Mohan,	Effective English Communication	Tata McGraw Hill, New Delhi 2000
4	Randolf, Quirk & Sidney Greenbaum	University Grammar of English	1993
5	Tiwari, N.P. et al ,	Communication Skills for Technical Students – Book	Somaiya Publications, 1995
6	Tiwari, N.P. et al,	A Communicative Grammar of English	Somaiya Publications, 1989

GN 102 ENGINEERING MATHEMATICS- I

1.   RATIONALE

There are variable and constant concepts in the engineering phenomena and problems, which need to be understood, analyze and predict their behaviour. For instance, motion and acceleration of an object under applied known force, effect of temperature and pressure under constant volume, etc. All these situations require modeling of constants and variables into a relationship known as formula (formulating) and solving problems of engineering by substituting the values of constants and variables. Thus mathematics is used to understand, analyse and find solutions. There are some standard principles and formulae, which should be understood by students and apply as per needs of situations in real life.

2. TEACHING AND EXAMINATION SCHEME

Course Code & Course Title	Periods/ Week (In Hours)			Total Credits	Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
GN-102	L	T	P	C	TH	TM	TW	PR/OR	
Engineering Mathematics	4	2	-	6	75	25	-	-	100

Minimum passing % : Theory 40%

Legends:

L-Lecture; ***T*** - Tutorial; ***P*** - Practical; ***C***- Credit;   ***TH***- End Semester Theory; ***TM*** – Test Marks:

PR/OR - End Semester Practical / Oral Examinations; ***TW-*** Term Work

3.   DETAILED COURSE CONTENTS

Unit 0	**Fundamentals of algebraic mathematical operations**

- Use of scientific calculator
- Recall of algebraic operations & formulae
- Solving of simultaneous equations with two variables

Unit 1	**Co-ordinate Geometry/ Analytic Geometry;**

Purposes/Applications of Co-ordinate Geometry. Coordinate systems. *Straight Line-*Distance between two points. Internal & external division of a line. Area of triangle. Slope of line. Angle between two lines. Various forms of equation of line-parallel to axis, point-slope form, slope intercept form, two point form, intercepts form & normal form. General equation of line. Distance of a point from a line. - Equations of circle,   Equations of tangent & normal to circle.

Unit 2   Trigonometry

Purposes/Applications of Trigonometry. Radian. Radian & degree. Area of sector & length of an arc. Trigonometric ratios of any angle & Trigonometric identities. Trigonometric ratio of allied angles, compound angles, & Multiple angles(only 2A). Sum & product formulae. Sine, Cosine rules. Solution of triangles

Unit 3   Limits & Functions

Functions- constants, variables. Kinds of functions (question not to be asked). Concepts of limits- algebraic, trigonometric, logarithmic & exponential functions (No question on method of substitution and Inverse Trigonometric function)

Unit 4   Differential Calculus

Purposes/Applications of Differential Calculus. Definition of Derivative. Derivatives of standard functions-applications. Derivative of sum, difference, product & quotient of a function. Derivative of composite, implicit & parametric functions with reference to - algebraic, logarithmic, trigonometric, inverse circular functions, exponential functions & logarithmic differentiations. Introduction to Second order derivatives.

Unit 5   Application of derivatives

Geometrical meaning of derivatives. Equation of tangent & normal to curves.   Derivatives as rate, motion, related rates. Maxima & minima.

4.   SPECIFICATION TABLE WITH HOURS & MARKS (THEORY)

Unit No.	Topic	Teaching Hours/ Semester	Marks
1	Co-ordinate Geometry	14	20
2	Trigonometry	17	16
3	Limits & Functions	8	12
4	Differential Calculus	15	20
5	Application of derivatives	10	07
		64	75

5. SUGGESTED LEARNING RESOURCES

S.No.	Author	Title of Books	Publication & Year
1.	Deshpande S.P.,	Mathematics for Polytechnics	Griha Prakashan, Pune, 1996 or latest
2.	Grewal B.S;	Engineering Mathematics	Khanna Pub., New Delhi1995 or latest
3.	Prasad, I.B.;	Engineering Mathematics	Khanna Pub., New Delhi1997 or latest
4.	TTTI, Bhopal	Mathematics for Polytechnics Vol. – I & Vol. – II	TTTI, Bhopal Latest
5.	Wartiker P.N.,	Applied Mathematics	Griha Prakashan Pune, 1996 or latest

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GN 103 APPLIED PHYSICS-I

1. RATIONALE:

Being the basis of all engineering branches, the students must acquire knowledge of basic principles; laws and facts of Physics This knowledge will improve their ability to apply it in solving engineering problems and overall growth of their disciplines.

2. TEACHING AND EXAMINATION SCHEME:

Course Code & Course Title	Periods/ Week (In Hours)			Total Credit	Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
GN-103 Applied Physics I	L	T	P	C	TH	TM	TW	PR/OR	150
	4	-	2	6	75	25	50	-	

Minimum passing % : Theory 40%   *Duration of Theory Paper: 3 Hrs.*

Legends:
L-Lecture; **T** - Tutorial; **P** - Practical; **C**- Credit; **TH**- End Semester Theory; **TM** – Test Marks:
PR/OR - End Semester Practical / Oral Examinations; **TW**- Term Work

3. DETAILED COURSE CONTENTS

Unit 1 UNITS & DIMENSIONS Fundamental and Derived Physical Quantities and their SI units. Dimensions and Dimensional formula, Principle of Homogeneity, use of Dimensional Analysis for checking the correctness of an equation. Definition of least count of Vernier Caliper, Micrometer Screw Gauge.
Unit 2 KINEMATICS Vectors and Scalars-Definition, Difference between vectors and scalars, types of vectors with example. Definition - Displacements and distance, Velocity and speed, uniform and average velocity, Uniform acceleration and retardation, problems based on kinematic equations for uniform acceleration. $V = u + at$, $S = ut + \frac{1}{2}at^2$, $v^2 = u^2 + 2as$. Velocity- time diagram, Motion under gravity.

Unit 3   PROPERTIES OF MATTER

Definition of Elasticity, Stress, Strain and Elastic limit. Hooke's Law. Definition of Young's modulus, Bulk modulus, Rigidity modulus. Determination of Young's modulus by Searle's method. Behaviour of wire under continuously increasing stress. Definition of Yield Point, Breaking Stress, and Factor Of Safety. Adhesive and Cohesive forces. Angle of contact. Concept and definition of Surface Tension, Surface Tension by Capillary rise method. Application of Surface Tension. Definition and explanation of Viscosity. Statement of Newton's law of viscosity, Terminal Velocity (no derivation) Stokes Law. Determination of Viscosity by Stokes method. Streamlined and Turbulent flow. Definition of Critical Velocity, Reynolds Number.

Unit 4   HEAT

Definition of specific heat and units of specific heat. Modes of transfer of heat transfer, Conduction, Convection and Radiation. Law of thermal conductivity. Definition of co-efficient of thermal conductivity. Determination of coefficient of thermal conductivity of a good conductor
Statement of Charles's law, Boyle's law and Gay Lussac's law. Derivation of general gas equation.

Unit 5   ELECTROSTATICS

Coulomb's Law of Electrostatics, Electric Field, Intensity of Electric Field, Electric Potential and its unit, Potential difference between two points (no derivation), Potential of a sphere, Potential of Earth, Definition and units of Capacitance, Principle of Capacitor, Capacitors in series, Capacitors in Parallel.

Unit 6   MAGNETISM

Magnetic Effect of Electric current (Oersted's Experiment) Magnetic Field, Intensity of Magnetic Field. Coulomb's Law of Magnetism, Magnetic lines of Force, Magnetic Induction, Expression for Magnetic Induction at the centre of a Circular coil carrying current (no derivation), Force acting on straight conductor placed in Magnetic Field (no derivation).

Unit 7 (A)   LAWS OF FORCES & FRICTION (MECHANICAL AND ALLIED GROUPS)

Triangle law of forces, parallelogram law of forces (expression only), graphical & analytical representation of force, resolution of forces, resolving force into rectangular components.
Definition & concept of friction, types of friction, Force of friction, Laws of static friction, Coefficient of friction, angle of friction (expression only), angle of repose(only qualitative aspects)

OR

UNIT 7(B) : SEMICONDUCTORS (ELECTRONICS AND ALLIED GROUPS)

Energy Band structure of electronic material(conductor , semiconductor and insulator)
Definition of semiconductors, types of impurities added to the semiconductors, intrinsic and extrinsic semiconductors.
Types of semiconductors P- type and N- type, Structure of P- type and N- type,
Extrinsic   semiconductor using pure Si and Ge semiconductors.
Types of carriers; N- type and P- type
Process of recombination of carriers.
Formation of P-N junction and depletion region.

4.SUGGESTED SPECIFICATION TABLE WITH MARKS & HOURS (THEORY)

Unit No.	Unit	Teaching Hours / Semester	Marks
1	Units and Dimensions	5	5
2	Kinematics	9	12
3	Properties of Matter	13	14
4	Heat & Gas Laws	9	10
5	Electrostatics	12	12
6	Magnetism	8	10
7A	Laws of Forces & Friction	8	12
	OR		
7B	Semiconductors	8	12
	Total	**64**	**75**

7A-Mechanical and allied branches   7BFor Electronics and allied branches

5.   SUGGESTED LIST OF EXPERIMENTS

Sr. No.	LIST OF EXPERIMENTS
1	Use of Vernier Caliper
2	Use of Micrometer Screw gauge
3	Determination of Surface tension by capillary rise method using Travelling Microscope.
4	Determination of coefficient of viscosity by stroke's method.
5	Determination of acceleration due to gravity ('g') by simple pendulum.
6	Determination of Young's modulus by Searle's method.
7	Determination of Coefficient of thermal conductivity by Searle's method.
8A	Find resultant force using parallelogram of forces
8B	Draw and interpret band structure of Insulator, Semiconductor and conductor, Band structure of P-type & N-type extrinsic semiconductor, Drawing PN junction.

6. SUGGESTED LEARNING RESOURCES

Sr.No.	Author	Title	Publication and Year
1.	Halliday D and Resnickr	Physics Part-I & II	Latest
2.	Das S.K., Sisodiya M.L., Neher P.K., Kachhawa C.M.,	Physics Part-I & II for 10+2 Students	Latest
3.	B.G. Dhande	Applied physics for polytechnics	Latest
4.	Bhandarkar	Applied Physics for polytechnics	Latest
5.	Saxena HC & Singh Prabhakaer	Applied Physics Vol. I & II	Latest
6.	Rao, B.V.N.	Modern Physics	Latest
7.	R.K.Guar and S.L. Gupta.	Engineering Physics	Latest
8.	B.L. Thereja.	Engineering Technology	Latest
9.	Modern Publishers.	ABC of Physics	Latest
10.	V.K Mehta	Elements of electronic engineering	Latest
11	R S Khurmi	Applied Mechanics	Latest

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GN 104 APPLIED CHEMISTRY

1.   RATIONALE

Applied Chemistry is multi-disciplinary science having wide applications in all the branches of engineering and technology. In simple terms, it is the science of chemical phenomena in various engineering situations. An understanding of the basic concepts of applied chemistry is essential not only for all chemists but also for engineers. Therefore it forms an indispensable base for them. The emphasis is given more on applications of principles of chemistry to engineering situations rather than fundamental principles only. It also develops in the students the habit of scientific enquiry, ability to investigate the cause and effect relationship, ability to interpret and analyze the results under given conditions.

2.   TEACHING AND EXAMINATION SCHEME:

Course Code & Course Title	Periods/ Week (In Hours)				Total Credits	Examination Scheme				Total Marks
						Theory Marks		Practical Marks		
GN-104 Applied Chemistry	L	T	P	C		TH	TM	TW	PR/OR	
	3	-	2	5		75	25	50	-	**150**

Minimum passing % : Theory 40%

Legends:
L*-Lecture;* ***T*** *- Tutorial;* ***P*** *- Practical;* ***C****- Credit;* ***TH****- End Semester Theory;* ***TM*** *– Test Marks:*
PR/OR *- End Semester Practical / Oral Examinations;* ***TW****- Term Work*

3.   DETAILED COURSE CONTENTS

Unit 1	Atomic Structure and Chemical Bonding

Fundamental particles and their characteristics, Energy levels - definition, designation of energy levels, Bohr- Bury's laws for distribution of electrons in shells (1st three laws only), concept and shape of orbitals (s and p only), Quantum numbers-designation, definition, values, Aufbau and Pauli's Exclusion Principle, Hund's rule of maximum multiplicity, orbital electronic configuration of elements with atomic number 1 to 20, Lewis and Langmuir concept of stable configuration. Concept of electrovalent, covalent and co-ordinate bond, Formation, properties and examples of electrovalent compounds ($NaCl$, MgO, $CaCl_2$) covalent compounds (Cl_2, O_2, N_2, CO_2)and coordinate compounds (O_3, SO_2).

Unit 2   Electrochemistry

Arrhenius theory of electrolytic dissociation., Degree of Ionisation- definition, factors affecting degree of ionisation , Nature of solute and solvent, concentration of solution, and temperature, Strong and weak electrolytes - definition and examples, Concept of the terms involved in electrolysis –conductor, insulator, electrolyte, non-electrolyte, electrolysis, electrodes, electrolytic cell, cathode, anode and current density, electrochemical series- concept and significance. Mechanism of electrolysis, Ionisation, primary reactions at the cathode, activity series of cations, primary reactions at the anode, activity series of anions, electrolysis of i. Fused NaCI using carbon electrodes, ii. aqueous NaCI using platinum electrodes iii. aqueous $CuSO_4$ using platinum electrodes iv. aqueous $CuSO_4$, using copper electrodes);

UNIT 3   Water and its treatment

Hard and soft water, types of hardness and its causes, disadvantages of hardness of water (i) for industrial use - dyeing, textile, sugar, paper, bakeries, (ii) in boilers for steam generation with special reference to sludge and scale formation (no chemical equations), zeolite and ion exchange process for water softening, desalination by electro dialysis and reverse osmosis, concept of pH

Unit 4   Corrosion and Its Control

Definition, Atmospheric corrosion (direct chemical corrosion) - definition, Oxidation corrosion, the nature of the oxide film, stable, unstable and volatile, mechanism of oxidation corrosion, corrosion due to other gases. Immersed corrosion (electrochemical corrosion) - definition, factors necessary for electrochemical corrosion , Galvanic cell corrosion, concentration cell corrosion- metal ion concentration and differential aeration. Mechanism of electrochemical corrosion- Hydrogen evolution mechanism, Oxygen absorption mechanism, Protection of metals from corrosion; galvanising, tinning, metal spraying , proper designing , using pure metals, using metal alloys, Cathodic protection- sacrificial anode and impressed current .Modifying the environment- De-aeration, De-activation, De-Humidification and alkaline neutralization.

Unit 5   Lubricants
Definition, functions of Lubricants, Types of Lubrication, Fluid Film, Boundary, Extreme Pressure, Classification of Lubricant - solid, semi- solid, liquid synthetic oils. Characteristics of Lubricants, Definition and Its significance -Viscosity. Viscosity Index, Flash and Fire Point, Oiliness, Pour Point, Volatility, Acidity, Emulsification and Saponification Value. Selection of Lubricants for Delicate Instruments, High Pressure and Low Speed Machines, Extreme Pressure and Low Speed Machines, Mechanisms of Lubrications.

4. SUGGESTED SPECIFICATION TABLE WITH MARKS & HOURS (Theory)

Unit No.	Name of the unit	Hours	Marks
1	Atomic Structure and Chemical bonding	10	15
2	Electrochemistry	08	13
3	Water and its treatment	09	15
4	Corrosion and its control	16	25
5	Lubricants	05	07
	Total	**48**	75

5. SUGGESTED LIST OF EXPERIMENTS

Sr. No.	Unit No.	List of Experiments
1.		Double titration of acid and base using phenolphthalein
2.		Double titration of acid and base using methyl orange
3.		Redox titration of potassium permaganate, ferrous sulphate and oxalic acid.
4.		Determination of degree of hardness of water by EDTA method
5.		Determination chloride content of water by Mohr's method
6.		Determination of total alkalinity of water sample
7.		Titration of strong acid and strong base using pH meter
8.		Determination of conductivity of water
9.		Titration of strong acid and strong base using conductometer
10.		Corrosion susceptibility of aluminium to acid or base.

6. SUGGESTED LIST OF ACTIVITIES

S.No.	Title
1.	Quiz on Electronic configuration of atoms.
2.	Demonstration of process of electrolysis
3.	Demonstration of purification of water by domestic/economical method.
4.	Identification and application of lubricants in different equipment/glasswares used in different laboratories
5.	Visit to some metallurgical industries for demonstration of different processes of metallurgy.
6.	Preparation of chart of different alloys of steel and their uses
7.	Seminar on different aspects of fuel, properties and usages
8.	Use of pH paper for testing different samples of water, blood etc.
9.	Demonstration and use of different samples of paints, varnishes, drying oils, pigments, thinners, dryers, fillers, plasticizers and anti-skinning agents.

7. SUGGESTED LEARNING RESOURCES

Sl. No.	Author	Title	Publication and Year
1.	M.M. Uppal	A text book of Engineering Chemistry,	Khanna Publishers
2	V.P. Mehta	A textbook of Engineering Chemistry,	Jain Bros. Delhi
3	S.N. Narkhede	A Textbook of Engineering Chemistry	Nirali Prakashan
4	R.A. Banawat, S.K. Mahajan, S.K.Mehta	Textbook of Applied Chemistry	India Book House
	V.S. Godbole	Applied Chemistry	
5	R.S. Sharma	Textbook of Engineering Chemistry	Khanna Pubnlishers
	P.C. Jain and M. Jain	Engineering Chemistry	
6	J.C. Kuriacose and J. Rajaram	Chemistry in Engineering	Tata McGraw Hill Publishing Co.Ltd., New Delhi
7	Dr.S. Rabindra and Prof.B.K. Mishra	Engineering Chemistry:	Kumar and Kumar Publishers (P) Ltd., Bangalore -40
8	S.S.Kumar	A Text book of Applied Chemistry-I	Tata McGraw Hill, Delhi
9	Sharma	A Text book of Applied Chemistry -I	Technical Bureau of India, Jalandhar
10	S.S.Dhara	A Textbook of Engineering chemistry	S.Chand & Company, New Delhi
11	Dr. G.H. Hugar	Progressive Applied Chemistry – I & II	Eagle Prakashan, Jalandhar

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GN 204 ENGINEERING DRAWING

1.   RATIONALE:

Drawing is a graphical language of engineering field. Engineering technician irrespective of his field of operation in an industry is expected to possess a thorough understanding of drawing, which includes clear spatial visualization of objects and the proficiency in reading and interpreting a wide variety of engineering drawings. It is the skill, which translates an engineering idea into lines and dimensions on a piece of paper. Besides this he is also expected to possess a certain degree of drafting skill- depending upon his job functions-in his day-to-day activities. This course of Engineering Drawing for Diploma courses is aimed at developing basic knowledge and skills of engineering drawing and use of computer in the field of Engineering Drawing.

2.   TEACHING AND EXAMINATION SCHEME:

Course Code & Course Title	Periods/ Week (In Hours)			Total Credits	Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
GN-204 Engineering Drawing	L	T	P	C	TH	TM	TW	PR/OR	100
	2	-	4	6	-	-	50	50	

Minimum passing % : Theory 40% and Practical 40%   *Duration of Theory Paper: 3 Hrs.*

Legends:

L*-Lecture;* ***T*** *- Tutorial;* ***P*** *- Practical;* ***C****- Credit;*   ***TH****- End Semester Theory;* ***TM*** *– Test Marks:*

PR/OR *- End Semester Practical / Oral Examinations;* ***TW-*** *Term Work*

3. DETAILED COURSE CONTENT

Unit 1   Introduction
- Importance of Engineering drawing as a means of communication.   - Introduction to drawing equipment, instruments and their uses.   - Planning of drawing sheet as per I.S. 696 - 1972.   - Indian standard practices of laying out and folding of drawing   - Different types of lines used in engineering drawing.   - Importance of scale in Engineering Drawings.   - Lettering

Unit 2	Dimensioning techniques and standard conventions

- Methods of dimensioning, Dimensioning terms and notation (use of I.S. code 696 and 2709), General rules for dimensioning, Dimensioning of cylinder, holes, arcs of circle, narrow space, angles, counter sunk hole, screw thread, taper etc.
- Conventional representation of various materials.

Unit 3	Engineering Curves & Shapes

- Construction of an Equilateral and Isosceles triangle,Square,Rhombus,Regular pentagon & Regular hexagon given distance across the corners/ flats and given length of a side using general method of construction
- Types of Engineering curves
- Construction of Engineering curves like
  - Ellipse- by focus & directrix method and arcs of circles method
  - Parabola- by focus & directrix method and rectangule or oblong method
  - Hyperbola- by transverse axis & Focus and directrix method
  - Cycloid- by generating circle rolling on a straight line
  - Involutes of a triangle ,circle & pentagon
  - Draw normal & tangents to the above curves from given point on the curve
- Practice problems of drawing various engineering curves

Unit 4	Orthographic projection

- Definitions of various terms associated with orthographic projections.
- Planes of projections.
- Concept of Quadrants.
- First and third angle method of projection.
- Projection of points
- Projection of lines

    (i)   Parallel to both Principal planes

    (ii)   Parallel to one and Perpendicular to other Principal plane.

    (iii)   Inclined to one plane and parallel to other plane.

- Projection of Triangle, Square, Rhombus, regular Pentagon when inclined to one principal plane & perpendicular to other plane.

- Introduction to the following solids
    Cylinder, cone, cube.

    Right regular solids such as

  (i) Prism: Triangular & Square
  (ii) Pyramid: Square & Pentagonal.
      - Projections of above mentioned solids when axis is inclined to one principal plane & Parallel to other principal plane.
      - Conversion of simple pictorial views into orthographic views.

- Practice problems on projection of points, lines and planes.
- *Problems where one end of the line is in one quadrant & other end in other quadrant and traces are to be excluded.*
- *Problems where apparent projection of plane are given, true shape & slope angle are to be drawn are excluded.*

Unit 5   Section of solids

- Concept of sectioning planes
- Auxiliary planes and true shape of section.
- Drawing projections and section of solids like square prism, square pyramid, pentagonal pyramid, cylinder and cone with sectioning plane inclined to one principal plane and Perpendicular to the other principal plane (Axis of solid perpendicular to one principal plane and parallel to the other)

Unit 6   Development of lateral surfaces

- Concept and importance of surface development in the engineering field.

  Methods of development of surfaces-Radial & Parallel line method.

  Development of surfaces for the following right regular solids-
- Cylinder
- Prism
- Cone
- Pyramids
- Development of solids standing on its base & cut by a plane inclined to either VP/HP and   perpendicular to the other is also included.
- *Practice problems on above with top & bottom of the solid is excluded*

Unit 7   Isometric Views

- Limitations of orthographic projections.
- Procedure for preparing isometric projections.
- Difference between Isometric projection & Isometric view.
- Isometric view of geometrical solids and simple machine parts.
- Conversion of orthographic views into isometric views.
- Construction of Isometric view for any real object. Conversion of orthographic views of simple components into isometric views.

4. SUGGESTED SPECIFICATION TABLE WITH MARKS & HOURS

Unit No.	Unit	Teaching Hours / Semester
1	Introduction	**1**
2	Dimensioning techniques & standard conventions	1
3	Engineering Curves & Shapes	4
3	Orthographic projections	**13**
4	Section of solids	3
5	Development of surfaces	4
6	Isometric projections	2
-	Revision	4
	Total	**32**

5. SUGGESTED LIST OF ACTIVITIES

Following shall be the list of sheets to be prepared as Engineering drawing lab work

Sheet No.	TITLE	Contents	Hours
1.	TYPES OF LINES, LETTERING, DIMENSIONING.	All types of lines, Single stroke vertical capital letters, Methods of Dimensioning-Aligned & unidirectional System, Conventional representation of materials.	4
2.	GEOMETRICAL CONSTRUCTIONS	Construction of Equilateral and Isosceles triangle, Square, Rhombus, Regular pentagon & hexagon	4
3.	ENGINEERING CURVES	Construction of ellipse, parabola, hyperbola by given methods. Involutes, cycloid. Draw normal and Tangent to curves.	8
4.	PROJECTION OF POINTS & LINES	Drawing projection of points in all 4 quadrants. Drawing of projections of lines in following positions (i) Parallel to both Principal planes (ii)Parallel to one and Perpendicular to other Principal plane. (iii) Inclined to one plane and parallel to other plane.	6
5	PROJECTION OF PLANES	Drawing the projection of Triangle square, Rhombus, regular Pentagon when inclined to one principal plane & perpendicular to other plane.	6
6	PROJECTIONS OF SOLIDS	Drawing projection of following solids Cylinder, cone, cube. Right regular solids such as Prism: Triangular & Square,Pyramid: Square & Pentagonal,when axis is inclined to one principal plane & parallel to other principal plane.	8
7	ORTHOGRAPHIC PROJECTIONS	Simple problems on conversion of pictorial into orthographic views.(atleast 2 problems each in 1st angle and 3rd angle)	4
8	SECTIONS OF SOLIDS	Drawing projections and section of solids like square prism, square pyramid, pentagonal pyramid, cylinder and cone with sectioning plane inclined to one principal plane and Perpendicular to the other principal plane (Axis of solid perpendicular to one principal plane and parallel to the other)	8

9.	DEVELOPMENT OF LATERAL SURFACES	Draw the Development of surfaces for the following right regular solids- Cylinder, Cone, Prism & pyramids (square, triangular, pentagonal).	8
10	ISOMETRIC VIEWS	Conversion of orthographic views of simple components into isometric views.	8

6. SUGGESTED LEARNING RESOURCES

S.No.	Author	Title	Publisher
1.	BIS, India	IS. 696. (Latest revision).	BIS, India
2.	N.D. Bhatt	Engineering Drawing	Charoter Publisher,Anand
3.	R. K. Dhawan	Engineering Drawing & Machine Drawing	Kumar
4.	R.B. Gupta	Engineering Drawing	Satya Prakashan, Delhi
5.	P.S. Gill	Geometrical Drawing	Ketson & Sons
6.	P.S. Gill	Machine Drawing	Ketson & Sons
8.	TTTI, Bhopal	Work Book in Mechanical Drafting	TTTI, Bhopal
9.	T. Jeyapoovan	Engineering Drawing & Graphics Using AutoCAD 2000	Vikas Publishing House Pvt. Ltd, New Delhi.
10	N.D. Bhatt	Machine Drawing	Charoter Publisher,Anand

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SEMESTER II

GN-105 - COMPUTER FUNDAMENTALS & APPLICATIONS

1. RATIONALE

The course on Computer Fundamentals & Applications will enable the students to understand the basic concepts related to computer fundamentals, Data Representation & Number Systems, Computer Languages, operating system, Computer Software and Internet Technology and will be able to apply the same in different areas of electronics engineering. Laboratory practice will help in developing the requisite skills.

2. TEACHING AND EXAMINATION SCHEME

Course Code & Course Title	Periods/ Week (In Hours)			Total Credits	Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
GN-105	L	T	P	C	TH	TM	TW	PR/OR	
Computer Fundamentals & Applications	-	-	4	4	-	-	50	50	100

Minimum passing % : Theory 40%

Legends:
L*-Lecture;* ***T*** *- Tutorial;* ***P*** *- Practical;* ***C****- Credit;* ***TH****- End Semester Theory;* ***TM*** *– Test Marks:*
PR/OR *- End Semester Practical / Oral Examinations;* ***TW****- Term Work*

3. DETAILED COURSE CONTENTS

UNIT 1   Computer Fundamentals

1.Introduction to Computer

2. History, Evaluation, Classification and Generations of computers

3.Organisation of the Computer System

4. Hardware

    Input device, Memory or Storage Devices, Processing Unit, Output device, Scanner

    Printers.

5. Communication technology and evolution of communication mediums

6. Software

       System software

       Application Software

       Shareware

       Freeware

       Open Source

7. Concept of Computer Viruses

       Definition

       Types

       Preventive Measures

UNIT 2   Operating System

1. Introduction to operating system

  Definition Functions , Types, Examples, Comparisons of Various Operating Systems

2. Windows Operating System-

GUI(Graphical user Interface), desktop, Start Menu, Task Bar, Status Bar, Scroll Bar, Title Bar, Toolbar, Menu Bar. File Organization: Creating, Saving, Deleting, Renaming, Cutting, Pasting, copying, moving, Searching Files and Folders. Applications: My Computer, Recycle Bin, Windows Explorer, Control Panel.

