FOOD PROCESSING TECHNOLOGY (DFT)

DIPLOMA PROGRAMME FOOD PROCESSING TECHNOLOGY (DFT)

SEMESTER-I August to December (Including Examination)

SN	SUB CODE	SUBJECT NAME	L	T	P	Sessnl.	Th. Exam	Total
(A) For Entry of GKCIET Certificate holders								
1	HU 3101	Communication Skills	3	-	-	25	50	75
2	AP 3101	Applied Physics	3	1	-	25	75	100
3	AC 3101	Applied Chemistry	3	1	-	25	75	100
4	AM 3101	Applied Mathematics	3	1	-	25	75	100
5	AP 3151	Applied Physics Lab	-	-	2	50	-	50
6	AC 3151	Applied Chemistry Lab	-	-	2	50	-	50
7	HU 3151	Communication Lab	-	-	2	50	-	50
(B) For Entry of 10+2 Passouts								
1	WS 3151	General workshop Practice	-	-	8	200	-	200
2	ME 3105	General Engg.	2	-	-	25	25	50
3	IT 3151	Fundamentals of IT Lab	-	-	4	100	-	100
4	FT 3101	Introduction to Food Tech.	3	-	-	25	50	75
5	FT 3151	Introduction to Food Tech Lab	-	-	2	50	-	50
6	ME 3155	General Engg Lab	-	-	2	50	-	50
Common for both (A) and (B)								
1	FT 3102	Food Chemistry	3	1	-	25	75	100
2	ME 3151	Basic Engg Drawing Lab	-	-	4	100	-	100
3	FT 3152	Food Chemistry Lab	-	-	3	75	-	75
Total: GKCIET Certificate holders :			**15**	**4**	**13**	**450**	**350**	**800**
For 10+2 Passouts :			**8**	**1**	**23**	**650**	**150**	**800**

SEMESTER-II January to May (Including Examination)

SN	SUB CODE	SUBJECT NAME	L	T	P	Sessnl	Th. Exam	Total
1	FT 3201	Unit Operations in Food Processing	3	-	-	25	50	75
2	FT 3202	Food Microbiology	3	-	-	25	50	75
3	FT 3203	Handling & Storage of Food & Food Products	3	-	-	25	50	75
4	FT 3204	Fruits & Vegetable Technology	3	-	-	25	50	75
5	FT 3205	Pluses & Oilseeds Processing Tech	3	-	-	25	50	75
6	FT 3206	Dairy Tech.	3	-	-	25	50	75
7	FT 3251	Unit Operations in Food Processing Lab			2	50		50
8	FT 3252	Food Microbiology Lab			2	50		50
9	FT 3253	Handling & Storage of Food & Food Products Lab			2	50		50
10	FT 3254	Fruits & Vegetable Technology Lab			3	75		75
11	FT 3255	Pulses & Oilseeds Processing Tech Lab			3	75		75
12	FT 3256	Dairy Tech Lab			2	50		50
Total :			**18**	**0**	**14**	**500**	**300**	**800**

SEMESTER-III A Industrial Training June to August

SN	SUB CODE	SUBJECT NAME	L	T	P	Sessnl.	Th. Exam.	Total
1.	IT 4170	Industrial Training & Viva- Voce	0	0	0	50	-	50

SEMESTER-III B August to December (Including Examination)

SN	SUB CODE	SUBJECT NAME	L	T	P	Sessnl.	Th. Exam.	Total
1	FT 4101	Food Packaging Tech	3			25	50	75
2	FT 4102	Food Analysis & Quality Control	3			25	50	75
3	CH 4107	Instrumentation & Process Control	3			25	50	75
4	FT 4103	Cereal Process Tech	2			25	25	50
5	FT 4104	Tech of Meat, Fish and Poultry	3			25	50	75
6	FT 4151	Food Packaging Tech Lab			3	75		75
7	FT 4152	Food Analysis & Quality Control Lab			4	100		100
8	CH 4157	Instrumentation & Process Control Lab			2	50		50
9	FT 4153	Cereal Process Tech Lab			3	75		75
10	FT 4154	Tech of Meat, Fish and Poultry Lab			2	50		50
11	FT 4170	Pre Project Work			2	50		50
		Total:	**14**	**0**	**16**	**575**	**225**	**800**