UNIT 3   Application Software

1. MS Word

- Introduction
  - o Starting MS Word
  - o Creating, saving and opening a document
  - o Editing commands-Cut, Copy, Paste, Paste Special
  - o Text Formatting, Bullets and Numbering, Borders and shading etc.
  - o Tabs, Style, Views
  - o Insert Table, Picture, OLE Objects, etc.
  - o Checking Spelling and Grammar, Thesaurus
  - o Page Layout & Printing
  - o Mail Merge**.**

2. MS Excel

- o Create, Save and open a worksheet
- o Entering data – text, numbers and formulae in a worksheet, Hyperlink
- o Navigating within a Worksheet and also between different Worksheets of a Workbook
- o Inserting and deleting cells, rows and columns in a worksheet
- o Select, copy, paste and delete cell data within the worksheet

o Using various formulae and inbuilt functions like Trigonometric, Statistical, Logical, Data Sorting
o Update worksheets using special tools like spell check and auto correct.
o Setup the page and margins of worksheets for printing
o Enhance worksheets using charts & graphs

3. MS Power Point

o Introduction and starting the program
o Starting a presentation
o Adding new slide
o Saving and Opening presentation
o Text formatting options
o Copy, Move and delete slides and text
o Applying designs
o Using Animations
o Slide Transitions, Hyperlink
o Insert clip art
o Viewing the presentation

UNIT 4   The Internet

Networks, Advantages of networking, Types of networks.

o History and Functions of the Internet
o Working with Internet
o Web Browsers, World Wide Web, Uniform Resources Locator and Domain, Names, Issues related to web security.
o Uses of Internet
o Search for information, Email, Chatting, Instant messenger services, News Group, Teleconferencing, Video-Conferencing, E-Commerce and M-Commerce.

Email

o Manage an E-mail Account
E-mail Address, Configure E-mail Account, log to an E-mail, Receive E-mail, Sending mails, sending files an attachments and Address Book

o Downloading Files

4. SUGGESTED LIST OF EXPERIMENTS

S. No.	Unit No.	List of Experiments
1	**1**	Identify Input and output devices
2	**1**	Calculate capacity of different storage device
3	**2**	Identify OS and different application software s loaded on that OS

4	3	Load Windows operating system. Configure and load relevant device drivers
5	4	Practice on Windows 95/98/2000 ; o Starting Windows, Exploring the desktop, Arranging windows, My Computer, The start button, Creating Shortcuts, Practice on moving and sizing of windows o Study of file organization: creating, copying, moving, renaming and deleting o Practice on Windows Accessories- Notepad, Word Pad and Paint o Editing document & formatting text, Previewing and printing document/Image file o Practice on Windows Explorer o Recycle bin o Shutting down windows
6	4	Practice on MS-Word ; o Create and format document o Edit and Modify text- changing font size type and style o AutoText, AutoComplete, AutoCorrect, grammar and spellchecker, Find and replace of text o Open save and print a document o Insert, modify table o Insert graphics o Mail merge
7	5	Practice on Microsoft Excel o Create, save & format worksheet o Open and save worksheet file o Edit & modify data o Use formula and functions o Split windows and freeze pans o Data sort and security features o Create, edit, modify and print worksheet. o Create and edit charts
8	5	Practice on PowerPoint o Create, edit, insert, move, slides o Open and save presentation o Insert picture, audio slide layout, action button o Apply custom animation o Present slide show
9	6	Practice on: o Identification of type of Account. o Connecting to internet o Dial up access o Web browsing o Searching websites o Information searching o Email services o Creating email accounts & Receiving and sending mails

5. SUGGESTED LEARNING RESOURCES

S.No.	Author	Title of Books	Publication & Year
1	Norton Peter	Introduction to Computers (special Indian edition)	Tata McGraw Hills New Delhi, 6th Edition, 2005 ISBN: 0070593744
2	Kahate Atul	Information Technology	Tata McGraw Hills New Delhi, ISBN-13:9780070593718
3	Williams Stalling	Using Information technology: A Practical Introduction to Computers and Communication	Tata McGraw Hills New Delhi,
4	Curtin	Information Technology: The Breaking Wave (book only)	Tata McGraw Hills New Delhi, ISBN:0074635581
5	Ravichandran, D	Introduction to Computers and Communication	Tata McGraw Hills New Delhi, ISBN: 0070435650
7	Douglas E.	The Internet Book	Prentice Hall of India, New Delhi, 3rd Edition, ISBN: 812032286X
8	Basanbhara S.K.	Computer Today	Nita Mehta Publications, 2003 ISBN: 8186340742

GN 106 BASIC ENGINEERING SKILLS

1. **Rationale**:

A technician is expected to work on the shop floor. It therefore becomes essential for him to have a through exposure to safety aspects, fire fighting, first aid as he is the guide for the skilled and unskilled personnel working under him. From technical knowledge and skills point of view he is also expected to have knowledge on proper ways of using various hand tools, measuring devices etc. in addition to other engineering skills.

The course on Basic Engineering skills is aimed at providing him the knowledge and skills in all those areas through shop instructions, demonstrations and skill development exercises. This course is also aimed at providing the student the exposure to engineering equipment which will help him to assimilate the teaching which takes place at higher semesters.

2. **Teaching And Examination Scheme**

Course Code & Course Title	Periods/ Week (In Hours)			Total Credits	Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
	L	T	P	C	TH	TM	PR/OR	TW	
(GN106) Basic Engineering Skills	0	0	6	6	-	-	50	100	150

Legends: L-Lectures; P-Practical; C-Credits; TH-End Semester Theory; TM-Test Marks;

PR/OR-End Semester Practica/Oral Examinations TW- Term Work

3. **Detailed Course Contents**

Unit 1: General Safety, Housekeeping, Fire Fighting & First Aid   Introduction to General Safety aspects of engineering workshop, meaning and importance of housekeeping, possible fire hazards, fire triangle, types of fire extinguishers – selection and use, basic knowledge of first aid with specific inputs on cuts, burns, electric shocks, artificial respiration, handling emergencies.
Unit 2: Fitting Workshop Practice   Introduction to the trade, Introduction to various hand Tools, Measuring and Marking Tools, cutting tools, Holding tools, Striking tools, Types of files and filing methods. Drill bits and drilling Processes, using portable and pillar drilling machine. Operations performed in fitting shop such as measuring, marking, chipping, filing, grinding, sawing, drilling tapping and deing. Use of spirit level and plumb bob.
Unit 3: Carpentry Workshop Practice   Introduction to the trade, types of wood and its characteristics, forms of wood, defects in timber and its identification, wood working hand tools, wood working processes. Different types of joints and their usage. Introduction to wood working machines- lathe , circular saw, band saw, wood planner, universal wood working machine.
Unit 4: Electrical Workshop Practice

Brief introduction to power distribution, different hand tools used in electrical trade, different measuring instruments. Making of cable joints. Measurement of current, voltage, frequency and Power Consumption. Connecting and starting of Induction Motor. Changing of Direction of rotation of induction motor. Introduction to commonly used electrical Fittings (Domestic & Industrial). Reading of simple electrical drawings.

Unit 5: Basic Electronics Workshop Practice
Introduction to basic electronic components, Introduction to use of Multimeter in measuring voltage, current, resistance, capacitance. Checking of connectivity. Introduction to soldering process. Soldering Irons- Types and wattage. Reading of basic electronic circuits.

Note: during first 20 minutes of the practical session, Instructor shall provide theoretical knowledge as prescribed in the curriculum. (Shop Talk)

Unit No.	Topic	Hours/ Semester
1.	General Safety, Housekeeping, Fire Fighting & First Aid	06
2.	Fitting Workshop Practice	36
3.	Carpentry Workshop Practice	18
4.	Electrical Workshop Practice	18
5.	Basic Electronics Workshop Practice	18
	Total	**96**

GN201 ENGINEERING MATHEMATICS- II

1. **RATIONALE :**

Mathematics is the backbone of all areas of engineering and technology and hence technician / engineers need to study relevant theories and principles of mathematics to enable them to understand and grasp the concept of advance courses of the curriculum. With above in mind, the necessary content for the engineering mathematics is derived to understand advance use of mathematics in solving engineering problems.

2. **TEACHING AND EXAMINATION SCHEME :**

Course Code & Course Title	Periods/ Week (In Hours)			Total Credits	Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
	L	T	P	C	TH	TM	TW	PR/OR	
GN-201 Engineering Mathematics-II	4	2	-	6	75	25	-	-	100

Minimum passing % : Theory 40%   *Duration of Theory Paper: 3 Hrs.*

Legends:
L-Lecture; *T* - Tutorial; *P* - Practical; *C*- Credit;   *TH*- End Semester Theory; *TM* – Test Marks:
PR/OR - End Semester Practical / Oral Examinations; *TW*- Term Work

3. **DETAILED COURSE CONTENT :**

Unit 1   Determinants   Determinants of the second order and third order, solutions of equations in two or three variables using Cramer's Rule
Unit 2   Binomial Theorem - Binomial Theorem for a rational index, general term of binomial expansion, middle term (s).
Unit   3   Mensuration - Volume and surface area of - Prism, pyramid, frustrum of a sphere, frustrum of pyramid, frustrum of cone, Area and volume by Simpsons Rule
Unit 4   Matrices   Definition and Notations,   Elements of Matrix, Types of matrices, Special matrices - Square, Diagonal, Row, Column, Scalar Unit, Zero or null, upper and lower triangular matrices, Symmetric, Skew symmetric matrices . Addition, Subtraction and multiplication of matrices, Inverse of matrix using Adjoint method only Application of matrices in solving simultaneous equations in 2 or 3 variable.
Unit 5 Integral Calculus   Definition, fundamental properties. Methods of Integration - Integration by substitution, Integration by parts, Integration by partial fractions.. Definition of Definite Integral Properties of definite integrals, Application of integration**,** area under a plane curve, volume of revolution.(simple sums only)
Unit 6 Differential Equations

Definition, order and degree of a differential equation, solutions of differential equations of first order and first degree-variable separable type only. Second order differential equation of type $d^2y/dx^2 = f(x)$ only, Application of differential equation in engineering problems
Unit 7   Statistics (Mechanical and Allied Engg. Branches) . Measures of central tendency for grouped and ungrouped data - Mean, Median and Mode . Measures of dispersion for grouped and ungrouped data -range , mean deviation, standard deviation, variance and co-efficient of variation
OR
Unit 7   Complex Numbers. (Electronics engg and Allied branches) Definitions, Argand diagrams , polar form of a complex number, Addition, Subtraction, Multiplication & Division of a complex number. Exponential and circular function, De-moivres theorem, roots of a complex number- Cube roots of unity, n th roots of unity, , hyperbolic functions

4.   SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (THEORY):

Unit No.	Topic	Teaching Hours/ Semester	Marks
1.	Determinants	5	7
2.	Binomial Theorem	7	10
3.	Mensuration	7	10
4.	Matrices	11	08
5.	Integral Calculus	17	20
6.	Differential equations	08	10
7.	Statistics	09	10 $
OR			
7	Complex Numbers	09	10 #
	Total :	64	75

$- for Mechanical and allied branches

 # - For Electronics and allied branches

5. SUGGESTED LEARNING RESOURCES :

S.No.	Author	Title of Books	Publication & Year
1.	Deshpande S.P,	Mathematics for Polytechnics	Griha Prakashan, Pune, 1996 or latest
2.	Grewa, I B.S;	Engineering Mathematics	Khanna Pub., New Delhi1995 or latest
3.	Prasad, I.B.;	Engineering Mathematics	Khanna Pub., New Delhi1997 or latest
4.	Wartiker P.N.,	Applied Mathematics	Griha Prakashan Pune, 1996 or latest

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GN 202 APPLIED PHYSICS-II

1. RATIONALE:

Physics is one of the basic building blocks for engineering sciences. Therefore, the students need to describe and explain the basic principles, laws & facts of physics. These skills will enhance their ability to apply it in solving engineering problems related to their respective branches of engineering

2. TEACHING AND EXAMINATION SCHEME:

Course Code & Course Title	Periods/ Week (In Hours)			Total Credits	Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
GN-202 Applied Physics-II	L	T	P	C	TH	TM	TW	PR/OR	150
	4	-	2	6	75	25	50	-	

Minimum passing % : Theory 40% and Practical 40%   *Duration of Theory Paper: 3 Hrs.*
Legends:
L-*Lecture;* **T** - *Tutorial;* **P** - *Practical;* **C**- *Credit;*   **TH**- *End Semester Theory;* **TM** – *Test Marks:*
PR/OR - *End Semester Practical / Oral Examinations;* **TW**- *Term Work*

3.   DETAILED COURSE CONTENTS

Unit 1   FORCE, WORK, POWER, AND ENERGY Definition of Force and its units. Types of Forces with example- Direct, Remote action e.g. Gravitational Force, Magnetic Force, Electric Force. Effect of Forces on body-External, Internal. Work-definition and units, Graphical Representation of workdone, Energy definition and units. Types of Mechanical Energies- K.E. & P.E. Law of Conservation of Energy, Total Energy, Power-definition and units, Power (Force X Velocity)
Unit 2   CURRENT ELECTRICITY Ohms law, General equation of Ohms law, Factors affecting resistance, specific resistance and units. Effect of temperature on resistance, Law of resistance in series and parallel. Internal resistance and EMF of the cell. Potential drop along a uniform wire. Principle of potentiometer. Comparison of EMF of a given cell by single cell method. Camparision of EMF of a given cell by sum and difference method. Use of meter bridge to determine the unknown resistance. Definition of Electric power and energy in d.c. circuit. Concept of Kilowatt hour, calculation of energy bills.

Unit 3	ELECTROMAGNETISM

Electromagnetic Induction, Faraday's Laws of Electromagnetic Induction, Lenz's Law, Self Induction & Mutual Induction.

Unit 4	LOGIC GATES

Introduction to Binary Number System, Concept of '0' and '1' in Binary System. Binary equivalent of Decimal numbers from 0 to 10
Logic Gates: 1. 'NOT' Gate , 2. 'OR' Gate 3. 'AND' Gate. NAND , NOR GATE Their Logic Representation & Truth Table

Unit 5	SOUND

Definition and examples of Free and Forced Vibrations, Resonance. Determination of velocity of sound using Resonance Tube.
Definition of Beats (No derivation),   Beat frequency & application of Beats, Definition of Echo, Reverberation & Reverberation time, Sabine's Formula, Acoustical Planning of an Auditorium. Factors affecting Reverberation Time, Ultrasonic waves, Piezo Electric Effect, Applications of Ultrasonic waves.

Unit 6	CIRCULAR MOTION AND GRAVITATION

Defination of Uniform Circular Motion, Angular Displacement, Angular Velocity, Relation between Linear and Angular velocity, Defination and concept of Centripetal and Centrifugal Force.(No derivation), Expression for velocity of a vehicle moving on a curved Horizontal Road, Expression for Angle of Banking & Super Elevation of Road. Newton's Law of Gravitation, Force of Gravity. Acceleration due to Gravity, Expression for Acceleration due to gravity.

Unit 7(A) FUNDAMENTAL CONCEPTS OF SIMPLE MACHINES
                (MECHANICAL AND ALLIED GROUPS)
Definition of efforts, velocity ratio, mechanical advantage & efficiency of machine and their relationship. Laws of machines, examples of simple machine, definition of ideal machine, systems of pulleys (First & Second). Determination of velocity ratio ,Mechanical Advantage & Efficiency.

<div align="center">OR</div>

Unit 7 (B) RECTIFIERS
                (ELECTRONICS AND ALLIED GROUPS)
V-I characteristics of P-N junction. Diode as a rectifier. Half wave rectifiers, working, input and output waveforms, percentage regulation,$((V_{NL} - V_{FL}) / V_{FL}) \times 100$
Full wave rectifier with centre tap transformer, working, input and output waveforms, percentage regulation
Bridge rectifier, working, input and output waveforms, percentage regulation

4.   SUGGESTED SPECIFICATION TABLE WITH MARKS & HOURS(THEORY)

Unit No.	Unit	Teaching Hours / Semester	Marks
1	FORCE, WORK,POWER & ENERGY	10	12
2	CURRENT ELECTRICITY	16	16
3	ELECTROMAGNETISM	6	8
4	LOGIC GATES & AWARNESS TO NANO SCIENCE	4	6
5	SOUND	8	9
6	CIRCULAR MOTION & GRAVITATION	10	12
7A	FUNDAMENTAL CONCEPTS OF SIMPLE MACHINES	10	12
	OR		
7B	RECTIFIERS	10	12
	Total	**64**	**75**

7A- for Mechanical and allied branches   7B- For Electronics and allied branches

4. LIST OF EXPERIMENTS

1. Determination of Specific resistance of a material wire by Voltmeter and Ammeter.
2. Determination of Internal resistance of a given cell by using Potentiometer.
3. Calibration of Voltmeter by using Potentiometer.
4. Comparison of E.M.F. of two given cells by single cell method using potentiometer.
5. Determination of specific resistance by meter bridge.
6. Verify the law of resistances in series by meter bridge.
7. Verify the laws of resistances in parallel by meter bridge.
8. Determination of velocity of sound by Resonance tube.

5. SUGGESTED LEARNING RESOURCES

S.No.	Author	Title	Publication and Year
1.	Halliday D and Resnickr	Physics Part-I & II	Latest
2.	Das S.K., Sisodiya M.L., Neher P.K., Kachhawa C.M.,	Physics Part-I & II for 10+2 Students	Latest
3.	B.G. Dhande	Applied physics for polytechnics	Latest
4.	Bhandarkar	Applied Physics for polytechnics	Latest
5.	Saxena HC & Singh Prabhakaer	Applied Physics Vol. I & II	Latest
6.	Rao, B.V.N.	Modern Physics	Latest
7.	R.K.Guar and S.L. Gupta.	Engineering Physics	
8.	B.L. Thereja.	Engineering Technology	
9.	Modern Publishers.	ABC of Physics	
10.	V.K Mehta	Elements of Electronic Engineering	

GN203 ENVIRONMENTAL STUDIES

1. RATIONALE

Due to various developmental activities carried out by man, our environment is continuously being abused and getting degraded. The air we breathe, water we drink, food we eat, land we live on, all are getting spoiled day by day. The purity of our environment is of prime importance for survival of human race on the earth. Man should not go for developmental activities at the cost of environment. This subject has been introduced in the Diploma Programme to bring about awareness towards the environmental purity amongst the students.

2. TEACHING AND EXAMINATION SCHEME

Course Code & Course Title	Periods/ Week (In Hours)			Total Credits	Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
	L	T	P	C	TH	TM	TW	PR/OR	
GN203 Environmental Studies	3	-	-	3	75	25	-	-	100

Minimum passing %: Theory 40%   *Duration of Theory Paper: 3 Hrs.*

3. DETAILED COURSE CONTENT

Unit 1 Multidisciplinary Nature Of Environmental Studies. Definition, scope and importance. Need for public awareness.
Unit 2   Natural Resources Renewable and nonrenewable resources. Natural resources and associated problems. • Forest resources: Use and overexploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people. • Water resources: Use and over-utilization of surface and ground water, floods, droughts, conflicts over water, dams- benefits and problems. • Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources. Case studies. • Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer & pesticide problems, water logging, salinity, case studies.

- Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.
- Land resources: Land as a source, land degradation, man induced land slides, soil erosion and desertification.

Role of an individual in conservation natural resources. Equitable use of resources for sustainable life styles.

Unit 3 Ecosystems.

Concept of an ecosystem. Structure and function of an ecosystem. Producers, Consumers and Decomposers. Energy flow in the ecosystem. Ecological succession. Food chains. Food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of following ecosystems: (a) Forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) Aquatic ecosystems (Ponds, streams, lakes, rivers, oceans, and estuaries).

Unit 4.   Biodiversity And Its Conservation.

Introduction – Definition: genetic, species and ecosystem diversity.

Biogeographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, national and local levels. India as a mega-diversity nation. Hot spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wild life, man-wild life conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.

Unit 5. Environmental Pollution.

Definition. Causes, effects and control measures of: Air pollution, water pollution, soil pollution, marine pollution, noise pollution, Thermal pollution, Nuclear hazards. Solid waste management: Causes, effects and control measures of urban and industrial wastes. Role of individual in prevention of pollution. Pollution case studies. Disaster management: flood, earthquakes, cyclone and landslides.

Unit 6. Social Issues And The Environment.

From unsustainable to sustainable development. Urban problems related to energy. Water conservation rainwater harvesting, watershed management. Resettlement and rehabilitation of people; its problems and concerns; case studies. Environmental ethics: Issues and possible solutions. Climatic change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust; case studies. Wasteland reclamation. Consumerism and waste products. Environmental protection act. Air (Prevention and control of pollution) Act. Water (Prevention and control of pollution) Act. Wildlife protection Act. Forest conservation Act. Issues involved in enforcement of environmental legislation. Public awareness.

Unit 7. Human Population And The Environment.
Population growth, variation amongst nations. Population explosion – Family welfare programme. Environment and human health. Human rights. Value education. HIV / AIDS. Women and child welfare. Role of Information technology in environment and human health. Case studies.
Unit 8. Field Work.
Visit local area to document environment assets – river / forest / grassland / hill / mountain. Visit to a local polluted site – urban / rural / industrial / agricultural. Study of common plants, insects, birds. Study of simple ecosystems – ponds, river, hill slopes, etc. (field work equal to 6 lecture hours).

4. SPECIFICATION TABLE WITH HOURS & MARKS (THEORY)

Unit No.	Topic	Teaching Hours	Marks
1)	Multidisciplinary Nature Of Environmental Studies.	01	03
2)	Natural Resources.	10	12
3)	Ecosystems.	06	08
4)	Biodiversity And Its Conservation.	06	09
5)	Environmental Pollution.	08	12
6)	Social Issues And The Environment.	07	12
7)	Human Population And The Environment.	04	09
8)	Field Work.	06	10
		48	75

5. MANDATORY ACTIVITIES

In addition to the class room instruction, visits should be arranged in any 2 of the following

areas:

1. Visit to NIO or Science Centre.
2. Visit to Selaulim/ Anjunem Dam.
3. Visit to study ecosystem (Pond, Stream, River, and Forest).
4. Visit to show Hill cuttings, mining areas.
5. Visit to show Rain water harvesting project / Vermicomposting plant / Watershed management project. (Krishi Vigyan Kendra – Old Goa)
6. Visit to water treatment/ waste water treatment plant.

6.   SUGGESTED VIDEOS

In addition to the class room instruction, video films on environment may be shown.

7.   SUGGESTED LEARNING RESOURCES

S.No.	Author	Title of Books	Publication
1	Erach Bharucha	Textbook of Environmental Studies for Undergraduate courses	University Press
2	P. Meenakshi	Elements of Environmental Science and Engineering	Prentice Hall of India (PHI)
3	S. Deswal & A. Deswal	A Basic Course in Environmental Studies.	Dhanpat Rai & Co.
4	Pandya and Camy	Environmental Engineering	Tata McGraw Hill
5	Asthana D.K. and Asthana Meera	Environmental Problems and Solutions.	S. Chand & Co
6	Centre for Environmental education	Video Film	Thaltej Tekra, Ahme
7	Dr. S.K. Dhameja	Environmental Studies	

GN 205 ENGINEERING MATERIALS

1. RATIONALE:-

Adequate knowledge of different types of engineering materials, their properties & applications are very essential for the engineers. This course content is designed to provide basic insight knowledge regarding engineering material and their applications which will be useful for the students to learn subjects of higher semesters. The range of materials available for engineering applications is quite vast, hence only the basic groups of ferrous non-ferrous, non-ferrous & other engineering materials with their general properties and uses have been stressed upon.

2. TEACHING AND EXAMINATION SCHEME:

Course Code & Course Title	Periods/ Week (In Hours)			Total Credits	Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
G-205	L	T	P	C	TH	TM	TW	PR/OR	
Engineering Materials	4	-	-	4	75	25	-	-	100

Minimum passing % : Theory 40%   *Duration of Theory Paper: 3 Hrs.*
Legends:

L-Lecture; **T** - Tutorial; **P** - Practical; **C**- Credit;   **TH**- End Semester Theory; **TM** – Test Marks:

PR/OR - End Semester Practical / Oral Examinations; **TW-** Term Work

3. COURSE CONTENTS

Unit 1 **Introduction to Engineering Materials**

Unit 1 Introduction to Engineering Materials
Classification of Materials
- Metal, Non-metal
- Ferrous Metal & Non-ferrous Metals.
Differences between Metals & non-metals.
Properties of Materials.
- Physical properties – Melting point, freezing point, boiling point, Density, Linear co-efficient of expansion, Thermal conductivity, Electrical resistivity.
- Mechanical properties – Strength, Elasticity, Plasticity ductility,

Malleability, Toughness, Brittleness, Hardness, fatigue, creep.
- Electrical properties – Resistivity, conductivity, Temperature coeff. of resistance, dielectric strength, Thermo electricity, super conductivity.
- Magnetic properties – permeability, coercive force, magnetic stresses.
- Chemical properties - Corrosion resistance, chemical composition, acidity, alkalinity.

Unit 2 Ferrous & Non-Ferrous Metals & its Alloys
➢ **Ferrous alloys.**
o Low carbon steel, medium carbon steel, High carbon steel, their carbon percentage, properties & uses.
o Cast iron – Grey cast iron, white cast iron, spheroidal grey cast iron, their properties & uses.
o Alloy steels.
▪ Constituents of alloy steels such as phosphorous sulphur, Silicon, Manganese and their effect on properties of materials.
▪ Stainless steel, chromium – Nickel steel, Nickel-chromium-molybdenum steel, Nitriding steel, Manganese steel, its properties & uses.
o Tool steel – composition, HSS, High carbon steel, properties & uses.
➢ **Non-ferrous Metals & alloys**

o Aluminium – Properties & uses.
o Aluminium alloys – constituents of alloy & their effect on   properties of metal
o Properties & uses of Duralumin, Y-alloy, Al-si alloy, Al-Zn-Mg alloys.
o Copper – Properties & uses.
o Copper alloys – Constituents of alloy & their effect on properties of metal.
o Properties & uses of Copper – Zinc alloys such as Muntz metal, manganese bronze, copper-Tin alloys such as Bronze, copper aluminium alloys such as aluminium bronzes.
o Properties & uses of lead & its alloys.

Unit 3 Non – Metallic materials

o Refractory
- Desirable properties.
- Difference between acid, basic & neutral refractories.
- Properties & uses of Fire clay refractory, silica refractory.
o Plastic
- Classification table only.
- Properties & uses of Thermosetting & Thermoplastic.

o Natural & Synthetic abrasive materials.
- Introduction, Properties & uses.
o Rubber
- Properties & uses of natural, neoprene, synthetic & butyl rubber.

- Vulcanization process.
  - Glass
- Properties & uses of soda glass, Borosilicate glass, fibre glass.
- Glass wool – composition, properties & uses.

  - Introduction to composite materials.Classification diagram only.

Unit 4 **Conductor, Semi Conductor, Insulating and Magnetic Materials.**

- Classification of Materials as conductor, Semiconductor and Insulating materials.
- Conductor Materials.
  - High conductivity materials
    - Copper, Aluminium, Carbon, Silver, Lead, Brass, Bronz, Tungsten & Gold.
    - Their properties as conducting materials and applications.
  - High resistivity materials
    - hichrome, constantan, manganin
    - Their applications
- Insulating materials
  - Introduction
  - Characteristics of Good Insulating materials
  - Solid Insulating materials
    - Wood, paper, rubber, mica, glass tibre, porcelain, varnish, PVC, Resins.
  - Their characteristics as insulating materials and applications.
  - Liquid insulating materials
  - Mineral oil, its properties as insulating material and applications.
  - Gaseous insulating materials like air, Nitrogen, Sulphur hexafloride & their applications.
- Semiconductor Materials.
  - Silicon & Germanium. Their specifications as semiconductor material and uses
- Magnetic Materials.
  Classification as:
    * Dia Magnetic
    * Para Magnetic
    * Ferromagnetic
    * Non magnetic
List of these materials and their applications.

Unit 5 **Construction Materials**

-                Building Stones :   Classification of rocks, Characteristics of good building stones, common building stones & their uses.
- Cement: Chemical composition of port land cement, outline of manufacturing process, types of cements, uses.
- Bricks: Bricks – Constituents, properties, classification, special bricks – refractory and flyash bricks; uses.
-            Other materials:
  -            Lime   – Sources. Properties, uses.
  - Clay   – Different building products from clay   like tiles, pipes etc.
  - Timber – Common varieties of timber, uses   wood products, veneer, plywood, etc.
  - Sand   – Sources: rivers, crushed aggregates,   characteristics uses.

4.   SPECIFICATION TABLE WITH HOURS & MARKS (THEORY)

Unit No.	Topic	Teaching Hours/ Semester	Marks
1	Introduction to Engineering Materials	04	09
2	Ferrous & Non-Ferrous Metals & its Alloys	16	18
3	Non – Metallic materials	12	12
4	Conductor, Semi Conductor, Insulating and Magnetic Materials.	16	18
5	Construction Materials	16	18
		64	75

SEMESTER III

Course Code	Name of Course	Teaching Scheme				Examination Scheme				Total Marks
						Theory Marks		Practical Marks		
		L	T	P	C	TH	TM	PR/OR	TW	
CO301	Computer Hardware	3	--	2	5	75	25	50	25	175
CO302	Programming Concepts through C	3	1	2	6	75	25	50	25	175
CO303	Computer Organization	4	--	--	4	75	25	--	--	100
CO304	Computer Laboratory - I	--	1	2	3	--	--	50	25	75
CS304	Basic Electrical Engineering	3	--	2	5	75	25	--	25	125
CS309	Digital Electronics	3	--	2	5	75	25	50	25	175
	Total	16	2	10	28	375	125	200	125	825

(CO301) COMPUTER HARDWARE

Rationale:

This course in computer hardware is meant to give the student an in depth exposure to the working of a typical computer system. The physical structure and working of all that goes inside the system unit is dealt with in this course. Students will be able to understand the maze of events that take place inside the hardware ranging from the power supply to motherboard and all peripherals.

TEACHING AND EXAMINATION SCHEME:

Course Code & Course Title	Periods/ Week (In Hours)			Total Credit	Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
CO301 COMPUTER HARDWARE	L	T	P	C	TH	TM	TW	PR/OR	175
	3	-	2	5	75	25	25	50	

DETAILED COURSE CONTENTS:

UNIT I

1   Personal Computer and Motherboard   (15 Marks)

1.1 Main System Unit and Motherboard.
    1.1.1 Front and Back panel of system unit its indicators, ports, connectors, jacks, sockets and switches.
    1.1.2 Motherboard and its Components
    1.1.3 Different forms of motherboards- Intel and AMD
    1.1.4 Motherboards, selection criteria and form factor.

1.2 Process Technologies-Dual Independent Bus Architecture, Hyper-threading Technology.

    Processor Socket and Slots
1.3 Chipset Basics - Chipset Architecture, North/South Bridge Architecture, Hub Architecture.

1.4 Overview and Features - PCI (Peripheral Component Interconnect), PCI-X (Peripheral Component Interconnect Extended), PCI-Express, PCMCIA-(PC Card), AGP (Accelerated Graphics Port) or (Advanced Graphics Port), Processor Bus (Front-Side Bus), PCI versus PCI-Express.

1.5 BIOS- BIOS Basics, CMOS Setup basics

UNIT II

2   Memory and Storage Devices and its Interfacing   (15 Marks)

2.1 RAM, ROM types and physical organization (Simms, Dims, Rimm)

2.2 Cache Memory- cache memory, cache levels (L1, L2, L3, and L4).

2.3 Flash Memory

2.4 Construction and Working of Hard Disk drive-Sides or Heads, Track, Sectors, Cylinder,

   Cluster, Sector Interleaving

2.5 Recording Techniques-Frequency Modulation (FM) Recording Techniques- MFM Recording

   Technique, RLL Recording (Run Length Limited)

2.6 Landing Zone, MBR (Master Boot Record), Zone Recording, Write Pre compensation

2.7 Hard Disk Drive Interface-IDE, SCSI, Parallel AT Attachment, Serial AT Attachment

2.8 Optical Storage: DVD-Digital Versatile Disc- Construction, Recording on DVD

2.9 Blue-ray Disk Specification.

UNIT III

3   Display Devices and Interfacing   (15 Marks)

3.1 CRT Color Monitor and Characteristics, Advantages and Disadvantages

3.2 LCD Monitor (Liquid Crystal Display) - Functional Block Diagram of LCD Monitor, Working

   Principle or Working of LCD Monitor, Advantages and Disadvantages, Types of LCD,

   Important Characteristics of LCD

3.3 Touch Screen Display

3.4 Plasma Display Technology

3.5 Video Accelerator Card

UNIT IV

4   Input and Output Devices   (15 Marks)

4.1 Keyboard- Keyboard Operation, Keyboard Electronics, Types of Key switches, Construction

   and Working, Keyboard Interfacing, Keyboard Connectors.

4.2 Mouse- Types of Mouse, Construction of Mouse, Mechanical Mouse, Opto-Mechanical Mouse

   Optical Mouse

4.3 Scanner-Types of Scanner, Construction and Working of Scanner,

4.4 Modem-Types of Modem, Specifications of Modem

4.5 Printer - Classification of Printer, Characteristics of Printer, Dot Matrix Printer, Inkjet Printer,

Laser Printer

UNIT V

| 5 | Power Supply and other Interfaces | (15 Marks) |

5.1 Block Diagram and Working of SMPS, SMPS Output Usage, Signal Description and Pinout.

Diagram of AT and ATX Connectors, Power Supply Form Factor, Power Supply Characteristics.

5.2 Uninterrupted Power Supply (UPS) -Types of UPS, Power Rating of UPS.

5.3 USB- USB Connectors, USB Features.

5.4 RS-232 (Recommended Standard - 232) -Different Voltage Levels used in RS-232, RS-232

Signal Description, RS 232 Communication.

5.5 Centronics Interface-Signals from PC to Printer, Signals from Printer to PC

5.6 Bluetooth, Bluetooth Specifications.

Suggested List of Practicals:

1.	Identification of front panel indicators and switches in a computer system of table top/ tower case model and also identification of rear side connectors.
2.	Draw a Computer system layout and Mark the positions of SMPS, Mother Board, FDD, HDD, and CD-Drive/DVD-Drive add on cards
3.	Study of Motherboard: Draw the layout of Pentium IV or Pentium Dual core or Pentium Core2 DUO motherboard and mark Processor, Chip set ICs. RAM, Cache, cooling fan, I/O slots and I/O ports and various jumper settings. (Latest Chipset of PC-Intel P67 Chipset, Intel H67 Chipset, G31 chip set, G45 chip set.)
4.	Study of CMOS Setup Program: 1. Changing the Standard settings 2. Changing advanced settings (BIOS and Chipset features)
5.	Study of various cards used in system.
6.	Study the installation and Re-installation of HDD.
7.	Study the installation and Re-installation of CD ROM Drive
8.	Study of SMPS Unit. Check and measure various supply voltages.
9.	Study of Keyboard and mouse
10.	Study of Display system.

11.	Study of Printer Installation & scanner installation
12.	Study of RS232 serial interface, Centronic
13.	Assembling a PC: Assemble a Pentium IV or Pentium Dual Core Pentium Core2 Duo system with necessary peripherals and check the working condition of the PC.

Text Books:

1) PC Hardware: The Complete Reference 1st Edition , Author: CRAIG ZACKER, Publisher: MCGRAW-HILL EDUCATION (INDIA) LTD (2001)

2) Modern Computer Hardware course by Manahar Lotia, Pradeep Nair,Payal Lotia

3) COMPUTER HARDWARE & MAINTENANCE by Author: Sunita Velapure, Snehal Rane

CO302   PROGRAMMING CONCEPTS THROUGH C

Rationale:

This course is meant to expose the student to the fundamental concepts of programming through the C language. Students will learn problem solving techniques and the implementation of a computer solution through the C programming language. This course will give a student the necessary programming skills and knowledge to program and to further learn other programming languages in the higher semesters.

TEACHING AND EXAMINATION SCHEME:

Course Code & Course Title	Periods/ Week (In Hours)			Total Credit	Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
	L	T	P	C	TH	TM	TW	PR/OR	
CO302 PROGRAMMING CONCEPTS THROUGH C	3	1	2	6	75	25	25	50	175

DETAILED COURSE CONTENTS:

UNIT I

1   Problem Solving and Programming Concepts   (15 Marks)

    1.1   Problem Solving in Everyday life

    1.2   Data storage and Communication with Computer

    1.3   Organizing the problem

        1.3.1   Analyzing the problem

        1.3.2   writing the algorithm

        1.3.3   Drawing the flow chart

        1.3.4   Internal and External documentation

    1.4   Testing the solution

    1.5   Coding the program

    1.6   Errors in programming.

(Algorithms and Flowcharts to be covered are listed in Annexure A)

UNIT II

2   Introduction to C   (15 Marks)

    2.1   Basic Elements of C

UNIT III

3   Conditional program execution, program loops and iterations   (15 Marks)

3.12 The do while statement

3.13 The continue statement

UNIT IV

4   Modular Programming and Pointers   (15 Marks)

4 .1 Introduction

4.2 User-defined functions in C

4.3 Function – Basics

4.4 General form of a function

   4.4.1   Declaring function/function prototype

   4.4.2   Accessing a function

4.5 Scope rules

4.6 Function arguments

   4.6.1   Call by value

   4.6.2   Call by reference

4.7 Return statements

   4.7.1   returning from a function

   4.7.2   return values

   4.7.3   functions of type void

4.8 Recursive functions

4.9 Standard Library functions

4.10   Pointer Concept

   4.10.1 Pointer declaration

   4.10.2 Initializing pointer variable

   4.10.3 Accessing variable through pointer

UNIT V

5   Arrays, Strings and Structures   (15 Marks)

5.1   Arrays

   5.1.1   Array notation and representation

   5.1.2   Array declaration and defining

   5.1.3   Storing elements in array

   5.1.4   Manipulating array elements

   5.1.5   Two-dimensional and multi-dimensional arrays

     5.1.5.1 Variations of the two-dimensional array definitions

   5.1.6   strings and string handling functions

     5.1.6.1 String length

     5.1.6.2 Using strcpy to copy strings

     5.1.6.3 Concatenating strings using strcat

     5.1.6.4 String compare

5.2 Structures

5.2.1 Introduction
5.2.2 Defining a structure
    5.2.2.1 Initializing of a structure
    5.2.2.2 Accessing and processing a structure
5.2.3 Array of Structures

Suggested list of Practicals

Sr.No	List of Experiment
1	Programming exercises on basics of C
2	Programming exercises on Decision making
3	Programming exercises on Loops
4	Programming exercises on Functions
5	Programming exercises on Arrays
6	Programming exercises on Structures
7	Programming exercises on strings
8	Programming exercises on pointers

Text Books:

1. Computer Concepts and Programming in C – A. P. Godse & D. A. Godse
2. Problem solving and Programming concepts- M. Sprankle

Reference Books:

1. Let us C – Yashavant Kanetkar
2. How to solve it by Computer – R.G. Dromey
3. Computer programming in C – V. Rajaraman
4. J.R. Hanly & E.B. Koffmann- Problem Solving and Program Design in C

ANNEXURE – A

List of algorithms and flowcharts

1. Exchanging the values of two variables
2. Counting
3. Summation of a set of numbers
4. Factorial computation
5. Sine function computation
6. Generation of the Fibonacci sequence
7. Reversing the digits of an integer
8. Finding the square root of a number
9. The Greatest common divisor of two integers
10. Generating prime numbers
11. Raising a number to a large power
12. Computing the nth Fibonacci number

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CO303   COMPUTER ORGNIZATION

Rationale:

This course is a basic course that is meant to give a student the requisite knowledge on the basic building blocks of a computer system, the interconnections and the sequence of data flow and execution that takes place in the CPU. Students will be able to understand the architecture and organization of a typical computer.

TEACHING AND EXAMINATION SCHEME:

Course Code & Course Title	Periods/ Week (In Hours)			Total Credit	Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
CO303 COMPUTER ORGANIZATION	L	T	P	C	TH	TM	TW	PR/OR	**100**
	4	-	-	4	75	25	-	-	

DETAILED COURSE CONTENTS:

UNIT I

1   Basic Structure / Organization of Computer   (15 Marks)

    1.1 Basic organization of Computer (Von Neumann Machine)
        1.1.1   Input Unit
        1.1.2   Memory unit
        1.1.3   Arithmetic and Logic Unit
        1.1.4   Output unit
        1.1.5   Control Unit
    1.2 Features of Von Neumann Model and Von Neumann Bottleneck
    1.3 Basic Operational Concepts
        1.3.1   Connections between the processor and the main memory
        1.3.2   Functions of different registers Program Counter (PC), Instruction Register (IR), Memory Address Register (MAR), Memory Data Register (MDR), General purpose Registers.
        1.3.3   Execution of a program (Different steps that take place while execution of a program)
        1.3.4   Concepts of Interrupt and Interrupt service Routine(ISR)

1.4 Introduction to Buses-Concept of a bus, Data bus, Address Bus and Control Bus. System bus.

    1.4.1   Bus Structures- Single bus structure and multiple bus structure.

          1.4.1.1 Single Bus structure

          1.4.1.2 Multiple Bus Structures- Traditional bus configuration , High speed bus configuration

    1.4.2   Bus Design Parameters (`Only definitions of the below parameters. No timing diagrams`)

          1.4.2.1 Bus Types – Dedicated and Multiplexed

          1.4.2.2 Method of Arbitration – Centralized and Distributed

          1.4.2.3 Bus Timings

          1.4.2.4 Bus width

          1.4.2.5 Data transfer types

UNIT II

2   Basic CPU Organization   (15 Marks)

2.1 Internal Structure of CPU

    2.1.1   Major Components of CPU – control ,Register set ,ALU

    2.1.2   CPU Operation (flowchart showing major functions of Processor)

2.2 Accumulator Based CPU Organisation- Accumulator Based CPU

2.3 General Register Organization- Typical CPU with general purpose register organisation

2.4 Stack Organization- Register Stack, Memory Stack (`just the basics`)

2.5 Registers

    2.5.1   Register Transfer Language – Symbolic notations used to describe micro operations

    2.5.2   Register Transfers

    2.5.3   Micro-operations (`Arithmetic Micro-operations only`)

          2.5.3.1 Performing Arithmetic Operation (e.g. sequence of operation required to subtract the contents from one register to another)

          2.5.3.2 Fetching a word from memory (data address and control signals for data transfer between memory and processor)

2.6 Instruction Cycle

    2.6.1   Instruction Fetch Cycle

    2.6.2   Instruction Decode/Execute Cycle

2.7 Control Unit

    2.7.1 Hardwired Control Unit

    2.7.2 Micro programmed Control Unit (soft wired control)

2.8 Instruction Format

    2.8.1 Elements of instruction

    2.8.2 Types of operands

    2.8.3 Instruction representation

2.9 Complex Instruction Set Computers (CISC) characteristics & Reduced Instruction Set Computers (RISC) Characteristics

UNIT III

3 Memory Organization **(15 Marks)**

3.1 Introduction to memory and memory parameters

3.2 Characteristics (Parameters) of Memory

      3.2.1 Characteristics of some common memory technologies – physical characteristics

      3.2.2 Comparison between serial/sequential and random access memory, volatile and non volatile memory

3.3 Classification of memory

      3.3.1 Primary (Semiconductor Memory) based on

          3.3.1.1 Principal of operation

          3.3.1.2 Physical Characteristics

          3.3.1.3 Mode of access

          3.3.1.4 Terminology used for fabrication

      3.3.2 Secondary/Auxiliary memory based on access type- sequential and random

3.4 Memory Hierarchy- two, three and four levels

3.5 Main Memory

      3.5.1 RAM- Static and Dynamic RAM

      3.5.2 Working /Implementation of Static RAM Cell (SRAM)

      3.5.3 Working/implementation of Dynamic RAM Cell (DRAM)

      3.5.4 Comparison between SRAM and DRAM

      3.5.5 Working/implementation of ROM Cell

      3.5.6 PROM, EPROM, EEPROM

      3.5.7 Synchronous DRAM (SDRAM), Double-Data-rate Series (`only concepts, No internal Architecture to be covered`)

      3.5.8 Comparison between DRAMs and SDRAMs

3.6 Auxiliary/ Secondary Memory (`Brief description only`)

      3.6.1 Magnetic disk

      3.6.2 Redundant Array of Inexpensive Disks (RAID) – level 0 to level 4

      3.6.3 Flash Memory

      3.6.4 Optical Memory- CD-ROM, DVD

3.7 Cache memory

      3.7.1 Cache memory systems and hit rate

      3.7.2 Mostly commonly used cache organizations – Look-aside and look-through (`cache read / write operations are not to be covered`)

      3.7.3 Program locality, Locality of reference, Block fetch

      3.7.4 Elements of cache design

          3.7.4.1 Cache size

          3.7.4.2 Mapping function

             3.7.4.2.1 Direct –Mapping technique (only definition)

             3.7.4.2.2 Associative techniques (only definition)

             3.7.4.2.3 Set-associative –mapping (only definition)

3.7.4.3 Replacement algorithms
    3.7.4.3.1 Least –recently –Used (LRU) `(only definition)`
    3.7.4.3.2 First-In-First-Out (FIFO) `(only definition)`
    3.7.4.3.3 Least-Frequency-Used (LFU) `(only definition)`
    3.7.4.3.4 Random   `(only definition)`
  3.7.4.4 Write policy (cache updating policies) - write through system, buffered write through system and write back system `(only definitions)`

UNIT IV

4   Input & Output Organization   (15 Marks)
  4.1 Input Output (I/O) Systems
    4.1.1 Requirements of input output (I/O) systems
    4.1.2 Input Output (I/O) interfacing techniques
        4.1.2.1 Memory mapped I/O
        4.1.2.2 I/O mapped I/O
  4.2 Types of Data Transfer techniques
    4.2.1 Program controlled I/O or polling control
    4.2.2 Interrupt program controlled I/O or interrupt driven I/O
    4.2.3 Hardware controlled I/O
    4.2.4 I/O control by handshake signals
  4.3 Programmed I/O
  4.4 Interrupt driven I/O
    4.4.1 Interrupt Hardware / Hardware interrupt
    4.4.2 Enabling and disabling interrupts
    4.4.3 Handling multiple devices
        4.4.3.1 Vectored interrupts
        4.4.3.2 Interrupt Nesting
        4.4.3.3 Interrupt priority
    4.4.4 Interrupt and response to interrupt (flowchart showing steps that take place w.r.t. to interrupt and response to interrupt)
  4.5 Comparison between Programmed I/O and Interrupt Driven I/O

UNIT V

5   I / O Channels & DMA Organization   (15 Marks)
  5.1 I/O Channels
    5.1.1 Characteristics of I/O channels
    5.1.2 Types of I/O channels –Selector channel and multiplexer channel
  5.2 Direct memory Access
    5.2.1 Drawbacks of programmed I/O and interrupt driven I/O
    5.2.2 DMA operation
    5.2.3 Comparison of I/O program controlled transfer and DMA Transfer
    5.2.4 DMA Idle cycle

5.2.5 DMA Active cycle

5.2.6 DMA Channels

5.2.7 Data Transfer Modes – Single, Block and Demand Transfer modes

5.2.8 Use of DMA in a Computer system

5.2.9 Bus Arbitration

     5.2.9.1 centralized Arbitration

     5.2.9.2 Distributed Arbitration

5.3 Universal Serial Bus (USB)

     5.3.1 USB features

     5.3.2 USB Connector

     5.3.3 USB Data

     5.3.4 USB Transfer types

5.4 I/O Processor

     5.4.1 CPU-IOP communication- Features and functions of IOP, Block diagram of IOP, CPU and IOP communication

Text Books:

1. Computer Organisation and Architecture by A.P. Godse and D.A. Godse / Computer Architecture and Organisation by A.P. Godse and D.A. Godse
2. Computer Organisation and Architecture by William Stallings
3. Computer System Architecture by M. Morris Mano

CO304   COMPUTER LABORATORY I

Rationale:

This course is a continuation of computer basics studied in a generic manner in semester I. A student of computer engineering needs to know as to what are the processes that go on inside a system. For this a proper understanding of the operating system becomes very essential. Windows and Linux are two popular and widely used operating system. This course is meant to give a student hands on work experience on various aspects of windows and Linux operating systems.

TEACHING AND EXAMINATION SCHEME:

Course Code & Course Title	Periods/ Week (In Hours)			Total Credit	Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
	L	T	P	C	TH	TM	TW	PR/OR	
CO304 COMPUTER LABORATORY I	-	1	2	3	-	-	25	50(O)	75

DETAILED COURSE CONTENTS:

UNIT I

1   Windows OS overview and Installation of Windows OS

   1.1 Understanding OS architecture
       1.1.0 Layers in the window
   1.2 Windows compared to other systems
   1.3   Defining system requirements
   1.4   Planning clean installs v/s upgrades
   1.5   Planning for upgrades
   1.6   Planning for clean installation
   1.7   Understanding installation types
        1.7.0   Installing from removable types
        1.7.1   Performing network based installation
   1.8 Using Virtualized installation
        1.8.0 Introducing Virtualization
        1.8.1 Application Virtualization

UNIT II

2   Managing Control Panel and Applications

   2.1 Configuring Administrative tools
        2.1.0 Working with Administrative tools
   2.2 Using the Power Management tools

2.3 Understanding the system Applets

2.4 Installing configuring and removing applications

   2.4.0 Understanding installation methods

   2.4.1 Configuring applications

   2.4.2 Removing Applications

2.5 Differences between Services and Standard Applications

   2.5.0 Define services

   2.5.1 Configure service settings

   2.5.2 Managing service accounts

   2.5.3 Understanding service dependencies

   2.5.4 Stopping, Starting and restarting services

UNIT III

3 Device Management

3.1 Understanding device drivers

3.2 Defining device drivers

3.3 Locating and downloading drivers

3.4 Installing third party software

3.5 Using the device manager

3.6 Exploring Plug and Play operations

3.7 Understanding Plug and Play features

3.8 Defining the plug and play process

3.9 Connecting and Managing Devices

3.10 Initial device installation

3.11 Updating drivers

3.12 Printers

3.13 Comparing local and network printers

3.14 Connecting and disconnecting printers

UNIT IV

4   Windows Troubleshooting

4.1 Using Disk Fragmentation
4.2 Performing disk cleaning up
4.3 Scheduling task
4.4 Accessing additional troubleshooting tools
    4.4.0 Using event viewer
    4.4.1 Task manager
    4.4.2 Resource monitor

UNIT V

5   Introduction to Linux

5.1 The Linux OS
5.2 Linux Architecture and Components
5.3 Features of Linux System
5.4 Types of Shells
5.5 Linux Distributions
5.6 Common uses of Linux
5.7 Process Management

UNIT VI

6   Installation of Linux

6.1 Installation Requirements
6.2 Creating Boot and Root Disks
6.3 Partitioning the Hard Disk
6.4 Installing the Linux Partitions
6.5 Installing the Linux Software
6.6 Viewing Installed Software Files
6.7 Troubleshooting

UNIT VII
7   Administrating Linux System

7.1 Users and Logins
7.2 System Accounting and Logging
7.3 Managing Disk Space
7.4 Exploring Linux file system
7.5 Linux file system Management
7.6 Linux file system Administration

UNIT VIII

8   Shell Programming

8.1 Basic Linux Commands
8.2 Writing Shell Scripts
8.3 Understanding vi Editor

Text Books:

1. Microsoft Windows Operating System Essentials by Tom Carpenter SYBEX

2. Complete Guide to Linux, Peter Norton and Arthur Griffith
3. Linux + Guide to linux Certification ,Second Edition by Jason W. Eckert, M. John Schitka
4. Linux Lab: Hands On Linux by Prof. Deven N. Shah Prof. Dayanand Ambawade

Practical work: Lab Exercises to be performed on the above topics.

CS304 BASIC ELECTRICAL ENGINEERING.

1.   RATIONALE:

This course will enable the students to understand the basic concepts and principles of AC Circuits, Transformers and Motors.

2.   TEACHING AND EXAMINATION SCHEME:

Course Code & Course Title	Periods/ Week (In Hours)			Total Credit	Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
	L	T	P	C	TH	TM	TW	PR/OR	
CS304 **BASIC ELECTRICAL ENGINEERING.**	3	-	2	5	75	25	25	-	**125**

Minimum passing % : Theory 40%   **Duration of Theory Paper:** 3 Hrs.
L-Lecture; T - Tutorial; P - Practical; C- Credit;   TH- End Semester Theory; TM – Test Marks:

PR/OR - End Semester Practical / Oral Examinations; TW- Term Work

3. Units :
Unit- I– AC Circuits   (06hrs) (09 marks)
Sinusoidal AC voltage waveform. Definition of various terms related to AC wave, average value, RMS value, form factor, peak factor of AC wave.(no derivation)

Three-phase circuits. Concept of phase sequence, balanced system. Relation between line and phase quantities for star and delta connections. Real, reactive and apparent power in three-phase system. Applications of three phase three wire, four wire and five wire system(no derivation and numerical).

Unit- II – Transformer   (8 hrs) (15 marks)
Principle of operation and basic construction of a single phase transformer (core, winding & insulation only). EMF equation, losses in transformer, efficiency and voltage regulation. Rating of transformer(no numericals).

Unit- III – DC Motors   (10 hrs) (15 marks)
Working principle of DC motors, main parts of DC motor and their functions, classification of DC motors (shunt, series and compound and their applications).
Necessity of starter, methods of reversal of direction of rotation of DC shunt and series motor.

Unit- IV – AC Motors   (12 hrs) (15 marks)
Working of three phase induction motor, main parts, classification (squirrel cage & Slip ring), torque slip characteristics and application (only diagram).
Necessity of starter, Starters used- Direct On Line starter, manually operated star delta starter and auto transformer starter, (w.r.t. circuit diagram, working and application). Method of reversal of direction of rotation
Working principle and application of
         - Single phase induction motor (split phase only)
         - Universal motor

Unit- V – Earthing   (06 hrs) (09 marks)
Necessity of earthing, types of earthing- equipment earthing & system earthing (definitions only).
Types of earthing electrodes- Pipe and Plate.
Methods of reducing earth resistance. IE rules relevant to earthing.

Unit- VI – Protective Devices   (06 hrs) (12 marks)
Fuse- Definition, Types of Fuses- Rewirable fuse, HRC fuse & Cartridge fuse. Rating for fuse such as Voltage ratings, Current ratings, Breaking capacity (Rupture capacity) & Minimum fusing current.

MCB- Principle of operation and functions.
ELCB- Current operated type. Principle of operation and functions.

4. SUGGESTED SPECIFICATION TABLE WITH MARKS & HOURS (THEORY)

Unit No.	Unit	Teaching Hours / Semester	Marks
1	AC Circuits	06	09
2	Transformers	08	15
3	DC Motors	10	15
4	AC motors	12	15
5	Earthing	06	09
6	Protective Devices	06	12

5.   SUGGESTED LIST OF EXPERIMENTS
(Any 8-10)

Sr. No.	LIST OF EXPERIMENTS
1	Measurement of voltage ratio and current ratio of single phase transformer
2	Measure input and output quantities in a single phase transformer
3	Speed control of DC motor
4	Starting of DC shunt motor and reversal of direction of rotation
5	Starting of three phase induction motor using star delta starter
6	Open circuit test of single phase transformer
7	Short circuit test of single phase transformer
8	Study of stepper motors
9	Study of servo motors
10	Study of universal motors
11	Study of rotor resistance starter for starting of Slip ring induction motor.

6. SUGGESTED LEARNING RESOURCES

Sr.No.	Author	Title	Publication and Year
1	B.L. Thereja.	Text book of Electrical Technology	Latest
2	V.K. Mehta	Principles of Electronics Engineering	Latest

CS 309 DIGITAL ELECTRONICS

1. RATIONALE:

This course includes detailed study of digital circuits such as adders, subtractors, flip flops, counters, registers and memories. This course will enable the students to understand the structure of digital computers, peripheral and other digital devices.

2. TEACHING AND EXAMINATION SCHEME:

Course Code & Course Title	Periods/ Week (In Hours)			Total Credit	Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
CS309 DIGITAL ELECTRONICS	L	T	P	C	TH	TM	TW	PR/OR	175
	3	-	2	5	75	25	25	50(P)	

Minimum passing % : Theory 40%   **Duration of Theory Paper:** 3 Hrs.
Legends:

L-Lecture; T - Tutorial; P - Practical; C- Credit;   TH- End Semester Theory; TM – Test Marks:

PR/OR - End Semester Practical / Oral Examinations; TW- Term Work

3. Unit-I Number Systems   (7 hrs) (12 marks)

Digital and Analog Signals- Decimal, binary, hexadecimal number system, conversion from one system to another, BCD code, ASCII code, gray code.
2's complement binary addition and subtraction.