SN	SUB CODE	SUBJECT NAME	L	T	P	Sessnl.	Th. Exam	Total
1	FT 4201	Waste Management & Effluent Treatment	3			25	50	75
2	FT 4202	Elements of Food Engg	3			25	50	75
3	FT 4203	Food Beverages Tech	3			25	50	75
4	FT 4204	Cereal Process Tech.	1			25	-	25
5	FT 4205	Computer Application in Food Tech. Lab.			3	75	-	75
6	HU 4201	EDP & Management	3			25	50	75
7	FT 4270	Project Work			4	100		100
8	FT 4251	Waste Management & Effluent Treatment Lab			3	75		75
9	FT 4252	Elements of Food Engg Lab			4	100		100
10.	FT 4253	Food Beverages Tech Lab			4	100		100
11.	FT 4254	Cereal Process Tech. Lab.			1	25		25
		Total:	**13**	**0**	**19**	**600**	**200**	**800**

HU 3101 COMMUNICATION SKILLS

L T P **Maximum Sessional Marks: 25**
3 0 0 **Maximum End Term Examination Marks: 50**

UNIT - I

REPORT WRITING: Reports and their importance, Types of Routine Reports, Structure of Reports, Bibliography & References, Proof-reading Symbols & their Functions, Expressions from Foreign Languages

(10 Hrs.)

UNIT –II

COMMUNICATION TECHNIQUES: Importance of Communication, One Way and Two Way Communication, Essentials of Good Communication, Barriers to Communication and Techniques to overcoming Barriers, Telephonic Communication

(10 Hrs.)

UNIT -III

GRAMMAR: Common Errors in writing, Change of Narration, Change of Voice, Use of Idioms & Phrases.

(10 Hrs.)

UNIT –IV

WRITING SKILLS: Applications for jobs, Essay-writing, Equivalent Terminology (100 to 150 administrative technical terms in English with their equivalent meanings in Hindi or Punjabi)
LIBRARY ACTIVITIES: Collecting Reference materials from Books & Journals. (10 Hrs.)

RECOMMENDED BOOKS

Title	Author	Publisher
Oxford Guide to Writing & Speaking	John Seely	Oxford
English Grammar & Composition	Wren & Martin	ELBS
Writing Remedies	Edmond H. Weiss	Univ.Press

AP–3101 APPLIED PHYSICS

L T P **Sessional Marks: 25**
3 1 0 **End Term Exam Marks: 75**

UNIT – I

ROTATIONAL MOTION: Centre of Mass, Centre of mass of a two-particle system, motion of centre of mass and momentum conservation, Rotational motion of a single particle in two dimensions. Torque, angular momentum and its geometrical and physical meaning, law of conservation of angular momentum, centripetal force, banking of tracks and bending of cyclist, motion in vertical circle. Numerical Problems.

(10 Hrs.)

UNIT – II

MOMENT OF INERTIA: Moment of inertia of rigid body, radius of gyration, theorem of parallel and perpendicular axes, moment of inertia of a straight rod, circular ring, circular disc, cylinder (solid and hollow) sphere, relation between torque and moment of inertia, Kinetic energy and angular momentum , motion of cylinder and sphere rolling without slipping on an inclined plane. Numerical Problems.

(10 Hrs.)

UNIT – III

KINETIC THEORY OF GASES: Boyle's and Charles's laws, gas equation, pressure exerted by gas, K.E. of molecules, Kinetic interpretation of temperature and derivation of gas laws from kinetic theory of gases. Numerical Problems.

(04 Hrs.)

WAVE MOTION AND ELECTROMANETIC WAVES: Longitudinal and transverse waves, reflection of waves, standing waves, beats and Doppler effect, History of e.m. waves, Maxwell's equation. Hertz experiment, production, properties of e.m. waves, transverse nature and velocity of e.m. waves, propagation of radio waves in earth's atmosphere. Numerical Problems.

(06 Hrs.)