Unit-II Combinational circuits.   (14hrs) (21 marks)

Symbol, truth table of basic gates (OR, NOR, AND, NOT, XOR, XNOR)
Laws of Boolean algebra and simplification of Boolean expressions
Demorgans and Duality theorem
K-map techniques (upto 4 variables)
Implemntation of NOT,OR and AND gates using Universal gates (NAND, NOR)
Half adder, Full adder, Half subtractor , Full subtractor.
4-bit paraller binary adder: block diagram and operation.
Block diagram and implementation using basic gates: Multiplexer (4 to 1), Demultiplexer (1 to 4), Encoder (4 to 2), Decoder (2 to 4).
BCD to 7 segment decoder driver (common cathode).

Unit-III Flip Flop.   (8 hrs) (12 marks)
Symbol, truth table, operation and timing diagrams of RS F/F & clocked RS F/F (using NAND gates), D F/F JK F/F,JK master slave F/F(no timing diagram), T F/F.

Unit-IV Registers & Counters.   **(8 hrs) (21 marks)**

4 bit shift Register- function and logic block diagram, timing diagrams with negative edge triggered D F/F(Serial in-parallel out, Serial in-serial out, parallel in-parallel out register, parallel in serial out shift register) ,concept of shift right shift left, Ring counter.

Counters (no design). – Asynchronous/ Synchronous 4 bit up counter & Asynchronous/ synchronous 4 bit Down Counter , decade (mod 10) counter (synchronous type) (timing diagrams with negative edge triggered)

Unit V-ADC &DAC   **(7 hrs) (9 marks)**

Types of ADC & DAC (no description)

Working of binary ladder DAC.

Successive approximation ADC(only).

4. SUGGESTED SPECIFICATION TABLE WITH MARKS & HOURS (THEORY)

Unit No.	Unit	Teaching Hours / Semester	Marks
1	Number Systems	7	12
2	Combinational Circuits	14	21
3	Flip flops	8	12
4	Registers and Counters	8	21
5	ADC and DAC	7	9

5. UGGESTED LIST OF EXPERIMENTS

Sr. No.	LIST OF EXPERIMENTS
1	Verification of logic gates and demorgans theorem.
2	NAND as universal gate
3	NOR as universal gate
4	Half adder and full adder
5	Half subtractor and full subtractor
6	MUX & D-MUX
7	Seven segment decoder common anode & common cathode
8	RS and JK F/F
9	Assemble and test shift register using IC 7495
10	Assemble and test decade counter (any one type)
11	Assemble and test DAC

6. SUGGESTED LEARNING RESOURCES

Sr.No.	Author	Title	Publication and Year
1	Malvino and Leach	Digital principal and applications	Latest
2	R.P. Jain	Modern Digital Electronics	Latest
3	Bartee	Digital Computer Fundamentals	Latest

SEMESTER IV

Course Code	Name of Course	Teaching Scheme				Examination Scheme				Total Marks
		L	T	P	C	Theory Marks		Practical Marks		
						TH	TM	PR/OR	TW	
CO401	Microprocessors and its Applications	3	-	2	5	75	25	-	25	125
CO402	Introduction to Database Management Systems	3	1	2	6	75	25	50	25	175
CO403	Object Oriented Programming through JAVA	3	1	2	6	75	25	50	25	175
CO404	Operating Systems	3	-	2	5	75	25	-	25	125
CO405	Data Communication & Computer Networks	3	-	2	5	75	25	-	25	125
CO406	Computer Laboratory II	-	-	2	2	-	-	50	25	75
	Total	**15**	**2**	**12**	**29**	**375**	**125**	**150**	**150**	**800**

CO401 MICROPROCESSORS AND ITS APPLICATIONS

Rationale:

The role of Microprocessor in all industries is well established. They are used in instrumentation, transportation, military equipments like tanks, radars etc. communication, automatic testing products, lift control, speed control of motors, automatic control of generator's voltage, fuel control of furnaces etc. Microcomputers play a dominant role in all spheres of our life and outcome is the evolution of microprocessors itself.

In this course on microprocessors and its applications the students will be exposed to the basic concept of microprocessors using 8086 microprocessor. Students will be made aware of the terminologies, its components and elementary idea of Assembly Language Programming. This course will give the students the prerequisite knowledge for the study of Advanced Microprocessors.

TEACHING AND EXAMINATION SCHEME:

Course Code & Course Title	Periods/ Week (In Hours)			Total Credit	Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
CO401 MICROPROCESSORS AND ITS APPLICATIONS	**L**	**T**	**P**	**C**	**TH**	**TM**	**TW**	**PR/OR**	**125**
	3	-	2	5	75	25	25	-	

Detailed Course Contents:

UNIT 1

1. **Basics of Microprocessor** (15 Marks)

1.1 Introduction to Microprocessor
    1.1.1 Organization of a Microprocessor-Based System (Microprocessor, Memory, Input/Output, System Bus)
    1.1.2 Difference between 8-bit, 16-bit and 32-bit processors
1.2 Functional Block diagram of 8085
1.3 Functions performed by microprocessor   (No Diagrams)
    1.3.1 Microprocessor-initiated operations
    1.3.2 Internal operations
    1.3.3 Peripheral operations
1.4 Architecture of 8086
    1.4.1 8086 Internal Block Diagram
    1.4.2 Bus Interface Unit
        1.4.2.1 Segment registers, Instruction Queue, Instruction pointer
    1.4.3 Execution Unit
        1.4.3.1 General purpose Registers, Flag registers, Control Unit, Pointer, Base and index Registers

1.5   Memory Organisation of 8086   (Including Diagrams)

      1.5.1   Memory Segmentation

      1.5.2   Generation of 20-bit physical address

UNIT 2

2.   Addressing Modes and Instruction set of 8086   (15 Marks)

2.1   Classification of addressing Modes   (Including Programs)

      2.1.1   Immediate addressing Mode

      2.1.2   Register addressing Mode

      2.1.3   Memory addressing Mode

            2.1.3.1 Direct

            2.1.3.2 Register Indirect

            2.1.3.3 Indexed

            2.1.3.4 Based

            2.1.3.5 Based-Indexed addressing Mode

      2.1.4   Relative addressing Mode

            2.1.4.1 Register Relative

            2.1.4.2 Relative Based Indexed

      2.1.5   Implied addressing Mode

      2.1.6   Port addressing Mode

2.2   Classification of Instructions   (Including Programs)

      2.2.1   Data Transfer Instructions

    MOV, IN, OUT, PUSH, POP, PUSHF, POPF, XCHG

      2.2.2   Arithmetic Instruction

    ADD,ADC,INC,DAA,SUB,SBB,DEC,CMP,MUL,DIV,CBW,CWD

      2.2.3   Bit Manipulation Instructions

    AND,OR,NOT,XOR,SHL,SHR,SAL,SAR,ROR,ROL,RCR,RCL

      2.2.4   String Instructions

    MOVSB/W, CMPSB/W, LODSB/W, SCASB/W, STOSB/W

    String prefix : REP, REPE/REPZ

      2.2.5   Branch Instructions

    Unconditional: CALL-NEAR and FAR, RET, JMP-NEAR and FAR

    Conditional: JC, JNC, JZ, JNZ, JP, JNP, JO, JNO, JS, JNS

    If – then, if –then -else, multiples if –then –else, while –do, repeat -until structures

      2.2.6   Processor Control Instructions

    STC, CLC, CMC, STD, CLD, STI, CLI, NOP

      2.2.7   Interrupt Instructions

    INTO, INT, IRET

UNIT 3

3.   Assembly language Programming Concepts   (15 Marks)

3.1.   Stack   (No Programming)
       3.1.1 Stack operations (PUSH, POP)
       3.1.2 Stack pointer
3.2.   Procedures   (No Programming)
       3.2.1 Types of procedures- Re entrant and Recursive
       3.2.2 Brief overview of CALL and RET instructions for implementing procedure

3.3.   Macros   (No Programming)
       3.3.1 Syntax of a macro
       3.3.2 Passing parameters to a macro
3.4.   Comparison between Macro and Procedures
3.5.   Assembler Directives
       3.5.1 Segment,db,dw,ends,endp,endm,assume,start,end, proc,equ,dup
3.6.   Assembly Language Program Development Tools
       3.6.1 Editor, assembler, linker, loader, debugger, Emulator
3.7.   Writing Assembly Language Programs (Excluding Stack, Procedures, Macros)

UNIT 4

4. Pin diagram and Interrupts   (15 Marks)

4.1   Brief overview of 8086 in minimum mode and maximum mode
4.2   Pins used in minimum mode and its description
4.3   Pins used in maximum mode and its description
4.4   Pins common in both the modes
4.5   Bus operations
      4.5.1   8086 read machine cycle (including timing diagrams)
      4.5.2 8086 write machine cycle (including timing diagrams)
4.6   Types of 8086 interrupts
      4.6.1 Hardware interrupts, software interrupts and interrupts due to error condition
4.7   Interrupt response with diagram
4.8   Interrupt pointer table
4.9   Priority of interrupts

UNIT 5

5. Interfacing and Applications (15 Marks)

5.1   Interfacing 8086 with memory (Only 8086 Memory Array, ROM/EPROM interface to the 8086 diagrams included)

5.2   Case study on 8086 application   (no programs)
     5.2.1. Traffic Light controller
     5.2.2 Interfacing ADC & DAC

5.3   Brief overview of Pentium Processor   (only Architectural features)

Suggested List of Experiments:

1. To implement a 8086 program on Data Transfer Instructions
2. To implement a 8086 program on Arithmetic Instructions
3. To implement a 8086 program on Bit Manipulation Instructions
4. To implement a 8086 program on String Instructions
5. To implement a 8086 program on Branch Instructions

(Note: Programs may be implemented using a single LOOP only wherever required. Double LOOPs are not included)

Text books:

1. Microprocessor Architecture, Programming & Applications with the 8085 by Ramesh S. Gaonkar

2. Microprocessors and Interfacing : Programming and Hardware by Douglas V. Hall

3. Microprocessors and microcomputer – based system design by Mohamed Rafiquzzaman

4. Advanced Microprocessors and Peripherals by K M Bhurchandi

Reference books:

1. Microprocessor 8086: Architecture, Programming and Interfacing by Sunil Mathur

2. Microprocessors: The 8086/8088, 80186/ 80286, 80386/80486 and the Pentium Family by Nilesh B. Bahadure

3. The 8086 Microprocessor: Architecture, Software and Interfacing Techniques by Walter A. Triebel & Avtar Singh

4. 8086 Microprocessor: Programming and Interfacing the PC (Programming and Interfacing the Personal Computer) by Kenneth Ayala

CO402   INTRODUCTION TO DATABASE MANAGEMENT SYSTEMS

Rationale:

Each and every Organization needs to share huge amount of data in effective manner. This subject enables to create, store, modify and extract information from a database. Database management system has been developed to manage the information stored in the database. After learning this subject student will be able to use DBMS package as a backend for developing database applications.

TEACHING AND EXAMINATION SCHEME:

Course Code & Course Title	Periods/ Week (In Hours)			Total Credit	Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
CO402 INTRODUCTION TO DATABASE MANAGEMENT SYSTEMS	L	T	P	C	TH	TM	TW	PR/OR	175
	3	1	2	6	75	25	25	50	

DETAILED COURSE CONTENTS:

UNIT 1

1   Introduction to Database Management System   **(15 Marks)**
   1.1 Database - an introduction
   1.2 The database management system
   1.3 Advantages of using a database
   1.4 Features of data in a database
   1.5 Components of a DBMS
   1.6 The three level architecture for a database system
   1.7 Database design
   1.8 Data modeling - an introduction
   1.9 Types of data models
      1.9.1   Record based logical models
      1.9.2   Object based data models
      1.9.3   Other data models
   1.10 Relational Model
      1.10.1   Relational Database Primer
         1.10.1.1 Tabular Representation of data
         1.10.1.2 Some terminology
         1.10.1.3 Domains
      1.10.2   Relational Database Characteristics

UNIT 2
2   Introduction to Relational Database Management System   **(15 Marks)**
   2.1 Relational Algebra
      2.1.1   Relational Algebra Operators
         2.1.1.1   Restrict
         2.1.1.2   Project
         2.1.1.3   Product
         2.1.1.4   Union

2.1.1.5   Intersection
2.1.1.6   Difference
2.1.1.7   Join
2.1.1.8   Divide
2.1.2   Grouping
2.2   Relational Calculus
2.3   Database Integrity
   2.3.1   Constraints
   2.3.2   Declarative and Procedural Constraints
       2.3.2.1   Type Constraints
       2.3.2.2   Attribute Constraints
       2.3.2.3   Instance Constraints
       2.3.2.4   Database Constraints
   2.3.3   More on Constraints
2.4   Keys
   2.4.1   Superkey and key
   2.4.2   Composite key
   2.4.3   Candidate key
   2.4.4   Primary key
   2.4.5   Alternate key or Secondary key
   2.4.6   Foreign key
2.5   Entity and Referencial Integrity
   2.5.1   Entity Integrity
   2.5.2   Referencial Integrity

UNIT 3
3   Database Design & ER modelling   **(15 Marks)**
   3.1   Entity/Relationship (E/R) Modelling
     3.1.1   Components of an ER model
       3.1.1.1 Entities
       3.1.1.2 Attributes
     3.1.2.   Entity Relationship Diagram(ERD)
       3.1.2.1   Symbols in ER diagram
     3.1.3. Relationships
       3.1.3.1   Degree
       3.1.3.2   Cardinality
       3.1.3.3   Dependency

   3.2   Functional Dependency
   3.3   Normalisation and Normal Forms (Restricted to Definitions of Normalisation, First Normal Form, Second Normal Form, Third Normal Form, Boyce-Codd Normal Form)

UNIT 4
4   Structured Query Language   **(15 Marks)**
   4.1 Structured Query Language
     4.1.1   SQL - an introduction
     4.1.2   Advantages of SQL
     4.1.3   SQL commands
     4.1.4   SQL data types and literals
     4.1.5   Literals
     4.1.6   SQL operators
     4.1.7   Embedded SQL

4.2 Queries and Subqueries
    4.2.1 Basic queries in SQL
    4.2.2 DDL Queries
        4.2.2.1 Create table
        4.2.2.2 Create table as select
        4.2.2.3 Alter table add
        4.2.2.4 Alter table modify
        4.2.2.5 Drop table
        4.2.2.6 Renaming a table
    4.2.3 Database modification DML queries
        4.2.3.1 Insert
        4.2.3.2 Update
        4.2.3.3 delete
    4.2.4 basic structure
        4.2.4.1 the select, from, where clause
        4.2.4.2 SQL operators in queries
    4.2.5 Aggregate functions
        4.2.5.1 avg
        4.2.5.2 min
        4.2.5.3 max
        4.2.5.4 sum
        4.2.5.5 count
    4.2.6 Set operations
        4.2.6.1 union, intersect, except
    4.2.7 Grouping while selecting
    4.2.8 Joins
    4.2.9 Order by
    4.2.10 Having

UNIT 5
5 Transaction Processing   **(15 Marks)**

    1.1 Transaction
        1.1.1 Transaction – Need and Mechanism
        1.1.2 Transaction Processing (TP) Monitor
        1.1.3 Transaction Properties
    1.2   Recovery
    1.2.1 Classification of recovery
    1.2.2 System recovery
        1.2.2.1 Failure recovery
        1.2.2.2 Media recovery
    1.3   Two phase commit
    1.4   Concurrency problems(only definitions)

Suggested list of Practicals

1. Designing E-R diagrams for given applications.

2. Tabular representation of E-R diagrams.

3. Creating & Executing DDL commands in SQL. & Apply various Integrity constraints on table.

4. Creating & Executing DML commands in SQL.

5. Writing Queries using various operators & Arithmetic, String Functions.

6. Executing Queries using the Select Command with Where, Having ,Group by and order by clauses also execute the queries using aggregate functions.

7. Execute the queries for implementation of Joins.

8. Execute the queries for implementation of Set Operations.

9. Implementation of Views.

10. Overview and comparison of different database softwares .(MySQL,Oracle,Microsoft SQL Server)

Text Books:
1. Introduction to Database Management Systems -Isrd Group
2. Introduction to Database Management Systems -Atul Kahate

Reference Books:
1. Database System Concepts- Kroth ,Tata McGraw Hill
2. Advanced Database Management System – Chakrabarti Dasgupta

CO403   OBJECT ORIENTED PROGRAMMING THROUGH JAVA

Rationale:

Java is a computer programming language that is concurrent, class-based, and object-oriented, It is intended to let application developers "write once, run anywhere" (WORA), meaning that code that runs on one platform does not need to be recompiled to run on another. Java is one of the most popular programming languages in use, particularly for client-server web applications, The language derives much of its syntax from C and C++, but it has fewer low-level facilities than either of them. This subject provides a student an insight to understand and implement the OOP concepts, do applet, graphics and multithreaded programming and Interact with the files. It also builds strong foundation for advanced java programming.

TEACHING AND EXAMINATION SCHEME:

Course Code & Course Title	Periods/ Week (In Hours)			Total Credit	Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
CO403 OBJECT ORIENTED PROGRAMMING THROUGH JAVA	L	T	P	C	TH	TM	TW	PR/OR	175
	3	1	2	6	75	25	25	50	

DETAILED COURSE CONTENTS:

UNIT 1:

1. INTRODUCTION TO JAVA   **(15 Marks)**

1.1   Basic concept of object-oriented programming
      1.1.1   Objects & classes
      1.1.2   Data abstraction & encapsulation
      1.1.3   Inheritance
      1.1.4   Polymorphism
      1.1.5   Dynamic binding
      1.1.6   Message communication
      1.1.7   Advantages & applications of OOP.
1.2   Java features
      1.2.1   Compiled & interpreted
      1.2.2   Platform independent & portable
      1.2.3   Object oriented
      1.2.4   Robust & secure
      1.2.5   Distributed
      1.2.6   Simple, small & familiar
      1.2.7   Multithreaded & interactive

UNIT 2:

2. CLASSES, OBJECTS & METHODS   **(15 Marks)**

2.1   Classes & objects
        2.1.1   Introduction
        2.1.2   Defining a class
        2.1.3   Field declaration
        2.1.4   Method declaration
        2.1.5   Creating objects
        2.1.6   Accessing class members
        2.1.7   Constructors
        2.1.8   Method overloading
        2.1.9   Static methods
        2.1.10   Nesting of methods
2.2   Inheritance
        2.2.1   Defining a subclass
        2.2.3   Subclass constructor
        2.2.4   Multilevel inheritance
        2.2.5   Hierarchical inheritance
        2.2.6   Overriding methods
        2.2.7   Final variables & methods
        2.2.8   Final classes
        2.2.9   Finalizer method
        2.2.10   Abstract methods & classes
2.3   Visibility control

UNIT 3:

3. ARRAYS, INTERFACES & PACKAGES   **(15 Marks)**

3.1   Arrays, Strings & Vectors
        3.1.1   One dimensional array
        3.1.2   Creating an array
        3.1.3   Two dimensional array
        3.1.4   Strings
                3.1.4.1 String array
                3.1.4.2 String methods
                3.1.4.3 String buffer class
        3.1.5   Vectors
        3.1.6   Wrapper classes
        3.1.7   Enumerated types
3.2   Interfaces
        3.2.1   Introduction
        3.2.2   Defining interfaces
        3.2.3   Extending interfaces
        3.2.4   Implementing interfaces
        3.2.5   Accessing interface variables
3.3   Packages

3.3.1 Introduction
3.3.2 Java API packages
3.3.3 Using system packages
3.3.4 Naming conventions
3.3.5 Creating packages
3.3.6 Accessing a package
3.3.7 Adding a class to a package
3.3.8 Hiding classes

UNIT 4:

4. MULTITHREADING & EXCEPTION HANDLING   (15 Marks)

4.1   Multithreaded Programming
    4.1.1 Creating threads
    4.1.2 Extending the thread class
    4.1.3 Stopping & Blocking the thread
    4.1.4 Lifecycle of a thread
    4.1.5 Using thread methods
    4.1.6 Thread exceptions
    4.1.7 Thread priority
    4.1.8 Synchronization
    4.1.9 Implementing the Runnable interface
4.2   Exception handling
    4.2.1 Types of errors
    4.2.2 Exceptions
    4.2.3 Syntax of exception handing code
    4.2.4 Multiple catch statements
    4.2.5 Using finally statements
    4.2.6 Throwing our own exception

UNIT 5:

5. APPLET & GRAHICS   (15 Marks)

5.1   Applet Programming
    5.1.1 Introduction
    5.1.2 Applet lifecycle
    5.1.3 Building Applet code
    5.1.4 Creating an executable Applet
    5.1.5 Designing a webpage
    5.1.6 Applet tag
    5.1.7 Adding Applet to a HTML file
    5.1.8 Running the Applet
    5.1.9 Passing parameters to Applet
    5.1.10 Aligning the display
5.2   Graphics Programming
    5.2.1 Graphics class

5.2.2   Lines & rectangles
5.2.3   Circles & ellipses
5.2.4   Drawing arcs
5.2.5   Drawing polygon

Suggested List of Practicals:
1. Program to implement constants, variables, operators and expressions
2. Program to Implement if-else
3. Program to implement loops
4. Program to implement switch-case
5. Program to implement arrays and strings
6. Program to implement packages
7. Program to implement interfaces
8. Program to implement multithreading
9. Program to implement exception handling
10. Program to implement applets and graphics

Text Book:
Programming in Java- E Balagurusamy

Reference Book:

Timothy Budo, "An Introduction to Object-Oriented Programming with Java", Pearson Education, Latest Edition.

CO404   OPERATING SYSTEMS

Rationale:

Operating system is the software that makes a computers system operational. It is an interface between the human and machine. It drives all the hardware parts of the computer and is the first piece of software to run on the machine when the system boots. OS is a core technology subject, the knowledge of which is mandatory for every user. It familiarizes a learner with the OS concepts, structure, internal functionality, services and resource sharing. It will help a learner with OS design concepts.

TEACHING AND EXAMINATION SCHEME:

Course Code & Course Title	Periods/ Week (In Hours)			Total Credit	Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
	L	T	P	C	TH	TM	TW	PR/OR	
CO404 OPERATING SYSTEMS	3	-	2	5	75	25	25	-	125

DETAILED COURSE CONTENTS:
UNIT 1

1 **Introduction**   (15 Marks)

1.1   Definition of Operating System
1.2 Functions of Operating System
1.3   Types of Operating System and their features
    1.3.1   Batch Processing
    1.3.2   Multiprogramming
    1.3.3   Real time System
    1.3.4   Time Sharing
    1.3.5   Distributed
    1.3.6   Multimedia
1.4 Definitions: Assembler, Compiler, interpreter, linker, loader and editor
1.5 OS Structure
    1.5.1   Layered
    1.5.2   Monolithic
    1.5.3   Micro Kernel

UNIT 2

2   **Process Management**   (15 Marks)

2.1 Definition of Process
2.2 Concept of Context Switching
2.3 Process States
2.4 Process Transition Diagram
2.5 Process Control Block
2.6 Process Scheduling
    2.6.1   Scheduling Objectives

2.6.2   Scheduling Philosophies
2.6.3   Scheduling Levels
2.6.4   Scheduling Algorithms- First Come First Serve (FCFS), Round Robin
(RR), Priority Based, Priority Class

UNIT 3

3   Deadlocks   **(15 Marks)**

3.1 Concept
3.2 Graphical Representation Deadlock
3.3 Deadlock Pr-requisite
3.4 Deadlock Strategies(Only concepts, No Algorithms)
3.4.1   Deadlock Ignorance
3.4.2   Deadlock Detection
3.4.3   Deadlock Recovery
3.4.4   Deadlock Prevention
3.4.5   Deadlock Avoidance

UNIT 4

4   Memory Management   **(15 Marks)**

4.1   Functions
4.2   Contiguous Real Memory Management(Techniques Only)
    4.2.1   Single Contiguous Memory Management
    4.2.2   Fixed Contiguous Memory Management
    4.2.3 Variable Contiguous Memory Management
    4.2.4   Fragmentation –Internal and External
4.3   Non-Contiguous Real Memory Management
    4.3.1   Paging
        4.3.1.1 Introduction
        4.3.1.2 Relocation and address Translation
        4.3.1.2.1   General Methodology
        4.3.1.2.2   Implementation of PMT (Software Method)
    4.3.2   Segmentation
        4.3.2.1 Introduction
        4.3.2.2   Relocation and address Translation
4.4. Concept of Virtual Memory
    4.4.1 Introduction
    4.4.2 Definitions: Locality of Reference, Page Fault, Working set, Page Replacement Policy
        (FIFO, NRU, and LRU), Dirty Page/Dirty Bit, Demand Paging.

UNIT 5

5   Information and Security management   (15 Marks)

5.1. Functions of Information management Module
5.2. Concept of File System
5.3. Concept of Device driver
5.4   Security Management
    5.4.1   Introduction
    5.4.2   Security Threats
    5.4.3 Attacks on Security
    5.4.4 Computer Worm
        5.4.4.1 Mode of Operation
        5.4.4.2 Safeguard against worm
    5.4.5 Computer virus:
        5.4.5.1 Types of viruses
        5.4.5.2 Infection Methods
        5.4.5.3 Mode of Operation
        5.4.5.4 Virus Detection, Removal and Prevention.
5.4.6 Security Design Principles
5.4.7 Authentication
        5.4.7.1 Password
        5.4.7.2 Artifact
        5.4.7.3 Biometrics

Suggested list of Practicals

1   Study of Disk Operating System(Internal and External commands)

2   Study of Windows Operating System: (Architecture and functionality)

3   Study of Unix (Importance of Kernel, Shell, Commands, Basic Shell Programming)

4   Study of Unix File System (Importance of Root and Various Directories under root)

5   Implementation of process scheduling algorithms.

6   Study of Viruses and Worms.

7   Study of Antivirus: Types of Antiviruses, installation and usage.

8   Study of Biometric authentication.

9   Case Study on Android

10   Case Study on IOS7

Text Books:

Operating System Achyut S. Godbole Tata Mc-Graw Hill

Reference Books:

1. Operating System Concepts- Silberschatz Galvin John Wiley and Sons
2. Operating System William Stallings Pearson
3. Modern Operating systems Andrew tanenbaum-3rd editionPHI
4. Unix Concept and Programming Sumitabha Das Tata Mc-GrawHill
5. UNIX Programming Kumar Saurabh

CO405 DATA COMMUNICATION & COMPUTER NETWORKS

RATIONALE:

This course will allow students to develop background knowledge as well as core expertise in data communication and Computer networking (DCCN) technologies, which one of the fastest growing industries is in today's world.

The course starts from the very basics of communication technology and goes up to the implementations of LANs and WANs. The students will be exposed to communication principles, different types of media, modulation techniques multiplexing, switched networks, OSI Model, TCP/IP suite, wireless communication, fibre-optic communications and the state-of-art networking applications.

TEACHING AND EXAMINATION SCHEME:

Course Code & Course Title	Periods/ Week (In Hours)			Total Credit	Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
	L	T	P	C	TH	TM	TW	PR/OR	
CO405 DATA COMMUNICATION & COMPUTER NETWORKS	3	-	2	5	75	25	25	-	125

DETAILED COURSE CONTENTS:

UNIT I:

1. Fundamentals of Data Communication   (15 Marks)

1.1   Introduction to data communication
1.2   Data Communication System/Model- Transmitter-Medium-Receiver
1.3   Concept of Signal and Data
1.4   Concept of channel and channel characteristics - Channel noise, Channel bandwidth, Channel data transmission rate (bit rate), channel capacity, transmission time, propagation time, throughput, channel utilization.
1.5   Communication modes - Simplex, half duplex and full duplex.
1.6   Digital Data Transmission-Parallel transmission and Serial transmission- Serial Data Transmission modes - Synchronous and Asynchronous transmission.
1.7   Transmission media:
    1.7.1   Guided media/bounded media
      1.71.1 Twisted pair – Unshielded Twisted Pair (UTP) – Category 1 to Category 6 and Shielded Twisted Pair (STP)
      1.7.1.2 Co-axial cable – Baseband and Broadband coaxial cable, Standards for co-axial cable, connectors.
      1.7.1.3 Optical Fibre – Multimode Fibre, Modal dispersion, Monomode Fibre, Advantages of optical Fibre

1.7.1.4 Fibre optics communication components/system - Transmitter/Light Source, Transmission medium, and the receiver (photodiode).

1.7.1.5 Comparison of bounded media

1.7.2 Unguided media (Radio, VHF, microwave satellite), Infrared transmission, Cellular phones. (to be covered in brief).

UNIT 2:

2. Data Modems and multi channel data communication (**15 Marks**)

2.1 Concept of Modulation – need of modulation.

2.2 Types of modulation

    2.2.1 Analog data, Analog Signal

        2.2.1.1 Amplitude Modulation

        2.2.1.2 Frequency Modulation

        2.2.1.3 Phase Modulation

    2.2.2 Analog data, Digital signal

        2.2.2.1 Pulse Code Modulation (PCM)

    2.2.3 Digital data, Analog Signal / Modem Modulation Techniques

    2.2.3.1 Amplitude Shift Keying

    2.2.3.2 Frequency Shift Keying

    2.2.3.3 Phase Shift Keying

    2.2.4 Digital data, Digital Signal / Encoding Techniques.

        2.2.4.1 Unipolar -NRZ (NRZ-L,NRZ-I),RZ

2.3 Introduction to Modem

    2.3.1 Building blocks of modem

    2.3.2 Types of Modems -half Duplex,Full Duplex.

    2.3.3 Protocols used by modem to transfer files

2.4 Multichannel data communication

    2.4.1 Circuits & Channels

    2.4.2 Multichanneling - FDM, TDM, CDM `(to be covered in brief)`

    2.4.3 Access Techniques- FDMA, TDMA, CDMA `(to be covered in brief)`

UNIT 3:

3. Networking Fundamentals   **(15 Marks)**

3.1 An overview of networking

    3.1.1 Need of computer networks

    3.1.2 Classification of computer networks based on

        3.1.2.1 Transmission technology –Broadcast networks and Point to Point networks

        3.1.2.2 Geographical area covered – LAN, MAN, WAN

        3.1.2.3 Acknowledgement sent by receiver - Connectionless and connection oriented communication

3.2 Switching techniques:

    3.2.1 Circuit Switching

    3.2.2 Packet switching

3.3 Datagram, Virtual circuit and permanent Virtual Circuit

3.4 Message switching

3.5 Cell switching (ATM)

3.6 Network Topologies

3.6.1 Types of Topologies

    3.6.1.1 Bus topology: Examples of bus topology: Ethernet, Local Talk

    3.6.1.2 Ring topologies, Examples of Token Ring Topology: IBM Token Ring, FDDI (Fiber Distributed Data Interface)

   3.6.1.3 Star topologies, Example of Star Network: ATM (Asynchronous Transmission Mode)

    3.6.1.4 Tree Topology

    3.6.1.5 Mesh Topology

UNIT 4:

4 OSI Model, TCP/IP Suite and Data link protocols   (15 Marks)

4.1 Network architectures

    4.1.1 Layering the communication process

    4.1.2 The need for layered solutions

4.2 Open system Interconnection (OSI) model

4.2.1 Functions of all 7 Layers

4.2.2 Data transmission in OSI Model

4.3 TCP/IP Protocol suite

    4.3.1. TCP/IP Reference model layers

    4.3.2 LAN Protocol and OSI

    4.3.3 Data transmission by TCP and Ethernet

    4.3.4 Data Encapsulation

    4.3.5 Data Routing

4.4 Data Link Protocol

    4.4.1 Protocol

    4.4.2 Transmission Control Procedure

        4.4.2.1 Synchronous protocols

        4.4.2.2 Asynchronous Data Link Control (DLC) Protocols

    4.4.3 Character Oriented Protocols (COP)

        4.4.3.1 Binary synchronous Protocol (Bisync or BSC)

    4.4.4 Bit Oriented Protocols (BOP)

        4.4.4.1 High level Data Control Protocol (HDLC)

UNIT 5:

5. Local Area Network (LAN) & **Wide Area Network (WAN)   (15 Marks)**

5.1 LAN application and Benefits

5.2 Base band versus Broadband

5.3 Media access control - Aloha & Slotted Aloha, CSMA/CD

5.3 LAN hardware -NIC, LAN operating systems.

5.4 Implementing LAN

    5.4.1Implementing of LAN using twisted pair

        5.4.1.1 10BASET (Twisted pair Ethernet),

        5.4.1.2 Ethernet Expansion-5-4-3 Rule, 10Base5 + 10BaseT Expansion, Stackable Hub, 10Base5 + 10 Base T, Ethernet Specification.

    5.4.2 Implementing of LAN using fiber optic cables

    5.4.3 Implementing of LAN using wireless technology

    5.4.4 Fast LAN

5.4.5 Non-standard LANs.

5.4.6 Extending LAN

5.4.6.1 Fiber optic extension

5.4.6.2 Repeaters, Bridges, Routers, Gateways, Switches, Hubs, Virtual LANs
(protocols not be covered)

5.5 Network using WAN and network services

5.5.1 Difference between WAN and LAN

5.5.1 Host to Terminal connection

5.5.2 LAN to LAN Connections

5.5.3 Remote LAN Connection
(protocols not be covered)

Suggested List of Laboratory Experiments:

1   Study different types of communication media.
2   Study Different types of modulation techniques.
3   Recognize the physical topology and cabling (coaxial, OFC, UTP, STP) of a network.
4   Recognition and use of various types of connectors RJ-45, RJ-11,BNC and SCST
5   Recognition of network devices (Switches, Hub, Routers of access points for Wi-Fi)
6   Making of cross cable and straight cable.
7   Install and configure a network interface card in a workstation.
8   Identify the IP address of a workstation and the class of the address and configure the IP
    Address on a workstation
9   Connectivity troubleshooting using PING, IPCONFIG, IFCONFIG
10   Visit to nearby industry for latest networking techniques

Text Books:

1. ISRD Group , Data Communication And Computer Networks, McGraw-Hill, ace series
2. Prakash C. Gupta, "Data communications and Computer Networks", PHI Learning Private Limited,2014
3. Rajneesh Agrawal and Bharat Bhushan Tiwari, "Data Communication and Computer Networks", Vikas Publishing house Ltd, 2005.
4. Behrouz A Forouzan, "Data Communication and Networking", Tata McGraw-Hill,2008
5. William Stallings, "Data and Computer Communications", Pearson Education, 2008.

Reference Books:

1. Tomasi Wayne, "Introduction to Data Communications and Networking", Pearson Education, 2007.

CO406 COMPUTER LABORATORY II

Rationale:

Computers today are used for a wide range of applications such as signal processing and communications, image and video processing, control systems, test and measurement, computational finance, and computational biology. A computer engineering student should be able to analyze data, develop algorithms, and create models and applications by way of simulations on a computer. For this purpose a language of technical computing that provides an interactive environment for numerical computation, visualization, and programming is required. In this course students are exposed to such environment and language, tools, and built-in math functions that enable you to explore multiple approaches and reach a solution faster than with spreadsheets or traditional programming languages, such as C/C++ or Java.

TEACHING AND EXAMINATION SCHEME:

Course Code & Course Title	Periods/ Week (In Hours)			Total Credit	Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
	L	T	P	C	TH	TM	TW	PR/OR	
CO406 COMPUTER LABORATORY II	-	-	2	2	-	-	25	50	75

DETAILED COURSE CONTENTS:

UNIT 1

1. Introduction

1.1 Starting the command Windows.
1.2 Working in the Command Window.
1.3 Arithmetic Operations with Scalars.
1.4 Display Formats.
1.5 Elementary Math Built-In Functions.
1.6 Defining Scalar Variables
1.7 Useful Commands for Managing Variables.
1.8 Script Files.
1.9 Examples of Applications.

UNIT 2

2. Creating Arrays.

2.1 Creating a One-Dimensional Array (Vector).
2.2 Creating a Two-Dimensional Array (Matrix).
2.3 Notes about Variables
2.4 The Transpose Operator.
2.5 Array Addressing 42
2.6 Using A Colon : In Addressing Arrays.
2.7 Adding Elements to Existing Variables.
2.8 Deleting Elements.
2.9 Built-In Functions for Handling Arrays.
2.10 Strings and Strings As Variables.

UNIT 3

3. Mathematical Operations with Arrays.

3.1 Addition and Subtraction.
3.2 Array Multiplication.
3.3 ARRAY DIVISION.
3.4 Element-By-Element Operations.
3.5 Using Arrays and Built-In Math Functions.
3.6 Built-In Functions for Analyzing Arrays.
3.7 Generation of Random Numbers.

UNIT 4

4. Using Script Files and Managing Data.

4.1 Workspace and the Workspace Window.
4.2 Input to a Script File.
4.3 Output Commands.
4.4 The Save and Load Commands.
4.5 Importing and Exporting Data

UNIT 5

5. Two-Dimensional Plots.

5.1 The Plot Command.
5.2 The Fplot Command.
5.3 Plotting Multiple Graphs in the Same Plot.
5.4 Formatting a Plot.
5.5 Plots with Logarithmic Axes.
5.6 Plots with Error Bars.
5.7 Plots with Special Graphics.
5.8 Histograms.
5.9 POLAR PLOTS.
5.10 Putting Multiple Plots on the Same Page.
5.11 Multiple Figure Windows

UNIT 6

6. Programming

6.1 Relational and Logical Operators.
6.2 Conditional Statements.
 6.3 The Switch-Case Statement.
6.4 Loops.
6.5 Nested Loops And Nested Conditional Statements.
6.6 The Break and Continue Commands.

UNIT 7

7. User-Defined Functions and Function Files.

7.1 Creating a Function File.
7.2 Structure of a Function File.
7.3 Local and Global Variables.
7.4 Saving a Function File.
7.5 Using a User-Defined Function.
7.6 Examples of Simple User-Defined Functions.
7.7 Comparison between Script Files and Function Files.
7.8 Anonymous and Inline Functions.
7.9 Functions.
7.10 Sub functions.
7.11 Nested Functions.

UNIT 8

8. Polynomials

8.1 Curve Fitting and Interpolation.
8.2 Polynomials.
8.2 Curve Fitting.
8.3 Interpolation.
8.4 The Basic Fitting Interface.

UNIT 9

9. Applications in Numerical Analysis.

9.1 Solving an Equation with One Variable.
9.2 Finding a Minimum or A Maximum Of A Function.
9.3 Numerical Integration.
9.4 Ordinary Differential Equations.

UNIT 10

10. Three-Dimensional Plots.

10.1 Line Plots.
10.2 Mesh and Surface Plots.
10.3 Plots with Special Graphics.
10.4 The View Command.

UNIT 11

11 Symbolic Math

11.1 Symbolic Objects and Symbolic Expressions.
11.2 Changing the Form of an Existing Symbolic Expression.
11.3 Solving Algebraic Equations.
11.4 Differentiation.
11.5 Integration.
11.6 Solving an Ordinary Differential Equation.
11.7 Plotting Symbolic Expressions.
11.8 Numerical Calculations with Symbolic Expressions.

Lab exercises to be done on each of the above topics

Text Books:

MATLAB An Introduction and applications by Amos Gillat

Reference Books:

SCILAB (A Free Software to Matlab) by Hema Ramchandran , Achuthsankar S. Nair

SEMESTER V

Course Code	Name of Course	Teaching Scheme				Examination Scheme				Total Marks
		L	T	P	C	Theory Marks		Practical Marks		
						TH	TM	PR/OR	TW	
EN612	Internet Technology And Web Designing	3*	-	2*	5	75	25	25	25	150
CO501	Computer Security	3*	-	2*	5	75	25	-	25	125
CS501	Entrepreneurship Development	-	-	2	2	-	-	-	50	50
E1	Elective I	3*	-	2*	5	75	25	25	25	150
IT501	INDUSTRIAL TRNG.	-	-	16	16	-	-	-	-	GRADE
	TOTAL	9	-	24	33	300		175		475

*Workload shall be doubled
Electives I:
EN614 – E- Commerce
CO511 – Data structures using c
CO512 – Introduction to Microcontrollers
CO513 – Principles of multimedia

SEMESTER –VI

Course Code	Name of Course	Teaching Scheme				Examination Scheme				Total Marks
		L	T	P	C	Theory Marks		Practical Marks		
						TH	TM	PR/OR	TW	
CO601	Network Management	3	-	2	5	75	25	25	-	125
CO602	Software Engineering and Testing	3	-	2	5	75	25	25	25	150
E2	Elective II	3	-	2	5	75	25	25	25	150
E2	Institutional Elective/Elective-II	3	-	2	5	75	25	25	25	150
CS602	Business Communication	-	-	2	2	-	-	50	50	100
CO603	PROJECT	-	-	6	6	-	-	50	50	100
	TOTAL	12	-	16	28	400		375		775

Electives II:
CO615 – Mobile Computing
CO611 – Advanced Computer Architecture
CO612-Computer Graphics
CO613- Cyber Law and Computer Forensics
CO614-Embedded Systems Design

Institutional Elective:
IE652: Introduction to Mobile Application Development

Directorate of Technical Education, Goa State

SEMESTER V

(EN612) INTERNET TECHNOLOGY AND WEB DESIGNING

1. RATIONALE:

The course will enable the students to understand the basics of internet and various applications of internet. This course develops competency amongst the students to design professional web sites and interactive web pages. They will have an overview of different technologies like HTML, CSS, Java scripts, and PHP.

2. TEACHING AND EXAMINATION SCHEME:

Course Code & Course Title	Periods/ Week (In Hours)			Total Credit	Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
EN612 INTERNET TECHNOLOGY AND WEB DESIGNING	L	T	P	C	TH	TM	TW	PR/OR	150
	3	-	2	5	75	25	25	25	

3. DETAILED COURSE CONTENTS:

UNIT 1

1. TCP/IP Model   **(15 marks)**

1.1 Layers in TCP/IP Model

1.2 TCP/IP Protocol Suite (Protocols associated with the layers of TCP/IP Suite - **definitions only**)

    1.2.1   Physical and Data Link layers

    1.2.2   Network Layer   (protocols: IP, ARP, RARP, ICMP)

    1.2.3   Transport Layer   (protocols: UDP, TCP, SCTP)

    1.2.4   Application Layer (protocols: HTTP, BOOTP, DHCP, DNS, FTP, SMTP, POP, IMAP, TELNET)

1.3 Network Layer Protocols

    1.3.1   Overview of Internet Protocol

        1.3.1.1 IP Addresses in Classful Addressing Scheme

            1.3.1.1.1 Dotted Decimal Notation

1.3.1.1.2 Loopback Address

1.3.1.1.3 IP Multicast Addresses

1.3.1.1.4 Drawbacks of Classful Addressing

1.3.1.2 IP version 6

1.3.1.2.1 Limitations of IP version 4

1.3.1.2.2 Features of IP version 6

1.3.1.2.3 IPv6 Packet Format (General Format Only)

1.3.2   Address Resolution Protocol

1.3.2.1 Resolution through Dynamic Binding (Using ARP)

1.3.2.2 Address Resolution Cache

1.3.3   Reverse Address Resolution Protocol

1.3.4   Internet Control Message Protocol

1.3.4.1 Error Reporting by ICMP (Destination Unreachable, Source Quench, Redirect, Time Exceeded)

1.3.4.2 ICMP Message Delivery

1.4 Transport Layer Protocols

1.4.1   Transmission Control Protocol

1.4.1.1 Features of TCP

1.4.1.2 Understanding the TCP Connection (Establishing, Terminating and Resetting a TCP Connection)

1.4.2   User Datagram Protocol

1.4.2.1 Basics of UDP

1.4.2.2 UDP Packet Format

UNIT 2

2.   Application Layer Protocols and World Wide Web   (15 marks)

2.1 Dynamic Host Configuration Protocol

2.1.1   Features of DHCP

2.2 Domain Name System

2.2.1   Domain Name Server (Hierarchical namespaces, DNS namespaces, Name servers, Domain Name Resolution, Domain Names)

2.2.2 Concepts used in a Domain Name System (Domain, Zones, Root server, Resolver)

2.3 File transfer and Access Using FTP and TFTP

2.3.1 Understanding FTP

2.3.2 FTP Process Model

2.3.3 Trivial File Transfer Protocol

2.4 Electronic Mail

2.4.1 Conceptual Components of an E-mail System

2.4.2 Email address format

2.4.3 Protocols used for providing services to email messages (to be covered in brief)

2.4.3.1 Simple Mail Transfer Protocol

2.4.3.2 Post Office Protocol

2.4.3.3 Internet Message Access Protocol

2.4.3.4 Multipurpose Internet Mail Extension

2.5 Basics of world wide web (**introduction - reference book 2**)

2.6 Hypertext Transfer Protocol

2.6.1 Understanding Uniform Resource Locator (URL)

2.6.2 Understanding HTTP commands (GET, HEAD, PUT, POST, DELETE, LINK, UNLINK)

2.7 Search Engine Basics (**reference book 3**)

UNIT 3

3   Introduction to Web Technology   (15 marks)

3.1 The concept of a tier

3.1.1 1-tier application

3.1.2 2-tier application

3.1.3 3-tier application

3.2 Comparison of Microsoft and Java Technologies

3.2.1 Introduction (presentation tier, business tier, database tier)

3.2.2 Presentation Tier Technologies

3.2.3 Business Tier Technologies

3.3 Web Pages – Types (static, dynamic, active) and Issues

3.3.1 Static Web Pages

3.3.1.1 Introduction

3.3.1.2 Advantages and Disadvantages

3.3.2 Plug-ins

3.3.3 Dynamic Web Pages

3.3.3.1 Need for Dynamic Web Pages

3.3.3.2 Introduction

3.3.3.3 Overview of Dynamic Web Pages

3.3.3.4 Overview of Dynamic Web Page Technologies

3.3.3.4.1 Server-side scripting (Active Server Pages (ASP), Java Servlets and Server Pages (JSP) and common gateway interface(CGI) - **brief introduction to these technologies**)

3.3.3.4.2 Client-side scripting (VBScript, JavaScript - **brief introduction to these technologies**)

3.3.4 Active Web Pages

3.3.4.1 Introduction

3.3.4.2 Advantages

3.3.4.3 Overview of Active Web Page Technologies

(Java applets, ActiveX controls - **brief introduction only**)

UNIT 4

4   HTML   **(15 marks)**

4.1 Introduction to HTML

4.1.1 HTML Tags (Container tag, Standalone tag)

4.1.2 HTML Page Structure (Head and Body)

4.1.3 Document Structure Tags (<HTML>,<HEAD>, <BASE>, <META>, <LINK>, <SCRIPT>, <TITLE>, <BODY>)

4.2 Formatting Tags

 4.2.1 Text Formatting Tags (<B>, <BASEFONT>, <BIG>, <FONT>, <I>, <STRIKE>, <SMALL>, <SUB>, <SUP>, <U>)

 4.2.2 Block Formatting Tags (
, <DIV>, <HR>, <H1>….<H6>, <P>)

4.3 List Tags

 4.3.1 List Item - <LI> tag

 4.3.2 Ordered List - <OL> tag (Attributes - Start, Type)

 4.3.3 Unordered List - <UL> tag (Attributes - Type)

 4.3.4 Definition List - <DL> tag

4.4 Hyperlink - <A> tag (Attributes – Href, Name, Target)

4.5 Image <IMG> tag (Attributes – Src, Alt, Width, Height, Border)

4.6 Table

 4.6.1 Introduction to HTML tables and their structure

 4.6.2 The Table tags (<TABLE>, <CAPTION>, <THEAD>, <TFOOT>, <TBODY>, <COLGROUP>, <COL>, <TR>, <TD>, <TH>)

 4.6.3 Attributes of <TABLE> tag (border, bordercolor, cellpadding, cellspacing, width, height, bgcolor, background, align, hspace, vspace, frame)

 4.6.4 Attributes of <TR> tag (align, valign, bgcolor, background, bordercolor)

 4.6.5 Attributes of <TD> tag (align, valign, width, height, colspan, rowspan, bgcolor, background, bordercolor)

 4.6.6 Spanning multiple rows and columns(colspan, rowspan)

4.7 Frames

 4.7.1 Application of frames

 4.7.2 Frames Document

 4.7.3 The <FRAMESET> tag

 4.7.4 Nesting <FRAMESET> tag

 4.7.5 Placing content in frames with the <FRAME> tag (Attributes - src, name, scrolling, noresize, frameborder, bordercolor, marginwidth, marginheight)

 4.7.6 Targeting named frames

 4.7.7 Creating Floating Frames - <IFRAME> tag (Attributes – align, height, width, name, src, frameborder)

4.8 Forms

4.8.1 Creating Forms - The <FORM> tag (Attributes – url, method, name, target, onSubmit, onReset)

4.8.2 Form Elements

4.8.2.1 The Input Tag (Attributes – type, name, value, size, maxlength, checked, disabled, readonly)

4.8.2.2 Single line text field, text area (multiline input - <textarea>), password, submit button, reset button, radio-buttons, checkboxes, list boxes (<select> and <option> tags)

4.8.3 Grouping Related Fields (<fieldset> and <legend> tags)

4.8.4 Passing form data (method and action attribute of <form> tag)

4.9 Multimedia (<embed> tag)

UNIT 5   **(15 marks)**

5. **CSS and JavaScript**

5.1 Basics of CSS3

5.1.1 Understanding the Syntax of CSS

5.1.2 Inserting CSS in an HTML Document (internal style sheet, external style sheet, inline style)

5.2 CSS3 Selectors (universal selector, type selector, class selector, id selector, attribute selector)

5.3 Typography

5.3.1 Font properties in CSS (font-family, font-size, font-size-adjust, font-stretch, font- style, font-variant, font-weight, font)

5.3.2 Introducing Web Font

5.4 Text formatting properties, border properties

5.5 CSS color Modes

5.5.1 Opacity Property

5.5.2 RGBA Value format

5.5.3 HSL and HSLA Values Format

5.5.4 Using Color Properties

5.6 Stunning Aesthetics with CSS3

5.6.1 Using the text shadow property

5.6.2 Gradient Properties

5.6.3   Background of a Web Page

5.7 CSS Transitions

5.8 CSS Transformations

5.9 CSS Animations

5.10 JavaScript concept, Origin of JavaScript, Advantages of java script, Java script syntax.

5.11 Variables, Data Types, Operators, Literals

5.12 JavaScript Control Statements

5.13 Arrays and Functions

5.14 Dialog Boxes

5.15 Introduction to Objects (object definition, properties, methods)

5.16 Core JavaScript built-in objects

5.16.1   Date object (getDate(), getDay(), getFullYear(), getHours(), getMinutes(), getMonth(), setDate(), setFullYear(), setHours(), setMinutes(), setMonth())

5.16.2   Math object (max(x,y,z,....,n), min(x,y,z,....,n), pow(x,y), round(x), sqrt(x))

5.16.3   String object (charAt(), concat(), indexOf(), lastIndexOf(), slice(), toUpperCase(), toLowerCase())

5.16.4   Array object (concat(), reverse(), sort(), push(), pop())

5.17 Events and Event Handlers

5.17.1   General information about events

5.17.2   Defining event handlers (onclick(), onload(), onsubmit(), onreset())

4. SUGGESTED LEARNING RESOURCES

List of Textbooks

Sr No	Title of Book	Author	Publication
1	Internet Technologies	Kogent Learning Solutions Inc.	Dreamtech Press
2	Web Technologies	Achyut Godbole Atul Kahate	Tata Mcgraw Hill
3	Advanced Internet Technology	Deven Shah	Dreamtech Press
4	Web technology and Design	C. Xavier	
5	Web Enabled Commercial Application Development Using HTML, JavaScript, DHTML and PHP, 4th Edition 2010	Ivan Bayross	Paper Back ISBN : 9788183330084

List of Software/Learning Websites

1. http://www.html.net
2. http://www.w3schools.com
3. http://www.tutorialpoint.com
4. http://www.homeandlearn.co.uk

Suggested List of Practicals

Sr. No	Practical Exercises
1	Write HTML codes for displaying image and demonstrate hyper linking.
2	Write HTML codes to attach video on webpage using embed tag in html
3	Create a Feedback Form Using Form handling.
4	Create a Contact Form using form handling.
5	Write a code for creating static page design using division tag
6	Write a code for design menu system using list tag
7	Design Google Page using HTML
8	Apply CSS formatting to created pages

(CO501) COMPUTER SECURITY

1. RATIONALE:

Computer security is one of the most important and relevant area of computing today. The requirement to address security in computer system design is an important design consideration in many of today's systems. It is essential to understand various threats to secure computing and the basic security design principles and techniques developed to address these threats. This course introduces the fundamentals of computer / network security and the basics of cryptography, application security and system security. The student will achieve a firm intuition about what computer security means and will be able to recognize potential threats to confidentiality, integrity and availability.

2. TEACHING AND EXAMINATION SCHEME:

Course Code & Course Title	Periods/ Week (In Hours)			Total Credit	Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
	L	T	P	C	TH	TM	TW	PR/OR	
CO501 COMPUTER SECURITY	3	-	2	5	75	25	25	-	125

3. DETAILED COURSE CONTENTS:

UNIT – I: (15 Marks)

Introduction to the concepts of security

1.1 The need for security- Basic Concepts
1.2 Security approaches-trusted systems
1.3 Security models- No security, Security through obscurity, host security, network security.
1.4 Security management practices
1.5 Principles of security- confidentiality, authentication, integrity, non repudiation, access control, availability, Ethical and legal issues.
1.6 Types of attacks:
    1.6.1 A general view- criminal attacks, publicity attacks, legal attacks.
    1.6.2 A technical view- Theoretical concepts: interception, fabrication, modification, interruption
    1.6.3 Passive and active attacks
    1.6.4 Practical side of attacks- Application level attacks, network level attacks
    1.6.5 Programs that attack- virus, worms, Trojan horse.
    1.6.6 Specific attacks- sniffing and spoofing, phishing, pharming.
1.7 User Authentication mechanism
1.7.1   Definitions
1.7.2   Types of authentication
1.7.3   Password Authentication –
1.7.4   Clear text password

1.7.5   Working and problems with this scheme
1.7.6   Problems with passwords
1.7.7   Biometric Authentication
1.7.8   Introduction
1.7.9   Working of Biometric
1.7.10 Biometric techniques
1.7.11 Physiological techniques
1.7.12 Behavioral Techniques

UNIT – II: (15 Marks)

Cryptography Techniques

2.1 Introduction- cryptography, cryptanalysis, cryptology.
2.2 Plain Text and cipher text
2.3 Substitution techniques: Caesar Cipher (only).
2.4 Transposition techniques
     2.4.1 Rail-fence technique
     2.4.2 Simple columnar transposition technique (Basic technique only)
2.5 Encryption and decryption
2.6 Symmetric and asymmetric key cryptography
     2.6.1 Problem of key distribution
2.7 Steganography
2.8 Key range and key size.
2.9 Possible type of attacks:
     2.9.1 Cipher-text only attack
     2.9.2 Known plain-text attack
     2.9.3 Chosen plain-text attack
     2.9.4 Chosen cipher-text attack
     2.9.5 Chosen-text attack.
2.10 Algorithm types and algorithm modes
     2.10.1 Algorithm types- stream ciphers and block ciphers
     2.10.2 Algorithm modes- Electronic Code book, Cipher chaining, Cipher Feedback mode

UNIT – III: (15 Marks)

Symmetric key and Asymmetric key Cryptography, Message Authentication and Hash Functions

3.1 An overview of symmetric-key cryptography
3.2 Data encryption standard (DES) - Basic working principal only.
3.3 Overview of asymmetric –key cryptography,
3.4 Asymmetric –key cryptography algorithms- The RSA Algorithm
     3.4.1 Introduction
     3.4.2 Examples of RSA
     3.4.3 Security of RSA- Plain-text attacks, chosen-cipher text attack, factorization
           attack, attacks on the encryption key, attack on the decryption key.
3.3 Comparison between symmetric and asymmetric key cryptography

3.4 Digital signatures
  3.4.1 Introduction
  3.4.2 Message digests (Hash Functions)
      3.4.2.1 Introduction
      3.4.2.2   Idea of a message digests
      3.4.2.3   Requirements of a message digest.
3.6 Digital Signature Techniques - RSA and Digital Signature
3.7 Problems with public key exchange.
3.8 Digital certificates
  3.8.1 The concepts of digital certificates,
  3.8.2 Certification Authority (CA)
  3.8.3 Technical details of a digital certificate.