UNIT – IV

ELECRONICS AND PHOTONS: Discharge through gases at varying pressure, cathode rays and their properties, specific charge on electron by J.J. Thomson, Millikan's Oil drop method.

(04 Hrs.)

ATOMIC AND NUCLEAR PHYSICS: Photoelectric effect, laws and experimental verification of laws, photocell and its applications, production of x-rays, soft and hard x-rays, uses of x-rays, Radioactivity laws, half-life and average life, decay , mass defect, binding energy, Nuclear Fission and Fusion. Numerical Problems.

(06 Hrs.)

RECOMMENDED BOOKS:

Text Book
APPLIED PHYSICS R K Gaur
REFERENCE BOOK
Fundamentals of Physics

AC-3101 APPLIED CHEMISTRY

L T P
3 1 0

Sessional Marks: 25
End Term Exam Marks: 75

UNIT - I

Organic Chemistry: Functional Group I: (Halides and hydroxy compounds): Nomenclature of compounds containing halogen atoms and hydroxyl groups: haloalkanes, haloarenes; alcohols and phenols. Physical, chemical properties and use; Functional Group II: (Ethers aldehydes, ketones, carboxylic acids and their derivatives). Nomenclature of Ethers aldehydes, ketones, carboxylic acids and their derivatives, physical, chemical properties and uses (acyl halides, acid anhydrides, amides and esters); Functional Group II: (Cyanides, isocyanides,, nitro compounds and amines) Nomenclature of Cyanides, isocyanides, nitro compounds and amines and their methods of preparation, physical, chemical properties and uses.

(10 Hrs.)

UNIT - II

Transition Metals and Coordination Chemistry: Transition Metals: Electronic configuration, general characteristic properties, oxidation states of transition metals. First row transition metals and general properties of their compounds oxides, halides and sulfides.

Coordination Compounds: Nomenclature, isomerism in coordination compounds, bonding in coordination compounds, stability of coordination compounds, application of coordination compounds, compounds containing metal-carbon bond; application of organo-metalics.

(10 Hrs.)

UNIT - III

Chemical Thermodynamics: First law of Thermodynamics: Internal energy, enthalpy, and application of first law of thermodynamics, Second and third law of thermodynamics: Entropy, Free energy, spontaneity of a chemical reaction, Free-energy change and chemical equilibrium.

(06 Hrs.)

Surface Chemistry: Surfaces: Adsorption, Colloids (preparation and general properties), emulsions, micelles; Catalysis: Homogeneous and heterogeneous, structure of catalyst.

(04 Hrs.)

UNIT – IV

Bio-molecules: Carbohydrates: Monosaccharides, disaccharides, polysaccharides; Amino acids and peptides: Structure and classification; Proteins and Enzymes: Structure of proteins, role of enzymes Nucleic acids: DNA and RNA; Lipids: Structure, membranes and their functions.

(06 Hrs.)

Chemistry in Action: Dyes: Classification of dyes with examples; Chemicals in medicines: Antipyretics, Antibiotics, analgesics, antiseptics, disinfectants, anti-malarial, tranquilizers, germicides and anesthetics, (only definition and examples); Rocket propellants: Types of propellants- solid, liquid and hybrid.

(04 Hrs.)

Recommended Books:

1. Chemistry for class XI and XII, published by NCERT
2. Organic Chemistry, Morrison & Boyd
3. Physical Chemistry, G. W. Castellan
4. Inorganic Chemistry, Ramesh Kapoor

AM-3101 APPLIED MATHEMATICS

L T P
3 1 0

Maximum Sessional Marks: 25
Maximum End Term Examination Marks: 75

UNIT-I

Successive differentiation, Leibnitz's theorem. Fundamental theorems: Rolle's Theorem & Lagrange's mean value theorem. Expansion of function using Taylor and Maclaurin's series. Indeterminate forms, L Hospital's Rule.

(10 Hrs.)

UNIT-II

Ordinary differential equations, its order and degree. Linear and non-linear differential equations. Formation of differential equation. General and particular solution of differential equation by variable separation method, homogeneous differential equation of first order and their solution, Solution of linear differential equation. Exact differential equation, differential equations reducible to these forms.