UNIT IV: (15 Marks)

Internet Security Protocols and Email Security

4.1 Secure Socket Layer (SSL)
  4.1.1 Introduction,
  4.1.2 The position of SSL in TCP/IP protocol suite,
  4.1.3 The working of SSL
        4.1.3 i) The handshake protocol
              ii) The record protocol
              iii) The Alert protocol
  4.1.4 Closing and resuming SSL connections
4.2 Transport Layer Security (TLS)
4.3 Secure Hyper Text Transfer Protocol (SHTTP)
4.4 Secure Electronic Transaction (SET)
  4.4.1 Introduction
  4.4.2 SET participants
  4.4.3 SET Process
4.5 Email Security:
4.5.1 Privacy Enhanced mail – Introduction, working of PEM
4.5.2 Pretty Good Privacy (PGP) – Working of PGP

UNIT V: (15 Marks)

Intrusion Detection and Firewall (Ref. Book 2)

Intruders
5.1 Masquerader, misfeasor, clandestine user
5.2 Intrusion techniques: one-way encryption / function, access control
5.3 Intrusion detection: (Brief description only)
  i) Statistical anomaly detection
  ii) Rule based detection
  iii) Honey pots
5.6 Firewalls:
  5.6.1 Introduction - the need of firewalls (Ref book 1.)

5.6.2 Firewall Characteristics: Design Goals and general techniques used to control access
    i) Service Control
    ii) Direction Control
    iii) User Control
    iv) Behavior Control

5.6.5 Types of Firewalls (brief description with figures only)
    i) Packet Filtering Firewall
    ii) Stateful Inspection Firewalls
    iii) Application level Gateway
    iv) Circuit Level Gateway

5.6.6 Concept of Demilitarized zone (DMZ) (Ref book 1.)
5.6.7 Limitations of firewall (Ref book 1.)

Reference textbooks

1. Cryptography and Network Security, Atul Kahate, Third Edition
2. Cryptography and Network Security, Principles and Practice, William Stallings.
3. Information Systems Security: Security Management, Metrics, Frameworks and best practices by
   Nina Godbole. Wiley India Publications.

Suggested list of practicals (Practicals can be implemented using C, C++, Java, etc.)

1. Write a program to apply XOR logic on the given string (char pointer) and display the result.
2. Write a program to encrypt and decrypt data based on following algorithms like Ceaser cipher, Substitution cipher and Hill Cipher
3. Write a program to generate public and private key pair.
4. Write a program to implement Symmetric and Asymmetric key cryptography algorithm logic using built-in functions.
5. Write a program to encrypt users password before storing it in data base and retrieve them back to verify.
6. Write a program to implement digital signature on a given text.
7. Write a program to detect live systems based on following: Port Scanning (e.g. : Nmap, SuperScan), Passive Fingerprinting(e.g.: Xprobe2), Active Fingerprinting(e.g.: Xprobe2)
8. Antivirus software and its settings. Settings, firewalls, Enabling/Disabling ports.

(CS501) ENTREPRENEURSHIP DEVELOPMENT

1.   RATIONALE

The course on Entrepreneurship Development focuses on creating awareness regarding entrepreneurial traits, entrepreneurial support system, opportunity identification, project report preparation and understanding of legal and managerial aspects related to setting up of enterprise. This can be helpful in motivating technical students to start their own small-scale business/enterprise.

2.   TEACHING AND EXAMINATION SCHEME

Course Code & Course Title	Periods/Week (In Hours)			Total Credits	Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
CS501 Entrepreneurship Development	L	T	P	C	-	-	PR/OR	TW	50
	-	-	2	2	-	-	-	50	

Minimum passing % Practical 40%

3.   COMPETENCY TO BE DEVELOPED THROUGH THIS COURSE

The course content should be taught and implemented with the aim to develop different types of skills leading to the achievement of the competency – ***Prepare a detailed project report for an identified product/service.***

4.   DETAILED COURSE CONTENT

Unit 1:Introduction	(7 Hours, 12 Marks)

Meaning of entrepreneurship, need in the present scenario, definition of an entrepreneurship, qualities of an entrepreneur, functions of an entrepreneur, risks and rewards of entrepreneurship.

Definition of Micro, Small And Medium Enterprises (MSME).Classification of Micro, Small And Medium Enterprises (MSME). Types of Enterprises - manufacturing, service and franchisee.

Unit 2:Forms of Business Organisation	(2 Hours, 9 Marks)

Main features of Sole Proprietorship, Partnership, Private Limited Company, Public Limited Company, Co-operative Society.

Unit 3:Entrepreneurial Support System (6 Hours, 9 Marks)

Central Government Agencies: Functions of Small Industries Development Bank of India(SIDBI), National Bank for Agriculture and Rural Development (NABARD), National Small Industries Corporation (NSIC), Micro, Small And Medium Enterprises -Development Institute (MSME- DI), Technology Business Incubator (TBI), Khadi & Village Industries Commission (KVIC).

State Government Agencies: Functions of District Industries Centre(DIC), Goa Industries Development Corporation (GIDC), Economic Development Corporation (EDC), Financial Institutions-Banks, Goa Handicrafts and Rural Small Scale Industries Development Corporation (GHRSSIDC), Rural Development Agency (RDA), Khadi and Village Industries Board (KVIB).

Unit 4: Business Opportunity Identification (7 Hours, 6 Marks)

Evaluation of business opportunity:- selection of industry, initial prospects study, product marketing concept, decision to proceed, feasibility study, project evaluation.

Unit 5: Market Research (6 Hours, 12 Marks)

Definition of demand, factors affecting demand, law of demand,demand curves

Definition of supply, factors affecting supply,law of supply, supply curves.

Preparation of questionnaire. Data collection for setting up a small enterprise.

Unit 6: Legal Aspects (4 Hours, 9 Marks)

Procedure of registration of Micro, Small And Medium Enterprise (MSME), meaning and registration of Value Added Tax(VAT), Service Tax, PAN. Slabs of Income tax.

Unit 7: Project Report (16 Hours, 18 Marks)

Need for project report, importance of Project report,

scope of project report:Economic aspects, technical aspects,financial aspects, managerial aspects, production aspects.

List the contents of a project report.

Proforma of a project report which includes:-Introduction,scheme, profitability and projections, infrastructure, break- even point, names and addresses of suppliers, remarks.

Project Profile.

Project appraisal criteria:- technical feasibility, financial feasibility, economic viability, commercial viability, managerial competency, political and labour considerations.

4. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (THEORY)

Unit No.	Topic	Teaching Hours/ Semester	MARKS
1	Introduction	7	12
2	Forms of Business Organisation	2	9
3	Entrepreneurial Support System	6	9
4	Business Opportunity Identification	7	6
5	Market Research	6	12
6	Legal Aspects	4	9
7	Project Report	16	18
TOTAL		48	75

5. MANDATORY ASSIGNMENTS

1. Preparation of a Case Study on leading entrepreneurs of Goa. (To be taken while conducting Unit 1)
2. Preparation of a Case Study on leading entrepreneurs of India. (To be taken while conducting Unit 1) Unit 1)
3. Filling of template of "Business Model Canvas"
4. Prepartion of Project Profile.
5. Preparation of Project Report.

6.SUGGESTED ACTIVITIES:

3. Visits to related departments (DIC,Banks,Tecnology Business Incubators, MSME-DI, NSIC, KVIC, KVIB).
4. Study visits to industries.
5. Organise entrepreneurship related event / activities.
6. Organise lectures/seminars with successful entrepreneurs.
7. Organise brainstorming sessions on ideation.
8. Establish an Entrepreneurship Development Cell.

7. SUGGESTED LEARNING RESOURCES

S.No.	Author	Title of Books	Year of Publication
1.	*Sharad jawadekar, shobha dodlani,*	*Business entrepreneurship*	*Suvichar prakashan mandal pune,*
2.	*S.S. Khanna*	*Entrepreneurship development*	*S. Chand & Co. Ltd, New Delhi,*
3.	*Vasant Desai*	*Management of small Scale Industry in India*	*Himalaya Publishing House*
4.	*Dilip Sarwate*	*Entrepreneurial development Concepts and practices*	*Everest Publication House, Pune*
5.	*CB Gupta and P Srinivasan*	*Entrepreneurship Development*	*S. Chand and Sons, New Delhi*
6.	*PM Bhandari*	*Handbook of Small Scale Industry*	

(IT501) INDUSTRIAL TRAINING

1. RATIONALE:

Industrial Training is a newly introduced component, in the curriculum under Revised Semester Pattern system for all 03 year Diploma Programmes. It is a Training programme designed to expose & prepare the students for the Industrial work situation. This exposure and hands on experience, will further enhance the prospects of student fraternity to be better placed on completion of their course.

2. TEACHING AND EXAMINATION SCHEME

Course code & course title	Periods/Week (in hours)			Total Credits	Examination Scheme				Total Marks
					Theory		Practical		
IT501 INDUSTRIAL TRAINING	L	T	P	C	TH	TM	PR/OR	TW	
	-	-	16	16	-	-	30	70	**GRADE**

Minimum passing %: 40%
Legends:
PR/OR - End Semester Practical / Oral Examinations; TW- Term Work

3. DETAILED COURSE CONTENTS

Students are required to study and have hands-on experience wherever possible in the following areas (depending on availability):

1. Company Profile
2. Organizational Structure
3. Company Product Range
4. Manufacturing Facilities Available /Services provided
5. Plant / Facility Layout
6. Operations / Production Processes
7. Production Planning and Control
8. Detail study of Latest Equipment/ Technologies Used
9. Stores Functions
10. Material Handling Systems/ Equipments
11. Quality Management Systems / Functions
12. Maintenance and Repair Practices
13. Safety Practices / Safety Equipments
14. Utilities
15. Logistics
16. Sales and Marketing
17. Ethics, Statutory Rules and Regulations followed
18. Product Design and Development
19. Any other area specific to the Industry providing Training

4. TERM WORK & PRACTICALS

Evaluation Scheme					
TW				PR/OR	
Attendance Marks*	Industrial Mentor's assessment Marks	Institute Mentor's assessment Marks	Training Report	Report Assessment & Seminar/Viva	TOTAL Marks
10	20	20	20	30	100

* 01 mark shall be deducted for every Absence (with or without permission).

Daily Dairy

The daily dairy should-be maintained in a book. It should reflect the day to day activities performed by the student (including task, men and materials involved). It should be counter signed by the Industry Mentor. It will become the basis for writing reports on the complete training.

Training Report

The training report should be submitted by the training students should include the following salient points- Certificate from institute, Certificate of training from company, detailed write up as per daily dairy, detailed drawings, working drawings, photographs, safety precautions, techniques for work minimization on site, organizational chart, Importance of project to the society, special methods/techniques/equipment should be separately high lightened, including environmental aspects. The report should be informative and technical, typed with double spacing on good quality bond paper and bound.

Assessment of Training Report be based on Knowledge, Presentation, Quality of contents and Sketches.

Note :

   a. Student/s undergoing Industrial Training shall follow Rules and Regulations of the Industry.
   b. Industrial Training will generally be organised and conducted in accordance with Industrial Training Manual duly prescribed by the Board.

5. SUGGESTED SPECIFICATION TABLE WITH MARKS & HOURS (THEORY)

Unit No	Name of the Unit	Teaching Hours	Marks
1	PR/OR	08 Weeks	30
2	TW		70
	Total	**08 Weeks**	**100**

Note:

   1. For Industrial training Grades will be awarded based on marks scored as follows:

   80% and above Marks – Grade 'A'

   60% to 79% Marks – Grade 'B'

   40% to 59% Marks – Grade 'C'

   Marks below 40% - Grade 'D'

   2. TW and PR/OR shall be separate Heads of passing. Student has to secure minimum

   Grade 'C' for passing.

(EN614) E-COMMERCE

1. RATIONALE:

This course will enable the students to understand current and emerging electronic commerce technologies using Internet, managing electronic commerce funds transfer, reinventing the future of business through electronic commerce, etc.

2. TEACHING AND EXAMINATION SCHEME:

Course code & Title	Periods/ week (in Hrs)			Total Credit	Examination Scheme				Total Marks
					Theory Marks		Practical marks		
	L	T	P	C	TH	TM	TW	PR/OR	
EN614 E-Commerce	3	-	2	5	75	25	25	25	150

3. DETAILED COURSE CONTENTS:

Unit 1

5. **Introduction**   (15 marks)

a.   Definition of e-commerce

b.   Conducting Business online

        1.2.1 Direct Marketing, selling and services

        1.2.2 Financial and Information Services

        1.2.3 Maintenance, Repair and Operations

        1.2.4 Value Chain Integration

1.3 Impact of e-commerce on business

1.4 Issues in implementing e-commerce

1.5 Comparison between Traditional Commerce and e-commerce

1.6 Incentives for engaging in E-commerce

1.7 Driving forces behind e-commerce

1.8 Advantages of e-commerce

        1.8.1 Primary benefits of E-commerce

        1.8.2 Advantages to customers

        1.8.3 Advantages to Business

        1.8.4 Advantages to society

1.9 Disadvantages of e-commerce

1.10 Electronic market

1.11 Types of e-commerce/e-commerce market models

1.12 Architectural framework for e-commerce

1.13 Applications of e-commerce

Unit 2
2.Emergence of E-Commerce (15 marks)

2.1 Electronic transaction process.

2.2 Electronic data interchange (EDI).

      2.2.1 What is EDI?

      2.2.2 Before Implementation of EDI

      2.2.3 After Implementation of EDI

      2.2.4 EDI basics

      2.2.5 EDI in action

2.3 EDI standards

2.4 Financial EDI.

2.5 Applications of EDI.

2.6 Benefits of EDI.

2.7 Typical EDI systems.

Unit 3
3.Electronic payment system (EPS) (15 marks)

3.1A Layered protocol Model

3.2 Types of Electronic payment system

3.3 Digital token based Electronic payment system

      3.3.1 Electronic cash

            3.3.1.1 Properties of E-cash

            3.3.1.2 How E-cash is generated

      3.3.2 Smart card & Electronic payment system

      3.3.3 Electronic check (E-Check)

3.4 Credit card based Electronic payment system

      3.4.1 Payment using Plain credit card

      3.4.2 Payment using Encrypted credit card details

      3.4.3 Payment using third party verification

3.5 Business Pros & Cons of credit cards

3.6 SET protocol Algorithm for credit cards

      3.6.1 A sample SET session

      3.6.2 Objectives of SET

Unit 4
4.E- commerce Enterprise (15 marks)

4.1Need to set up an E-commerce Enterprise

      4.1.1 Competition

      4.1.2 Global reach

      4.1.3 Customer service

      4.1.4 Value addition

      4.1.5 Operation oriented processes

      4.1.6 Nettish products

4.2 Setting up of ecommerce enterprise

    4.2.1 Web development and maintenance

    4.2.2 Static WebPages

    4.2.3 Integration with operational database

    4.2.4 Dynamic websites

    4.2.5 Customer transactions

    4.2.6 Transaction processing

4.3 Getting started with ecommerce enterprise

    4.3.1 Investments

        4.3.1.1 Web hosting and administration

        4.3.1.2 Web designing and development

        4.3.1.3 Online transactions

        4.3.1.4 Marketing and branding

        4.3.1.5 Training and development

        4.3.1.6 Management and control

    4.3.2 Marketing

    4.3.3 Growth

        4.3.3.1 Market share

        4.3.3.2 Geographical reach

        4.3.3.3 Product range

4.4 How to get customers and retain them

    4.4.1 Promotion

        4.4.1.1 Online promotional strategies

            4.4.1.1.1 Listing on search engines

            4.4.1.1.2 Banners

            4.4.1.1.3 Link exchange programs

            4.4.1.1.4 Affiliate programme

            4.4.1.1.5 Referral programs

            4.4.1.1.6 Directory listing

        4.4.1.2 Traditional promotional strategies

    4.4.2 Building trust

        4.4.2.1 Branding

        4.4.2.2 Navigation

        4.4.2.3 Presentation

        4.4.2.4 Fulfillment

        4.4.2.5 Logos of security

        4.4.2.6 Up-to-date technology

    4.4.3 Building loyalty

Unit 5

5.M-commerce   **(15 marks)**

5.1 Introduction

5.2 Requirements of a Mobile Commerce System

5.3 Mobile Commerce System Structure

5.4 Mobile Commerce Applications

        5.4.1 Commerce

        5.4.2 Education

        5.4.3 Enterprise Resource Planning

        5.4.4 Entertainment

        5.4.5 Health care

        5.4.6 Inventory tracking and dispatching

        5.4.7 Traffic

        5.4.8 Travel and ticketing

5.5 Mobile stations

        5.5.1 Operating system

            5.5.1.1 Palm OS

            5.5.1.2 Pocket OS

            5.5.1.3 Symbian OS

5.6 Mobile Middleware

        5.6.1 WAP

        5.6.2 imode

        5.6.3 Comparison of WAP and imode

4. REFERENCE BOOKS:

1. Business on the Net By Kamlesh Agarwala,Amit Lal,Deeksha Agarwala
2. Electronic Commerce By Mukesh Chandra Trivedi
3. Mobile Commerce Applications by Nan Si Shi

5. LIST OF EXPERIMENTS

Sr. No	Name of the Experiment
1.	Brief study of various Advantages and Disadvantages of E-commerce (Can include debate , group discussion)
2.	Analysis of any E-commerce website based on following criteria • User Interface • Product Catalog • Payment options • Search options • Security
3.	Designing a Homepage for E-Commerce Site
4.	Study of E-commerce Enterprise(any one)
5.	Case study of Payment gateway (any one)
6.	Case study of M-commerce Application(any one)

(CO511) DATA STRUCTURES USING C

1. RATIONALE:

Data structure is a subject of primary importance in Information and Communication Technology. Organizing or structuring data is important for implementation of efficient algorithms and program development. Efficient problem solving needs the application of appropriate data structure during program development.

Understanding of data structures is essential and this facilitates the understanding of the language. The practice and assimilation of data structure techniques is essential for programming. The knowledge of „C" language and data structures will be reinforced by practical exercises during the course of study. The course will help students to develop the capability of selecting a particular data structure.

2. TEACHING AND EXAMINATION SCHEME:

Course Code & Course Title	Periods/ Week (In Hours)			Total Credit	Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
	L	T	P	C	TH	TM	TW	PR/OR	
CO511 DATA STRUCTURES THROUGH C	3	-	2	5	75	25	25	25	150

3. DETAILED COURSE CONTENTS:

UNIT 1

4 Introduction to Data Structures   **(15 Marks)**

    4.1 Introduction
    4.2 Definition of Data Structures
    4.3 Types of Data Structures
    4.4 Data Structure Operations
    4.5 Algorithms
    4.6 Types of Algorithms- Brute force, divide-and-conquer, Greedy Algorithms, backtracking
    4.7 Space and Time complexity
    4.8 Asymptotic Notation

UNIT 2

5 Stacks and Queues   **(15 Marks)**

    5.1 Stacks
        5.1.1 Introduction to Stack
        5.1.2 Stack operations
        5.1.3 Stack implementation
        5.1.4 Application of Stacks

5.2 Queues
     5.2.1   Introduction
     5.2.2   Queue basics
     5.2.3   Queue implementation
     5.2.4   Circular queue (Basic concepts only)
     5.2.5   Priority queue (Basic concepts only)
     5.2.6   Double-ended queue (Basic concepts only)

UNIT 3

6   Linked List   **(15 Marks)**

6.1   Introduction
6.2 Basic concept
6.3 Implementation
6.4 Operations on a Linked List
     6.4.1   Insert a node (At the end of the list)
     6.4.2   Delete a node (At the end of the list)
     6.4.3   Search a node
     6.4.4   Traverse through the list.
6.5 Types of linked lists
6.6 Circular linked lists (Basic concepts only)
3.7 Doubly linked lists (Basic concepts only)

UNIT 4

4 Searching and Sorting   **(15 Marks)**

4.1. Searching Techniques
     4.1.1   Basic concept
     4.1.2   Linear Search
     4.1.3   Binary Search
4.2. Sorting Techniques
     4.2.1   Basic Concept
     4.2.2   Bubble Sort
     4.2.3   Selection Sort
     4.2.4   Insertion Sort
     4.2.5   Quick Sort

UNIT 5
Trees and Graphs (Only Concepts, No implementation)   **(15 Marks)**

5.1 Trees
     5.1.1   Basic Concept
     5.1.2   Binary Tree
     5.1.3   Binary Tree Representation
     5.1.4   Binary Tree Traversal
     5.1.5   Binary Search Tree

5.2 Graphs
    5.2.1   Basic Concept
    5.2.2   Types of Graph –undirected, directed graph
    5.2.3   Graph Terminology – Degree of vertex, indegree of a vertex, outdegree of a vertex, connected graph , directed Acyclic graph(DAG) and subgraph
    5.2.4   Graph representation – Adjacency matrix, Adjacency list, Adjacency matrix
    5.2.5   Graph Traversal – depth first search, Breadth first search

Suggested list of Practicals

   1   Program to implement Arrays & Strings

   2   Program to implement Structures

   3   Program to implement pointers

   4   Programs to implement file handling

   5   Program to implement stacks

   6   Program to implement Queues

   7   Program to implement linked Lists

   8   Program to implement Linear Search

   9   Program to implement Binary Search

  10   Program to implement Sorting Technniques.

Text Books:
    1. Data Structures through C - E. Balagurusamy
Reference Books:
    6. Data Structures through C- Yeshwant Kanetkar

(CO512) INTRODUCTION TO MICROCONTROLLERS

1. RATIONALE

With more and more computerization and automation of industrial processes, the application and use of the microcontrollers and embedded system in the industry has gained prominence and their applications are evolving rapidly. Microcontroller which is a true computer on a chip design to perform one or few dedicated functions , control many of the common devices in use today like digital watches, factory controllers, mobile phones ,digital cameras , GPS receivers, etc. this course on the microcontrollers is designed to develop the requisite skills to program and interface microcontrollers based systems.

2. TEACHING AND EXAMINATION SCHEME

Course Code & Course Title	Teaching Hours/ Week			Total Credits	Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
CO512 INTRODUCTION TO MICRO CONTROLLERS	L	T	P	C	TH	TM	TW	PR/OR	
	3	-	2	5	75	25	25	25	150

Minimum passing %: theory 40%,

Duration of the theory papers: 3 hours

L: Lectures, T: tutorials, P: Practical, C: Credit, TH: end semester theory, TM: Test Marks, TW: term work, PR/OR: End Semester Practical/Oral Exam,

3. DETAILED COURSE CONTENT

Unit-1 CONCEPT OF EMBEDDED SYSTEM   9 MARKS

Difference between microcontrollers and microprocessors, Types of microcontrollers (4-bit,8-bit,16-bit &32-bit microcontrollers), processor architecture- Harvard and Princeton, criteria for choosing a microcontroller of an embedded system.

Unit-2   ELEMENTS OF 8051 MICROCONTROLLER   **18 MARKS**

Architecture: functional block diagram.
Description in detail: input/output pins, ports and circuits, internal and external memory, register file structure(SFRs, Stack), counters and timers, basics of interrupts.

**Unit-3   INTRUCTION SET OF 8051 WITH ASSEMBLY LANGUAGE PROGRAMMING
21MARKS**

Addressing modes(only immediate, register and direct)
Assembly language programming: instruction set(bit and byte level)
Data transfer instructions, push and pop instructions, data exchanges.
Arithmetic instructions, Incrementing and decrementing, addition and subtraction, multiplication and division.

(Also includes basic assembly language programming based on above instructions)

**Unit-4   LOGICAL AND BRANCHING INSTRUCTION SET OF 8051
6MARKS**

Logical instructions: AND, OR, EX-OR, NOT operations, clear and set.
Branching instructions: unconditional jumps, calls and subroutines.

(No programming on above instructions)

**Unit-5 INTERFACING CONCEPTS
15MARKS**

Interfacing input devices: Matrix Keyboard.
Interfacing ouput devices: LCD, LED multiplexed display and seven-segment display.

Interfacing ADC & DAC (Problems on interfacing, No programs)

**Unit-6 OTHER MICROCONTOLLERS
6MARKS**

PIC, ATMEGA (Basic features and functions)

TEXT BOOKS:
1. The 8051 Microcontroller, Architecture, Programming & applications-second edition – Kenneth J. Ayala, Penram International
2. The 8051 Microcontroller and Embedded Systems, Mohammad Ali Mazidi.
3. Programming and customizing the 8051 Microcontroller,Michael Predko
4. Microcontrollers: Theory and Applications, Ajay Deshmukh.
5. Microcontroller & Applications, By D.A.Godse A.P.Godse

4. **LIST OF EXPERIMENTS**

1. Execute assembly language programs based on Data transfer Instructions
2. Develop assembly language programs based on Arithmetic Instructions (Addition , Subtraction, Multiplication, Division)
3. Develop Assembly Language Programs based on Logical Instructions (And, Or etc.)
4. Develop a program to interface LED with 8051
5. Develop a program to interface 7 segment Display with 8051
6. Develop a program to Interface 8 ADC/DAC with 8051

(CO513) PRINCIPLES OF MULTIMEDIA

1. **RATIONALE:**

Multimedia course will provide a comprehensive introduction to the principles and practices of multimedia design, production. Students will be introduced to the aesthetic, cultural and technical foundations of multimedia and their application in creating, designing, implementing and producing small-scale multimedia systems. This offers pathways for students interested in animation field to work images, audio, video and so on.

2. **TEACHING AND EXAMINATION SCHEME:**

Course code & Title	Periods/ week (in Hrs)			Total Credit	Examination Scheme				Total Marks
					Theory Marks		Practical marks		
	L	T	P	C	TH	TM	TW	PR/OR	
CO513 Principles of Multimedia	3	-	2	5	75	25	25	25	150

3. **DETAILED COURSE CONTENTS:**

UNIT – 1: Multimedia – an overview:
   1.1 Introduction
   1.2 Multimedia Presentation and production
   1.3 Characteristics of Multimedia
       Multiple media, non-linearity, scope of interactivity, integrity, digital representation.
   1.4 Utilities of Multisensory perception
   1.5 Hardware and software requirements
       Multimedia playback, Multimedia production.
   1.6 Uses of Multimedia
       Home entertainment, Educational purpose, Industrial training, Info. Kiosks, cororate presentations, business, electronic shopping, comm. & networks, medicine, engineering applications – etc.
   1.7 Promotion of Multimedia based contents
       Demand, compression technique, processing power, standards, bandwidth, distribution mechanisms.
   1.8 Steps for creating a multimedia presentation (8 steps in brief)

UNIT – 2 : Text
   2.1 Introduction
   2.2 types of text
        Unformatted, formatted, hypertext.
   2.3 Architecture of HyperText document
   2.4 Unicode standards
        UCS-4, UTF-32, UTF-16.
   2.5 Font
        Appearance, size and style
   2.6 Insertion of Text

Using keyboard, copy-paste, using OCR software.

2.7 Text Compression

Huffman coding, LZ coding.

2.8 File Formats

Text, doc, rtf, pdf, post-script.

Image

2.9 Introduction

2.10 - types of Image

Hard-copy n soft-copy, continuous tone, half-tone, bitone.

2.11 Seeing Color

2.12 Color Models

Rgb, Cymk, device dependency and Gamut.

2.13   Basic steps for Image Processing

2.14   Specification of Digital Images

Pixel dimension, Image resolution, file size, color depth.

2.15   Image processing software

Selection tool, Painting and drawing tool, color selection tool, gradient tool, clone tool, transformation tool, retouching tool, text tool, changing image chars, filters, layers, color channel, mask.

2.16   Image – File formats

Bmp, jpeg, gif, tiff, png, pict, tga, psd.

UNIT – 3:   Audio

3.1 Introduction

3.2 acoustics

3.3 Nature of Sound waves

3.4 Fundamental Characteristics of sound

3.5 elements of audio system

3.6 Audio – file formats

3.7 Audio Processing softwares

Video

3.8 Introduction

3.9 Motion video

3.10 Digital video processing

3.11 Video recording and storage formats

3.12 Video file formats

3.13 video editing concepts

3.14 Audio – file formats

3.15 Video Processing softwares

UNIT – 4: Animation

5.1 Introduction

5.2 Uses of Animation

5.3 Traditional Animation

Keyframes and tweening, cel animation, Rotoscoping, stop-motion, flip-book, motion cycling.

5.4 Principles of Animation

5.5 Compter-based animatiom

5.6 Animation on the web
5.7 3D Animation
5.8 Animation software

UNIT – 5: Multimedia database

5.1 Introduction
5.2 What is multimedia database
5.3 Content-based storage and retrieval(CBSR)
5.4 Designing a basic multimedia database
5.5 Image color features
5.6 Image texture features
5.7 Image-shape features
5.8 Audio features
5.9 Video features
5.10 Classification of data

Reference Books:

1. Principles of Multimedia by Ranjan Parekh. Tata McGraw-Hill (unit 1,2,3)
2. Principles of Multimedia by Ranjan Parekh. (Edition 2)   (unit 4,5)

Text Books:

1. Multimedia Systems Design by Prabhat K. Andleigh and Kiran Thakrar-PHI publication.
2. Multimedia systems by John F. Koegal Buford-Pearson Education.
3. Fundamentals of multimedia by Ze-Nian Li and MS Drew. PHI EEE edition.
4. ADOBE® FLASH® PROFESSIONAL Help and tutorials (for Practicles)

4.SUGGESTED LIST OF PRACTICAL EXPERIMENTS:

1. To study Flash fundamentals.
2. To study and use Drawing and Painting tools available in Flash.
3. To study handling Images in Flash.
4. To export Audio in flash.
5. To add Video to flash.
6. To learn adding Effects in flash.
7. To develop Animation in flash.
   Note: A mini-project to create and manage interactive multimedia web applications using Flash technology. (like web sites)

SEMESTER VI

(CO601) NETWORK MANAGEMENT

1. RATIONALE:

Computer network play an important role in today world. Hence management and administration of network in effective manner has become an important aspect. The course introduces students to the fundamentals of network management, primarily for TCP/IP networks. The students of this course will be able to design, install, configure and experience hands-on management of typical network components. They will also be able to Plan, install, configure, administer and manage a computer network. After learning this course student will be employable in the industry working in the area of network installation and management or they can start their own business providing hardware and software solutions to different organization in the area of networking.

2. TEACHING AND EXAMINATION SCHEME:

Course Code & Course Title	Periods/ Week (In Hours)			Total Credit	Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
CO601 NETWORK MANAGEMENT	**L**	**T**	**P**	**C**	**TH**	**TM**	**TW**	**PR/OR**	**125**
	3	-	2	5	75	25	-	25	

3. DETAILED COURSE CONTENTS:

UNIT – I: (15 Marks)
1. Network management, Goals, Organisation and functions
1.1 Network Management
1.2 Goals of Network management
1.3 Challenges of Network Management
    1.3.1 Growth of networks
    1.3.2 Continuous operations
    1.3.3 Automation, Multivendor networks
1.4 Network management Functions and sub Functions
    1.4.1 Network Provisioning
        1.4.1.1 Planning
        1.4.1.2 Design
    1.4.2 Network Operations and Network Operations Center (NOC)
        1.4.2.1 Fault Management / Service Restoration
        1.4.2.2 Configuration Management
        1.4.2.3 Performance Management
        1.4.2.4 Security Management
        1.4.2.5 Account Management

1.4.3 Network Maintenance
       1.4.3.1 Fault Management
       1.4.3.2 Trouble Ticket Administration
       1.4.3.3 Network Repairs
       1.4.3.4 Routine Network tests

1.5 Network administration
    1.5.1 Need of Network Administration
    1.5.2   Task of Network Administrator

1.6 OSI and network management model (Brief explanation only)
    1.6.1 Organizational model
    1.6.2 Information model
    1.6.3 Communication model
    1.6.4 Functional model

UNIT – II: **(15 Marks)**

2 Network Planning
    2.1 Factors to be considered while planning a Network.
        2.1.1 Identifying the applications that you intend to use on a Network.
        2.1.2 Traffic Requirements
        2.1.3 Scalability Requirements
        2.1.4 Geographical consideration
        2.1.5 Availability
        2.1.6 Security and Accessibility
        2.1.7 Cost consideration
    2.2 Designing Network -Network design life cycle
        2.2.1   Analysis
        2.2.2   Design
        2.2.3   Simulation /prototyping
        2.2.4   Implementation monitoring, Management
    2.3 Network configuration
        2.3.1   Peer-to-Peer Network
        2.3.2   Server based Network.
    2.4 Meeting Network Needs
        2.4.1   Choosing Network Type- LAN, MAN, WAN
        2.4.2   Choosing Network Topology
        2.4.3   Choosing Network components- Passive components-connectors- fiber optic connectors, RJ 45 connectors cables, patch panel, Information outlets(IO box) Active components-NIC, Servers, workstations, Switches, Hubs, transrecievers, Routers and its functions.
        2.4.4   Network Interface card functions and features.
          2.4.4.1 Selecting a NIC
          2.4.4.2 Installing NIC
        2.4.5   Choosing Servers - Types of Server- File, Print, Mail, Web & Database Servers.

2.4.6

2.5 Physical Setup of LAN

    2.5.1   Cabling a Network – Cable properties, Cabling standards, Co-axial cables Twisted pair cable, Fiber optic cable,

    2.5.2   Cable installations-External and internal installations.

    2.5.3   Types of LAN cables -   crossover cable & Straight through, Concept of color codes

    2.5.4   ools required for preparing LAN cable– Crimping Tool, cable stripper/cutter, punchdown tool

UNIT III: Network Implementation & configuration   (15 marks)

3.1 Network operating systems (NOS)

    3.1.1 Features of different NOS (LINUX, WINDOWS & NOVL NETWARE)

3.2 Installing and Configuring Windows Server - Preparing for Installation, Creating windows

    server boot disk

3.3 Installing windows server, Configuring server/ client.

3.4 Setting windows server –

    3.4.1 Creating Domain controller

    3.4.2 Adding the DHCP and WINS roles

    3.4.3 Adding file server and print server

    3.4.4 Adding Web based Administration.

3.5 Working with User Accounts

    3.5.1 Adding a User

    3.5.2 Modifying User Account

    3.5.3 Deleting or Disabling a User Account.

3.6 Working with Windows Security Groups

    3.6.1 Creating Group

    3.6.2 Maintaining Group Membership.

3.7 Working with Shares

    3.7.1 Understanding Share Security

    3.7.2 Creating Shares

    3.7.3 Mapping Drives

3.8 Network Printing

    3.8.1 Printer connections

        3.8.1.1 Server connections

        3.8.1.2 Workstations/Client connections

        3.8.1.3 Direct network connections

    3.8.2 Describe Windows Network Printing

        3.8.2.1 Add print Wizard

        3.8.2.2 Administering Printer Shares – Setting up Network Printer

UNIT IV: Network Administration and Trouble shooting   (15 Marks)

4.1 Locating Applications and Data

4.1.1   Server based operating systems and Server based applications.

4.1.2   Storing data files
4.1.3   Controlling workstation environment
4.2 Understanding the Problem – Troubleshooting, Segmenting the Problem, and Isolating the
      Problem, Setting Priorities.
4.3 Troubleshooting Tools – Hardware Tools, Software Tools, Monitoring and Troubleshooting
      Tools –Cable tester, Network analyzer, traffic analyzer, protocol analyzer/analysis and time
      domain reflectometer (TDR).
4.4 Troubleshooting a network using software tools
    4.4.1 NET, NET DIAG, NET watcher (in brief)
    4.4.2 TCP/IP utilities - Ping, traceroute, netstat, Nslookup, Ipconfig
    4.4.3 Filtering data – Two types Capture filters and Display filters.
4.5 Network Management –
    4.5.1 Network management protocols –SNMP (working in brief)

UNIT V: Backup and Recovery   **(15 Marks)**
5.1 Backup Purpose
5.2 Backup Considerations
5.3 Backup Granularity
5.4 Backup Architectures – direct attached backups, LAN based backups
5.5 Backup methods
5.6 Backup Process
5.7 Backup and restore Operations
5.8 Backup Topologies
5.9 Backup hardware
5.10 Implementation of RAID
      5.10.1 RAID Array Components
      5.10.2 RAID Levels (up to 3)
      5.10.3 RAID Comparison
      5.10.4 RAID Impact on Disk Performance
      5.10.5 Hot Spares
5.11 Components of an Intelligent Storage System
      5.11.1 Intelligent Storage Array.
5.12 Working with Windows Backup – Using Windows Servers Backup Software.

Reference books:

1. The Complete Reference Networking, Craig Zacker , Tata McGraw Hill
2. The Real World Network Troubleshooting Manual, Alan Sugano, Firewall Media.
3. Network Management , Mani Subramanian, Pearson.
4. Web-based Systems and Network Management, By Kornel Terplan
5. Network Management and Control, I.T. Frisch, Manu Malek-Zavarei, Manu Malek, S.S. Panwar

6. Information Storage and Management, Emc^2

Suggested List of Practical Exercises

1. Execute Basic TCP/IP utilities and commands. (eg: ping, ipconfig, tracert, tcpdump, ftp, telnet)
2. Study the design of college campus LAN (Campus wide network)
3. Prepare network cables - straight through and cross cables.
4. Design and implement small network using actual physical components with IP address scheme.
5. Installing Network Operating System (NOS) (eg: Windows Server-Create Domain Controller, Linux)
6. Create new Users & assign privileges/ Permission on NOS
   Modify/ Delete/Deactivate Users and groups
7. Setting up and Configuring Local Print Device and Network Print Device
8. Identify, Segment Network Faults and troubleshoot.
9. Study of network monitoring Tools (Eg: Bandwidth usage monitoring)
10. Study of Backup and recovery.

SUGGESTED LIST OF STUDENT ACTIVITIES

Following is the list of proposed student activities like:
i. Visit to various network service providers' site/ Data Centres.
ii. Survey of latest tools available to manage and administering website, and its presentation
iii. Presentation/demonstration of assigned project.

(CO602) SOFTWARE ENGINEERING AND TESTING

1. RATIONALE:

This subject will enable the diploma students to have awareness about software engineering. This includes design and development of software through series of phases. It covers planning about software, requirement gathering, designs, testing and maintenance. This course also covers test preparation and execution.

2. TEACHING AND EXAMINATION SCHEME:

Course code & Title	Periods/ week (in Hrs)			Examination Scheme				Total Marks
				Theory Marks		Practical marks		
CO602 Software Engineering And Testing	L	T	P	TH	TM	TW	PR/OR	150
	3	-	2	75	25	25	25	

3. DETAILED COURSE CONTENTS:

Unit 1

6.   Overview of Software Engineering & the Software Development Process   (15 marks)

a.   The evolving role of Software & changing nature of software
  i.   Definition of a Software
 ii.   Characteristics of a Software
iii.   Categories of Software
      1.2   Definition of Software Engineering, Need of Software Engineering

        1.2.1   Computer – based System Engineering

        1.2.2   Software Process

            1.2.2.1 The Software Life Cycle

               1.2.2.1.1 Waterfall Model

               1.2.2.1.2 "V" Model

               1.2.2.1.3 Spiral Model

               1.2.2.1.4 Prototype Model

               1.2.2.1.5 Iterative Model

(Diagram, Advantages and Disadvantages of above models)

Unit 2

6.Software Requirements   **(15 marks)**
6.1Requirement Engineering Process
    6.1.1.Types of Software requirements
- Requirement Inception
- Requirement Elicitation
  - Requirement elicitation through interview
  - Requirement elicitation through questionnaire
  - Record review
  - Output of requirement elicitation

    (Brief description of each)
- Negotiation
- Requirement Validation
- Requirement Elaboration
  - Initial user requirements
  - Initial technical requirements
  - Final functional requirements
- Structure of Soft ware Requirement Specification (SRS)
- Characteristics of RE(requirement engineering) process

Unit 3
7.Software Design   **(15 marks)**
7.1Overview of Function Oriented Approach
    7.1.1.Models and Tools
    7.1.2.Salient features of SSAD
7.2Overview of Object Oriented Approach
    7.2.1.Object Oriented Analysis
    7.2.2.Object Oriented Design
    7.2.3.Object Oriented Testing
    7.2.4.Object Oriented Maintenance
7.3Comparison between OOAD and SSAD
7.4Data Flow Diagram(DFD)
    7.4.1.Rules for drawing DFD
    7.4.2.Physical and Logical DFD
7.5Decision Tables

Unit 4
8.Coding, Documentation and Maintenance   **(15 marks)**
8.1Coding
    8.1.1.Coding standards and guidelines
    8.1.2.Code review
8.2Software documentation
    8.2.1.Internal documentation

8.2.2.External documentation
8.3Software Maintenance
        8.3.1.Characteristics of software maintenance
        8.3.2.Software reverse engineering
        8.3.3.Software maintenance Process models
8.4Verification and validation

Unit 5
9.Software Testing Process   **(15 marks)**
9.1Psychology of Testing
9.2Characteristics of Test engineer
9.3 Levels of Testing
        9.3.1. Unit, Module, Integration and System, Acceptance
        9.3.2.Stages of Testing, Testing process.
9.4Testing Approach
        9.4.1.Top-down v/s bottom-up approach
        9.4.2.Functional v/s Structural testing
        9.4.3.Mutation testing
        9.4.4.Regression testing.
9.5Types of Testing
        9.5.1.Black-box testing
        9.5.2.White-box testing
        9.5.3. Beta testing
        9.5.4.Performance testing
        9.5.5.Stress testing
        9.5.6.Acceptance testing
9.6 Manual testing and its limitations

Reference Books:
6. Software Engineering By Jibitesh Mishra (Unit 1,2,3,4)
7. Software Testing Tools by Dr. K.V.K.K. Prasad. (Unit 5)
8. Software Engineering By Bharat Bhushan Agarwal, Sumit Prakash Tayal(Additional Book)
9. Fundamentals of software engineering By RAJIB MALL(Additional Book)

Suggested List of Practicals :

1. Study of PHP fundamentals.
2. Study of PHP scripting with html.
3. Study of Http server setup (apache/xampp – etc.)
4. Study of Requirement gathering for a webpage (front-end)
5. Study of Specification documenting.
6. Study of application structure Design. (flow-chart, dfd models–etc)
7. Development of mini project in accordance with the phases studied.
   Note : Atleast 2 forms to be created along with database queries.

8. Study of Test case preparation and their execution using any tool.
9. Study of automated test execution using tool on form/page.

(CO603) COMPUTER PROJECT

1. RATIONALE

Project work aims at developing innovative skills in the students whereby they apply the knowledge and skills gained through the course by undertaking a project. In this a student or a group of students will under the mentorship of a guide will select a project, design and implement the hardware and software and demonstrate the working of the same. Students are expected to do a project based on some of the areas mentioned below.

2. TEACHING AND EXAMINATION SCHEME

Course Code & Course Title	Periods/ Week (In Hours)			Total Credits	Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
CO603 Computer Project	L	T	P	C	TH	TM	TW	PR/OR	100
	-	-	6	6	-	-	50	50	

3. DETAILED COURSE CONTENTS

The following are some of the suggested activities which the student has to undertake (which may slightly differ depending on the project chosen) during the project work. In doing so some process related and project related skills need to be evaluated.

1. Selection/Identification of project work by market survey/industrial survey.
2. Prepare the project proposal which should preferably contain complete details in the following form:
   - Title of the project.
   - Introduction and Objectives of the Project.
   - Project Category (Software oriented / Hardware oriented etc.)
   - Tools / Platform, Hardware and Software Requirement specifications.
   - Analysis (Block diagrams /DFDs/ ER Diagrams/ Class Diagrams/ Database Design, etc. as per the project requirements).
   - A complete structure which includes(as per the project):
     - ❖ Number of modules and their description to provide an estimation of the student's effort on the project.
     - ❖ Data Structures as per the project requirements for all the modules.
     - ❖ Process logic of each module.
     - ❖ Testing process to be used.
     - ❖ Reports generation (Mention tentative content of report).
3. Design and Implement the Project.
4. Prepare a project report which should preferably contain following details:
   Abstract, Project overview, Introduction and Motivation, Problem Statement, Requirement Analysis, Project design, Implementation Details, Technologies used, conclusion & future work, references, and Appendix.
   Every student must prepare well formatted, printed and hard bound report.

4. SUGGESTIVE AREAS OF PROJECT WORK:

    Database Management Systems
    Software Engineering and Software Development
    Web page Designing
    Digital Image Processing
    Computer Graphics and Animation
    Multimedia Systems
    Computer Networks
    Artificial Intelligence
    Internet and e-commerce
    Computer Security and Cryptography
    Computer hardware and embedded systems
    Improving existing systems / equipments.
    Any other related area found worth.

(CS602) BUSINESS COMMUNICATION

1. RATIONAL :

The course on Business Communication will help in development of speaking, listening, writing, and reading skills in students, with special reference to business environment like writing business letters, notes, reports, documents, holding meetings and discussions, working in groups, etc. . Special provision has been made for language workshops where the communication skills of the students can be enhanced.

2. Teaching and Examination Scheme :

Course Code & Course title	Periods per week in hours			Total credits	Examination scheme				TOTAL Marks
					Theory Marks		Practical Marks		
	L	T	P	C	TH	TM	PR/OR	TW	
CS602 Business Communication	-	-	2	2	-	-	50	50	100

3. Competences to be developed through this course:

The course content should be taught and implemented with the aim to develop different type of skills leading to the achievement of the competency "Communicate effectively in given Business situations''.

4. Detailed Course Content :

Unit 1.1: Communication Skills in the work place   Communication within the organizational, Types of communication, functions of Internal & external communications   Definition, components, importance of effective communication skills, types- verbal- non verbal, methods and hints to improve communication skills, body language, Précis and comprehension
Unit 1.2: Modern Office technology for communications: Using technology and internet to **obtain** information about suppliers, their credibility, latest specification of items, contacting people, quick feedback, social networking, skype, whatsapp, spell check, **dissemination** of information, send email to staff, paperless office, etc
Unit 2.1: Seminars   Objectives, topic selection, audience, structure, tips for good beginning and end, aids to presentation.
Unit 2.2: Project work: A link between the theory and the practical   Tips: Narrow down to the topic, specific not vague, data collection, structure, critical

thinking and analysis.
Unit 3.1 : Report writing: Understanding Objective and Subjective report writing (i)<u>Feasibility report:</u> Definition, types, economic feasibility, technical feasibility, definition.   (ii) <u>Trouble Report:</u> Purpose, instances when trouble reports are written, procedure followed in writing trouble report   (iii) Formal Reports: Essay, Pamphlet, Booklet or Book report, Parts of a book Report, understanding how to write formal reports
Unit 3.2 : Illustrations in a report: Uses, types, Use of illustrations: Tables, graphs, charts, Venn diagram, organizational charts, flow charts, maps, photographs, drawings and diagrams.
Unit 4.1: Topic -Letter writing: Credit letter, Collection and sales letters
Unit 4.2: Memorandum: Definition, difference from letter, examples of memorandum
Unit 5.1: Meetings: Preparation, Notice for the meetings, Agenda
Unit 5.2.: Note taking during meetings, minutes of meeting
Unit 6.1: Tender: Procedure, Preparation, Types of tenders, Single tender, local tender, e tender, Structure, Tender Notice, Terms and conditions, Payment details, specification, Documents to be submitted, placing orders, Evaluations, drafting advertisements for tenders
Unit 7: Job Interviews: Preparing for a Job Interview, guidelines on facing job interviews, ways of scouting for jobs, Writing Job Application, resume,

Marking scheme :

Term Work   **Maximum marks**

Overall classroom performance……………………………...…….10

Workbook (assignments)………… …………………………………25

Classroom activity (language workshop)………… ………….....15

Term End Assessment

Components   **Maximum marks**

Questions on syllabus……………………..20

Activity……………………………………..30

4. **Suggested specification table with hours and marks (Practical) :**

Unit No	Topic	Teaching hours per semester
1.	Communication Skills in the work place	04
2.	Organizing seminars, project work	04
3.	Report writing	05
4.	Letter Writing	05
5.	Meeting	05
6.	Tenders	04
7.	Job interviews	05
	Total hours	32

5. Suggested learning resources :

1. Business Correspondence and report writing, by R C Sharma & Krishna Mohan, Tata Mcgraw hill, New Delhi 2002,
2. Principles and practices of Business Communication ,Doctor R. Doctor A., Seth Publishers,14th edition,2006
3. The functional aspects of communication skills, P. Prasad, Sharma K. Rajendra, S. K. Kataria and Sons,2006
4. Raul R. Timm, How to make winning presentations, Sneha printers, Mumbai,
5. Stand and Deliver, how to become a masterful communicator and public speaker,
6. Dale Carnegie Training, CPI Cox & Wyman, UK.

(CO613) CYBER LAW & COMPUTER FORENSICS

Rationale:

This course will provide a foundation in the field of Cyber Laws and Computer Forensics. The main objective of this course is to make students familiar with applications of hardware and software to computer forensics, computer forensics law, the developments that are being taking place in the different areas with the help of Computer Science and Information Technology. This Course would therefore familiarize students with cyber law applicable to India and also the involved investigation process through forensic study.

TEACHING AND EXAMINATION SCHEME:

Course Code & Course Title	Periods/Week(in Hours)			Total Credit	Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
CO613 Cyber Law & Computer Forensics	L	T	P	C	TH	TM	TW	PR/OR	
	3	-	2	5	75	25	25	25	**150**

UNIT 1 (15 marks)

1.1 Power of arrest without warrant under the IT Act, 2000: A Critique

    1.1.1   Crimes of this millennium
    1.1.2   Section 80 of the IT Act, 2000-A Weapon or a Farce?
    1.1.3   Necessity of Arrest without warrant from any place, public or otherwise
    1.1.4   Arrest, but no punishment

1.2 Cyber Crime & Criminal justice: Penalties, Adjudication & Appeals under the IT act, 2000
    1.2.1   Concept of Cyber Crime and the IT Act, 2000
    1.2.2   Hacking
    1.2.3   Teenage Web vandals
    1.2.4   Cyber Fraud and Cyber Cheating
    1.2.5   Virus on the Internet
    1.2.6   Defamation, Harassment and Email Abuse

UNIT 2 (15 Marks)

2.1 Jurisdiction in the Cyber World
    2.1.1   Questioning the jurisdiction and validity of the present law of jurisdiction
    2.1.2   Civil law of jurisdiction in India
    2.1.3   Cause of Action
    2.1.4   Jurisdiction and the Information Technology Act, 2000
    2.1.5   Place of cause of Action in contractual and IPR disputes

2.2 Copyright Protection in the Cyber world
2.2.1   Works in which Copyright subsists and meaning of Copyrights
2.2.2   Copyright Ownership and Assignments
2.2.3   License of Copyrights
2.2.4   Copyright protection of content on Internet; Copyright notice, Disclaimer & Acknowledgement
2.2.5   Computer Software Piracy

UNIT 3   **(15 Marks)**

3.1   The Indian Evidence Act of 1872 v. Information Technology Act, 2000
3.1.1   Status of Electronic record as Evidence
3.1.2   Proof of Electronic Agreements
3.1.3   Proving Electronic Messages
3.1.4   Other Amendments in the Indian Evidence Acts by the IT Act
3.1.5   Amendments to the Bankers, Books Evidence Act, 1891and Reserve Bank of India Act, 1934

3.2 Protection of Cyber Consumers in India
3.2.1   Introduction
3.2.2   Are Cyber Consumers covered under the Consumer protection Act
3.2.3   Goods and Services
3.2.4   Consumer Complaints
3.2.5   Defects in goods and Deficiency in Services
3.2.6   Restrictive and Unfair trade practices
3.2.7   Instances of Unfair trade Activities
3.2.8   Beware Consumers

UNIT 4   **(15 Marks)**

4.1 The Forensic Process
4.1.1   Types of Investigations
4.1.2   The Role of Investigator
4.1.3   Elements of Good Process
4.1.4   Defining a Process
4.1.5   After the investigation
4.2 Forensic Lab Environment Preparation
4.2.1   The Ultimate Computer Forensic Lab
        4.2.1.1 Forensic Lab Security
        4.2.1.2 Protecting Forensic Lab
4.2.2   Forensic Hardware and Software Tools
        4.2.2.1 Using Hardware Tools
        4.2.2.2 Using Software Tools
        4.2.2.3 Investigator Liability
4.2.3   The FLYAWAY kit
4.2.4   Case Management
        4.2.4.1 Poor Case Management
        4.2.4.2 Misplacing Evidence
        4.2.4.3 Improper Evidence instructions

UNIT 5 **(15 Marks)**

5.1 Forensically Sound Evidence Collection
    5.1.1   Collecting Evidence from a single system
            5.1.1.1 Step 1: Power down the suspect system
            5.1.1.2 Step 2: Remove the Drive(s) from the suspected system.
            5.1.1.3 Step 3: Check for other media
            5.1.1.4 Step 4: Record BIOS information
            5.1.1.5 Step 5: Forensically image the drive (Only Definition)
            5.1.1.6 Step 6: Record Cryptography Hashes
            5.1.1.7 Step 7: Bag and Tag
    5.1.2   Common mistakes in evidence collection

5.2 Consumer Fraud
    5.2.1   What is Consumer Fraud?
    5.2.2   Types of Consumer Fraud
            5.2.2.1 Identity Theft
            5.2.2.2 Detecting Spam Attacks
            5.2.2.3 Phishing Websites
            5.2.2.4 Identity Theft Malware
            5.2.2.5 Theft of Personal Records by an Insider
            5.2.2.6 Investment Fraud

TEXT BOOKS:

1. Cyber Law Simplified, By Vivek Sood, Tata McGraw-Hill

2. Hacking Exposed™ Computer Forensics Secrets & Solutions, Chris Davis, David Cowen & Aaron Philipp, Tata McGraw-Hill Publishing Company Limited

SUGGESTED LIST OF EXPERIMENTS:

1. Study and analysis of Cyber Laws in India and its effectiveness
2. Study of Hacking, Email fraud and Internet Virus: Legal issues
3. Case Study on Copyright issues in Cyberspace
4. Study of Privacy and Data Protection in Cyberspace
5. Case study on Online Sale of Goods and Consumer Protection
6. Study of Laws Applicable to Protection from Computer Virus
7. Study and analysis of Computer frauds and Abuse
8. Study of Latest Forensic Hardware and software Tools
9. Tracing E – mail – Finding senders IP Address of received e – mail, tracing route of e – mail received using tools available on internet e.g. Visual Trace Route.
10. Study of Encase forensic Software

(CO614) EMBEDDED SYSTEMS DESIGN

1. RATIONALE:

This course provides a comprehensive introduction to the design and development of embedded hardware and firmware, their integration, and the management of Embedded System development process. The vast number of applications for embedded computing has given rise to high demand for engineers with experience in designing and implementing embedded systems.

2. TEACHING AND EXAMINATION SCHEME:

Course Code & Course Title	Periods/Week (In Hours)			Total Credit	Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
CO614 EMBEDDED SYSTEMS DESIGN	**L**	**T**	**P**	**C**	**TH**	**TM**	**TW**	**PR/OR**	150
	3	-	2	5	75	25	25	25	

3. DETAILED COURSE CONTENTS:

UNIT 1

6. Introduction to Embedded Systems   (15 marks)
6.1 Definition of Embedded System
6.2 Embedded Systems Vs General Computing Systems
6.3 History of Embedded Systems
6.4 Classification of Embedded Systems
6.5 Major Application Areas
6.6 Purpose of Embedded Systems
6.7 Characteristics and Quality Attributes of Embedded Systems

UNIT 2

7. Typical Embedded System   (15 marks)
7.1 Core of the Embedded System
     7.1.1   General Purpose and Domain Specific Processors
         7.1.1.1 Microprocessors
         7.1.1.2 Microcontrollers
         7.1.1.3 Digital Signal Processors
     7.1.2   Application Specific Integrated Circuits (ASICs)
     7.1.3   Programmable Logic Devices (PLDs)
     7.1.4   Commercial off-the-shelf Components (COTS)

7.2 Memory
    7.2.1   ROM
    7.2.2   RAM
    7.2.3   Memory According to the Type of Interface
    7.2.4   Memory Shadowing
    7.2.5   Memory Selection for Embedded Systems
    7.2.6   Sensors and Actuators
7.3 Communication Interface
    7.3.1   Onboard and External Communication Interfaces

UNIT 3

8. Embedded Firmware   **(15 marks)**
8.1 Embedded Firmware
8.2 Other system components
    8.2.1   Reset Circuit
    8.2.2   Brown-out Protection Circuit
    8.2.3   Oscillator Unit
    8.2.4   Real Time Clock
    8.2.5   Watchdog Timer
    8.2.6   Embedded firmware Design Approaches and Development Languages

UNIT 4

9. RTOS Based Embedded System Design   **(15 marks)**
9.1 Operating System Basics
9.2 Types of Operating Systems
9.3 Tasks, Process and Threads
9.4 Multiprocessing and Multitasking
9.5 Task Scheduling

UNIT 5

10. Task Communication   **(15 marks)**
10.1   Shared Memory
10.2   Message Passing
10.3   Remote Procedure Call and Sockets
10.4   Task Synchronization
    10.4.1 Task Communication/Synchronization Issues
    10.4.2 Task Synchronization Techniques
    10.4.3 Device Drivers
    10.4.4 How to Choose an RTOS

4. SUGGESTED LEARNING RESOURCES

TEXT BOOKS:

7. Introduction to Embedded Systems - Shibu K.V, Mc Graw Hill.

REFERENCE BOOKS:

1. Embedded Systems - Raj Kamal, TMH.

2. Embedded System Design - Frank Vahid, Tony Givargis, John Wiley.

3. Embedded Systems – Lyla, Pearson, 2013

4. An Embedded Software Primer - David E. Simon, Pearson Education.

5. SUGGESTED LIST OF PRACTICALS

1) Configure timer control registers of 8051 and develop a program to generate given time
   delay.

2) Port I/O: Use one of the four ports of 8051 for O/P interfaced to eight LED's. Simulate binary counter (8 bit) on   LED's.

3) Serial I/O : Configure 8051 serial port for asynchronous serial   communication with serial port of PC exchange text messages   to PC and display on PC screen. Signify end of message by   carriage return.

4) Interface 8051 with D/A converter and generate square wave of given frequency on oscilloscope.

5) Interface 8051 with D/A converter and generate triangular wave of given frequency on oscilloscope.

6) Using D/A converter generate sine wave on oscilloscope with   the help of lookup table   stored in data area of 8051.

7) Interface Stepper motor with 8051 and write a program to   move the motor through a given angle in clock wise or counter clock wise direction.

8) Generate traffic signal.

9) Temperature controller.

10) Elevator control.

(CO615) MOBILE COMPUTING

Rationale:

To study about various types of wireless data networks and wireless voice networks. This course is designed to understand the challenges of wireless communication and the solutions that are in use. To realize the role of wireless protocols in shaping the future Internet. This will help to Analyze and characterize Location management in wireless mobile networks.

Course code & Title	Periods/ week (in Hrs)			Total Credits	Examination Scheme				Total Marks
					Theory Marks		Practical marks		
	L	T	P	C	TH	TM	TW	PR/OR	
CO615 Mobile Computing	3	-	2	5	75	25	25	25	150

Detailed Course Contents:

UNIT – 1:   Introduction: **(15 Marks)**
>   1.9 Introduction
>   1.10   Applications
>   Vehicles, Emergencies, business, Replacement of wired network,
>   Location dependent services, Mobile and wireless devices, Simplified
>   reference model.
>   **1.11   Wireless Transmission**
>   Frequencies for Radio transmission, Antennas, Signal propagation, Path
>   loss for radio signals, Additional signal propagation effects, Multiple
>   path propagation.
>   1.12   Multiplexing
>   Space division, Freq. division, Code division.
>   1.13   Cellular Systems

UNIT – 2:   Medium Access Control   **(15 Marks)**
>   2.1 Motivation
>   Hidden and exposed terminals, Near and far terminals
>   2.2 SDMA
>   2.3 FDMA
>   2.4 TDMA
>   Fixed TDM, Classical Aloha, Slotted Aloha,
>   carrier sense multiple access (CSMA),
>   Demand assigned multiple access (DAMA),
>   Packet reservation multiple access (PRMA),
>   Multiple access with collision avoidance (MACA), Polling,
>   Inhibit sense multiple access (ISMA)
>   2.5 CDMA
>   Spread aloha multiple access (SAMA)
>   2.6 comparison of S/F/T/CDMA

UNIT – 3:   GSM   **(15 Marks)**
    3.1 Mobile services
       Bearer services, Tele services, supplementary services
    3.2 System architecture
      Radio subsystem, network and switching subsystem, operation subsystem.
    3.3 Localization and Calling
    3.4 Handover
    3.5 Security
      Authentication, Encryption.
    3.6 New data services
      HSCSD, GPRS architecture and transmission plane protocol.

UNIT – 4: DECT   **(15 Marks)**
    4.1 System architecture
    4.2 Protocol Architecture
       Physical layer, MAC layer, Datalink layer, network layer.
    4.3 TETRA
    4.4 UTRAN
      Basic architecture, radio network controller(RNC).
    4.5 Handover
      Hard handover, soft handover, overview of different handover types.
   Satellite systems
    4.6 Aplications
    4.7 Typical satellite systems for global mobile tele-communications
      Different types of orbits and their advantage and disadvantages.

UNIT – 5:   Multimedia Messaging Service   **(15 Marks)**
    5.1 MMS Architecture.
    5.2 MMS Interfaces, Addressing in MMS, Technical Specifications.
    5.3 Supported Formats, MMS Messages, Message Submission & Transfer.
    5.4 Delivery Report, Read-Reply Reports, Message Notification.
    5.5 Message Retrieval, Message Forwarding.
  Location Management Techniques for Mobile Computing Environments
    5.6 Introduction
    5.7 Location Management
      Location Update, Location Inquiry, Delay Constraint.
    5.8 Location Management Cost
    5.9 Network Topology.
    5.10 Mobility Pattern:
      Memoryless (Random Walk) Movement Model, Markovian Model,
      Cell History, Directional History, Shortest Distance Model.

Reference:

1. Mobile Communications by Jochen Schiller, Pearson Education, Edition-2.
2. Mobile Computing Handbook by Mohammad Ilyas, Imad Mahgoub, CRC Press.

Suggested list of Practicals :
1. To implement Code Division Multiple Access (CDMA).
2. Setup & Configuration of Wireless Access Point (WAP).
3. Study of WLAN: Ad Hoc & Infrastructure Mode.
4. Study of Bluetooth Protocol and Applications.
5. Implementation of Mobile Network using Network Simulator (NS2) .
6. Study of GlomoSim Simulator.
7. Study of Cellular system and related concepts.
8. Mobile Internet and WML.
9. Browsing the Internet using Mobile phone simulator.
10. Study of GSM architecture and Signaling techniques.
11. Study Assignment : Detailed study of Wireless Application Protocol .
12. Study Assignment : To study network security softwares.

(IE6**) INSTIUTIONAL ELECTIVE

1. **RATIONALE** :

It has been observed that the curriculum prescribed, is many times out of context of Industry, on account of the pace with which technology development is taking place at Industry end. Due to this, gap exists between the Industry requirement of manpower and manpower produced by the Polytechnics. Board takes some time to incorporate the development of technology in the curriculum and many a times technology becomes outdated when it is incorporated in the curriculum. Further the expertise to train students as per Industry current requirement is available at the institute, but the same cannot be taught to students, as it is not a part of curriculum.

To address this situation, Board has decided to permit Institutions affiliated to Board, to identify such technologies or other aspects and teach the same to the students as an elective subject called "Institutional Elective". Through this Institutional Elective subject, Institutions will be able to cater to the requirements of Industry by identifying their immediate requirement and prepare the students for the requirement by developing the curriculum in consultation with the Industry.

As many a time's same subject may not be offered more than one or two years, a non conventional way of teaching – learning may be required to be adopted. Participation of Industry experts, guest lecturers, visit to Industry, exploring the knowledge available on net, etc may be essential to achieve the objectives.

2. TEACHING AND EXAMINATION SCHEME :

Course code & course title	Periods/Week (in hours)			Total Credits	Examination Scheme				Total Marks
					Theory		Practical		
IE6** INSTIUTIONAL ELECTIVE	L	T	P	C	TH	TM	PR/OR	TW	
	3	-	2	5	75	25	25	25	150

3. DETAILED COURSE CONTENTS :

a) Curriculum shall be drafted by the concerned department by interacting with Industry counterpart in regards to the Newer Technology required to be transferred for purpose of Teaching /Learning process.

b) Department shall work out the modalities of execution of the curriculum at Industry/Institute Level.

c) Curriculum shall be forwarded to Board for approval before its implementation.

(IE652) INTRODUCTION TO MOBILE APPLICATION DEVELOPMENT

1. RATIONALE:

The use of mobile Applications and android based applications are increasing day by day. It is therefore necessary for students to understand designing of mobile Applications. This course covers the basics required for mobile applications development. As Android is most popular mobile operating system of today, this course also offers an introduction to Android Operating System with basics concepts to Android application development.

2. TEACHING AND EXAMINATION SCHEME:

Course Code & Course Title	Periods/Week(in Hours)			Total Credit	Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
Introduction to Mobile Application Development	L	T	P	C	TH	TM	TW	PR/OR	150
	3	-	2	5	75	25	25	25	

3. DETAILED COURSE CONTENTS:

UNIT 1: Overview of mobile devices, platforms and operating systems   (15 Marks)

1.1 The Mobile Ecosystem
    1.1.1   What is a Mobile Device
        1.1.1.1 Portable
        1.1.1.2 Personal
        1.1.1.3 Companion
        1.1.1.4 Easy Usage
        1.1.1.5 Connected device
    1.1.2   Mobile Device Categories
        1.1.2.1 Mobile Phones
        1.1.2.2 Low-end mobile devices
        1.1.2.3 Mid-end mobile devices
        1.1.2.4 High-end mobile devices
        1.1.2.5 Smart phones
        1.1.2.6 Tablets, net books and Notebooks

    1.1.3   Mobile Knowledge
        1.1.3.1 Display
            1.1.3.1.1 Resolution
            1.1.3.1.2 Physical Dimension
            1.1.3.1.3 Aspect ratio
            1.1.3.1.4 Input Methods
            1.1.3.1.5 Other features
1.2   Mobile Operating Systems

    1.2.1 Operating Systems
        1.2.1.1 Android OS
        1.2.1.2 Windows OS
        1.2.1.3 iOS
        1.2.1.4 Blackberry OS
        1.2.1.5 Symbian OS
        1.2.1.6 Tizen OS
        1.2.1.7 Comparison of Mobile Operating Systems

UNIT 2: Mobile Browsing Architecture and Design (15 Marks)

  2.1 Mobile Browsing
    2.1.1 Browsing types
        2.1.1.1 Focus navigation
        2.1.1.2 Cursor navigation
        2.1.1.3 Touch navigation
        2.1.1.4 Multi touch navigation
    2.1.2 Zoom Experience
        2.1.2.1 Basic Zoom

        2.1.2.2 Smart zoom

    2.1.3 Reflow Engine

    2.1.4 Multipage experience

  2.2 Architecture & Design
    2.2.1 Website Architecture
        2.2.1.1 Navigation

        2.2.1.2 Context

        2.2.1.3 Progressive enhancement

        2.2.1.4 Different version approach
        2.2.1.5 Design and usability
        2.2.1.6 Touch Design patterns
            2.2.1.6.1 Panorama UI
  2.3 Official UI Guidelines (in Brief)

UNIT 3: Mobile Application Development Technologies (15 marks)

  3.1   Setting up your Environment
    3.1.1 Working with Code
    3.1.2 Emulators and Simulators
    3.1.3 Android Emulator (Description in brief)

3.1.4 I phone Simulator (Description in brief)

3.2   Building Android Apps with HTML, CSS and JavaScript
        3.2.1 Web Apps Versus Native Apps
                3.2.1.1 What is a Web App
                3.2.1.2 What is a Native App
                3.2.1.3 Pros and Cons
                3.2.1.4 Choice of Web or Native Approach

3.3   Web Programming for Mobile Application Development(A Quick Recap)
        3.3.1 HTML, CSS and JavaScript
                3.3.1.1 What is HTML, CSS and Javascript
                3.3.1.2 Why use HTML, CSS and Javascript
                3.3.1.3 How to insert CSS and Javascript in a webpage

3.4   Introduction to jQuery
        3.4.1 What is jQuery
        3.4.2 Why jQuery
        3.4.3 Adding a jQuery to a webpage
        3.4.4 jQuery basic syntax
3.5   Introduction to jQuery Mobile
        3.5.1 What is jQuery Mobile
        3.5.2 Why use jQuery Mobile
        3.5.3 Adding jQuery Mobile to a webpage
        3.5.4 jQuery Mobile Pages
        3.5.5 jQuery Mobile Transitions
        3.5.6 jQuery Mobile Buttons
3.6   Introduction to Bootstrap
        3.6.1 What is Bootstrap
        3.6.2 Why use Bootstrap
        3.6.3 Where to get Bootstraps
        3.6.4 What Bootstrap package contains

3.7   Cross platform Mobile Application Development tools
        3.7.1   Appcelerator Titanium
                3.7.1.1 Overview
                3.7.1.2 Benefits of Appcelerator Titanium
        3.7.2   PhoneGap
                3.7.2.1 Overview
                3.7.2.2 Benefits of PhoneGap

        3.7.3   Xamarin
                3.7.3.1 Overview
                3.7.3.2 Benefits of Xamarin

UNIT 4: Introduction to Android (15 marks)

    4.1   Introduction to Android
          4.1.1 Why Develop for Android?
                  4.1.1.1 Market share
                  4.1.1.2 Time to market
                  4.1.1.3 Open Platform
                  4.1.1.4 Cross- Compatibility
                  4.1.1.5 Mash up Capability

          4.1.2 Android Programming Basics
                  4.1.2.1 Java: Your Android programming language
                  4.1.2.2 Activities
                  4.1.2.3 Intents
                  4.1.2.4 Cursorless Controls
                  4.1.2.5 Views and widgets
                  4.1.2.6 Asynchronous calls
                  4.1.2.7 Background Services

          4.1.3 Hardware Tools
                  4.1.3.1 Touch Screen
                  4.1.3.2 GPS
                  4.1.3.3 Accelerometer
                  4.1.3.4 SD card
           4.1.4 Software Tools
                  4.1.4.1 Internet
                  4.1.4.2 Audio and Video Support
                  4.1.4.3 Contacts
                  4.1.4.4 Security
                  4.1.4.5 Google API's

UNIT 5: Key concepts of Android Application Development (15 Marks)

    5.1   Key Concepts of Android
          5.1.1 The Big Picture
                  5.1.1.1 Linux Kernel (Android System Architecture)
                  5.1.1.2 Android Runtime
                  5.1.1.3 Application Framework
                  5.1.1.4 Applications and Widgets

          5.1.2 Life Cycle of Android
                  5.1.2.1 onCreate( ) method
                  5.1.2.2 onStart( ) method
                  5.1.2.3 onResume( ) method

5.1.2.4 onPause( ) method
5.1.2.5 onStop( ) method
5.1.2.6 onRestart( ) method
5.1.2.7 onDestroy( ) method
5.1.2.8 onSaveInstanceState(Bundle) method
5.1.2.9 onRestoreInstanceState(Bundle) method
5.1.3 Building Blocks
5.1.3.1 Activities
5.1.3.2 Intents
5.1.3.3 Services
5.1.3.4 Content Providers
5.1.4 Using Resources

5.2 Creating an Example Android Application in Android Studio
5.2.1 Creating a new Android Project
5.2.2 Defining the project and SDK settings
5.2.3 Creating an Activity
5.2.4 Modifying the Example Application
5.2.5 Reviewing the Layout and Resources Files
5.2.6 Previewing the Layout

4. SUGGESTED SPECIFICATION TABLE WITH MARKS & HOURS (THEORY)

Unit No.	Unit	Teaching Hours / Semester	Marks
1	Overview of mobile devices, platforms and operating systems.	9	15
2	Mobile Browsing Architecture and Design.	9	15
3	Mobile Application Development Technologies.	12	15
4	Introduction to Android.	8	15
5	Key concepts of Android Application Development.	10	15

5. SUGGESTED LIST OF EXPERIMENTS:

1. Study of history of Mobile Devices
2. Study of Resolution, Physical Dimensions and Aspect Ratio for Mobile Devices.

3. Study of various Mobile Brands in the Market.
4. Study of Panorama User Interface for Mobiles.
5. Study of Android Emulators and IPhone Simulator.
6. Implementation of HTML, CSS and JavaScript for Mobile Application Development

7. Implementation of jQuery Mobile Pages.
8. Implementing Simple web page using Bootstrap.
9. Study of PhoneGap, Appcelerator Titanium and Xamarine tools.
10. Study of Latest versions of Android Operating System.
11. Study of Android Studio in details.
12. Create a Hello Android Application using Android Studio.
13. Implementation of Activities in Android using Android Studio
14. Implementation of Labels, Buttons and Textboxes using Android Studio.
15. Study of Google API.

6. REFERENCE BOOKS:

1. Android Application Development for Dummies by Donn Felker (Unit 4)
2. Hello Android, Introducing Google's Mobile Development Platform, 3rd Edition by Ed Burnette (Unit 5)
3. Programming the Mobile Web by Maximiliano Firtman [O'Reilly]. (Unit 1 & 2)
4. Android studio development essentials-Second Edition By Neil Smyth   (Unit 5)
5. Building Android Apps with HTML, CSS and JavaScript-Second Edition by Jonathan Stark with Brian Jespon [O'Reilly].   (Unit 3)

7. REFERENCE WEBSITES:

1. www.w3schools.com (Unit 3)
2. Cross platform Mobile Applications Development Mobile Apps Mobility by Yonathan Aklilu Redda [Link: http://www.diva-portal.org/smash/get/diva2:626531/fulltext01.pdf] (Unit 3)
3. Mobile Operating Systems and Application Development Platforms: A Survey by Okediran O. O. [Link: http://scienceq.org/uploaded/editorial/1475902795.pdf] (Unit 1)

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(CO611) Advanced Computer Architecture

Rationale:

As it is necessary for a computer engineers to study the core concepts of a computer system. This course is designed to make the student familiar with advanced microprocessors. It covers processor technologies, processing and programming concepts for 16 bit and 32 bit microprocessors.

TEACHING AND EXAMINATION SCHEME:

Course Code & Course Title	Periods/Week(in Hours)			Total Credit	Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
(CO611) Computer Graphics	L	T	P	C	TH	TM	TW	PR/OR	150
	3	-	2	5	75	25	25	25	

UNIT 1 -Parallel Processing /Parallelism (15 Marks)

10.5 Concept of Parallel processing and throughput

    10.5.1 Definition of SISD,SIMD,MIMD

10.6 Pipelining –Definition of pipelining

    10.6.1 General considerations

        10.6.1.1 Four segment pipeline(block diagram)

        10.6.1.2 Space time diagram

        10.6.1.3 Speedup

        10.6.1.4 Pipeline performance-cycle time

    10.6.2 Arithmetic pipeline (Pipeline for floating point addition and subtraction)

    10.6.3 Instruction pipeline

        10.6.3.1 Four segment instruction pipeline

    10.6.4 Pipeline Conflicts

10.7 Vector Processing

    10.7.1 Definition and applications

    10.7.2 Vector Operations

    10.7.3 Matrix Multiplication

    10.7.4 Memory Interleaving

UNIT 2 –Advanced Processor Technology (15 Marks)

11.1 Array Processors

    11.1.1 Attached array processors (with block diagram)

    11.1.2 SIMD array processors(with block diagram)

11.2 Multiprocessor Architecture

    11.2.1 Tightly coupled

    11.2.2 Loosely coupled

11.3 Superscalar organization

    11.3.1 Superscalar versus super pipelined approaches

11.4 RISC and CISC architecture-Block diagram and characteristics

11.5 Overview of supercomputer.

UNIT 3 -16-bit Microprocessor –Intel 80286   **(15 Marks)**

    12.1   Salient features

    12.2   Internal architecture

    12.3   Register organization (General purpose register, segment register, status and control register, instruction pointer, segment descriptor cache register)

    12.4   Addressing mode such as Real, Protected Virtual Addressing mode,

    12.5   Selector, Descriptors and its types

    12.6   LDT, GDT, IDT

    12.7   Operations of 80286 in Real and PVAM.

    12.8   Instructions

UNIT 4 -32-bit Microprocessor –Intel 80386 & 80486   **(15 Marks)**

    9.7 80386

        9.7.1.Salient features

        9.7.2.Internal architecture

        9.7.3.Register organization (General-purpose register, segment register, status and control register, instruction pointer. Segment descriptor cache register. System address register LDTR & GDTR, TR, Debug register, Test registers, Control register)

        9.7.4.Addressing modes of 80386- real, PVAM, virtual 8086.

        9.7.5.Address translation in real, PVAM, paging.

    9.8 80486

        9.8.1.Difference between 80386 and 80486 processors

        9.8.2.Salient features

        9.8.3.Internal architecture

UNIT 5 - Advanced Microprocessors-Pentium   **(15 Marks)**

    8.1 Salient features of Pentium

    8.2 System architecture (Super-scalar Execution, Separate code & data cache, Floating Point Exceptions, Branch prediction)

    8.3 Pentium Memory Management

        8.3.1   Paging Unit

        8.3.2   Memory Management Mode

    8.4 Pentium Pro Processor

        8.4.1   Block diagram of Pentium Pro.

        8.4.2   Special features of Pentium Pro

            8.4.2.1 Control Register 4

    8.5 Overview of latest processors (Only characteristics)

        8.5.1   Dual Core

        8.5.2   Core 2 Duo

        8.5.3   i3,i5,i7

Reference Books:
1. Computer System Architecture-M.Morris Mano,Pearson Education (Unit 1,2)
2. Computer Organization and Architecture-William Stallings,Pearson Education (Unit 1,2)
3. Microprocessor and Microcomputer based system design-Rafiquzzaman.(Unit 3,4)
4. Advanced microprocessor & peripheral- A. K. Ray, K. M. Bhurchandi, TATA McGraw Hill (Unit 3,4,5)
5. The Intel Microprocessors: 8086/8088, 80186/80188, 80286, 80386, 80486 - By Barry B. Brey (Unit 5)

List of Experiments

Sr. No	Name of the Experiment
1.	4. Write an assignment on keyboard and display function 01H.,02H,08H,09H,0AH of DOS INT 21H and program to read password & validate the user.
2.	5. Write an assignment on keyboard functions 02H of BIOS INT 16H (Get Keyboard Flags) and program to display the status of keys described in 02H functions of BIOS INT 16H.
3.	6. Write an assignment on screen functions 06H (Scroll screen up), 07H (Scroll screen down) of BIOS INT 10H and program to simulate CLS (Clear Screen) command.
4.	7. Write an assignment on ASCIIZ string, file handle, file functions 41H (delete file), 56H (Rename file) of DOS INT 21H and program to simulate DEL (Delete file) and REN (Rename file) command.
5.	8. Write an assignment on file functions 43H (Set/Get file attribute) and 57H (Set/Get file time & date) of DOS INT 21H and program to display the attribute and date/ time of any file.
6.	9. Write an assignment on directory functions 39H (Create directory), 3AH (Delete directory) of DOS INT 21H and program to simulate MD (Make directory), RD (Remove Directory) commands.
7.	10. Write an assignment on directory functions 3BH (Change Directory), 47H(Get current directory) of DOS INT 21Hand program to simulate CD (Change directory) and PWD (Present Working Directory) commands.
8.	11. Write an assignment on Disk Storage Organization i.e. track, sector, cylinder, cluster, disk system area, data area and disk processing functions 02H(Read Sector), 03H (Write sector) of BIOS INT 13H. 12.
9.	13. Write a program to display the status of Flag register and Machine Status Word register of 286 on the screen. 14.
10.	15. Write a program to display the status of Flag register and Machine Status Word register of 386 on the screen. 16.

(CO612) COMPUTER GRAPHICS

Rationale:

This course is designed to provide a comprehensive introduction to computer graphics leading to the ability to understand contemporary terminology, progress, issues, and trends. Course material is structured to meet the needs of both designers and users of interactive Computer graphics systems.

TEACHING AND EXAMINATION SCHEME:

Course Code & Course Title	Periods/Week(in Hours)			Total Credit	Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
(CO612) Computer Graphics	L	T	P	C	TH	TM	TW	PR/OR	150
	3	-	2	5	75	25	25	25	

UNIT 1   **(15 marks)**

Introduction to Computer Graphics Systems and Applications

1.1   Overview of Graphics Systems
    1.1.1   Video display devices
            1.1.1.1 Refresh cathode ray tubes
            1.1.1.2 Raster scan display
                    1.1.1.2.1   Video controller
                    1.1.1.2.2   Raster scan display processors
            1.1.1.3 Random scan display
            1.1.1.4 Color CRT monitors
            1.1.1.5 Flat panel displays
            1.1.1.6 Liquid crystal display

1.2   Computer Graphics Applications (brief description only)
    1.2.1   Computer-aided design
    1.2.2   Presentation graphics
    1.2.3   Computer art
    1.2.4   Entertainment
    1.2.5   Education and training
    1.2.6   Visualization
    1.2.7   Image Processing
    1.2.8   Graphical user interfaces

UNIT 2   **(15 marks)**

2.1   Output Primitives

    2.1.1   Points and Lines
    2.1.2   Line Drawing Algorithms
        2.1.2.1 DDA Algorithm
    2.1.3   Circle Generating Algorithms
        2.1.3.1 Properties of Circle
        2.1.3.2 Midpoint Circle Algorithm
    2.1.4   Ellipse Generating Algorithms
        2.1.4.1 Properties of Ellipse
        2.1.4.2 Midpoint Ellipse Algorithm

2.2   Attributes of Output Primitives

    2.2.1   Line Attributes
        2.2.1.1 Line Type
        2.2.1.2 Line Width
        2.2.1.3 Pen and Brush Options
        2.2.1.4 Line Color
    2.2.2   Color and Grayscale Levels
        2.2.2.1 Color Tables
        2.2.2.2 Grayscale
    2.2.3   Area Fill Attributes
        2.2.3.1 Fill Styles
        2.2.3.2 Pattern Fill
    2.2.4   Character Attributes
        2.2.4.1 Text Attributes

UNIT 3   **(15 marks)**

3.1   Filled Area Primitives

    3.1.1   Scan Line Polygon Fill Algorithm
    3.1.2   Inside outside Tests
    3.1.3   Boundary Fill Algorithms
    3.1.4   Flood Fill Algorithms

3.2   Two-Dimensional Geometric Transformation
    3.2.1   Basic Transformations
        3.2.1.1 Translation
        3.2.1.2 Rotation
        3.2.1.3 Scaling
    3.2.2   Other Transformations
        3.2.2.1 Reflection
        3.2.2.2 Shear

UNIT 4   **(15 marks)**

4.1   Two Dimensional Viewing

    4.1.1   The Viewing Pipeline
    4.1.2   Viewing Coordinate Reference Frame
    4.1.3   Clipping Operations
        4.1.3.1 Point Clipping
        4.1.3.2 Line Clipping (Cohen-Sutherland line clipping method only)
        4.1.3.3 Polygon Clipping (Sutherland Hodgeman polygon clipping method only)

4.2   Three Dimensional Concepts

    4.2.1   Three Dimensional Display methods
        4.2.1.1 Parallel Projections
        4.2.1.2 Perspective projection
        4.2.1.3 Depth cueing
        4.2.1.4 Visible line and surface identification

UNIT 5   **(15 marks)**

5.1   Color Models

    5.1.1   Properties of Light
    5.1.2   Standard Primaries and the Chromaticity diagram
    5.1.3   Intuitive Color Concepts
    5.1.4   RCB color model
    5.1.5   YIQ color Model
    5.1.6   CMY color Model
    5.1.7   HSV color Model

5.2   Computer Animation
    5.2.1   Design of Animation Sequences (**steps – brief description only**)
        5.2.1.1 Storyboard Layout
        5.2.1.2 Object Definitions
        5.2.1.3 Key-Frame Specifications
        5.2.1.4 Generation of In-Between Frames
    5.2.2   Computer Animation Languages (**brief description only**)
        5.2.2.1 Key – Frame Systems
        5.2.2.2 Parameterized Systems
        5.2.2.3 Scripting Systems

TEXT BOOKS:

Computer Graphics – By Donald Hearn and M. P. Baker, PHI.

REFERENCE BOOKS:

Principles of Interactive Graphics – By Newman and Sproull, McGraw hill.

SUGGESTED LIST OF PRACTICALS

1. Study of Video Display Devices

2. Implementation of DDA Line drawing algorithm.

3. Implementation of Midpoint Circle drawing algorithm.

4. Implementation of Ellipse drawing algorithm.

5. Implementation of Flood Fill algorithm.

6. Implementation of Basic 2D transformation: Translation

7. Implementation of Basic 2D transformation: Rotation

8. Implementation of Basic 2D transformation: Scaling

9. Implementation of point Clipping Algorithm

10. Implementation of Line Clipping Algorithm