(10 Hrs.)

UNIT-III

Introduction to matrices; addition; subtraction and multiplication of matrices, inverse of 2x2 and 3x3 matrix by adjoint method and solution of linear simultaneous equations. Determinants, minors, cofactors, expansion of a determinant, properties of determinants, solution of linear simultaneous equations containing three variables by Cramer's rule.

(10 Hrs.)

UNIT-IV

Organization of data. Measures of Central Tendency- Mean, median, mode. Measures of Disperson - Standard deviation. Karl Pearson's coefficient of correlation. Probability and its laws. Conditional probability. Baye's theorem (without proof). Random Variable, Binomial and Poisson distributions.

(10 Hrs.)

RECOMMENDED BOOKS:

Text Book:

Erwin Kreyszig, Advanced Engineering Mathematics, Wiley Eastern Ltd

Reference Books:

Schaum's Outline Series, Probability & Statistics, Tata McGraw Hill

Thomas & Finney, Calculus, Pearson Education

ME- 3105 GENERAL ENGINEERING

L T P
2 0 0

Maximum Sessional Marks: 25
Maximum End Term Examination Marks: 25

UNIT-I

Mechanical Engineering Transmission of power Transmission of power through belt, rope drives and pulleys, gears and chains. Different types of pulleys and their applications. Chain drives and its comparison with belt drive. Gear drives, types of gears, simple gear trains and velocity ratio. Internal Combustion Engines Classification and application of IC Engines. Spark ignition and compression ignition engines. Working principle of two stroke and four stroke petrol and diesel engines. Ignition system in petrol engines i. e spark ignition, Magneto ignition, spark plug & Carburetor. Cooling system of IC engines. Lubrication of IC Engines. General Maintenance of engines

(10 Hrs.)

UNIT-II

Air Conditioning system Basic principle of refrigeration and air conditioning. Working of centralized air conditioner. Concept of split air conditioner and its applications Types & classification of CI and SI engines. Working principal of two stroke petrol engine and diesel engine, four stroke petrol and diesel engines, valve timing diagrams, ignition system in petrol engine, carburetor, cooling &lubrication in IC engines.

(10 Hrs.)

UNIT-III

Application and Advantages of Electricity Difference between AC and DC. Various applications of electricity. Advantages of electrical energy over types of energy Basic Quantities of Electricity Definition of voltage, current, power and energy with their units. Name of the instruments used for measurement of quantities given in Unit III. Connection of the instruments in 2.2 in electric circuit.

(10 Hrs.)

UNIT-IV

Various Types of Power Plants Elementary block diagrams of thermal. Hydro power station. Brief explanation of the principle of power generation in above power stations Electric Motors and Pumps Definitions and various application of single phase and three phase motors Connection and starting of three phase motors by star delta starter. Conversion of horse power in watts of kilowatts.. Type of pumps and working of centrifugal pumps

(10 Hrs.)

Recommended Books

Title	**Author(s)**	**Publisher**
Thermal Engineering	S.S. Thethi	IPH
Elements of Mech. Engg	Sadhu Singh	Khanna Publisher

FT-3101 INTRDUCTION TO FOOD TECHNOLOGY

L T P
3 0 0

Maximum Sessional Marks: 25
Maximum End Term Examination Marks: 50

UNIT-I

INTRODUCTION: Definition, function and characteristics of foods; Nutrients and their function; composition of common foods; present status of food industry in India.

(04 Hrs.)

MICROBIOLOGY: Microorganisms associated with foods, their classification, characteristics and their relevant properties.

(05 Hrs.)

UNIT-II

FOOD CHEMISTRY: Chemical composition of various foods; classification and properties of major food constituents; a brief review of post-harvest and anti-mortem changes in foods and their relevance.

(10 Hrs.)

UNIT-III

FOOD PROCESSING TECHNOLOGY (AN OVERVIEW) : An overview of technology of processing of cereals, pulses, oilseeds, fruit, vegetables, milk and milk products, egg and poultry products, fish and fish products, meat and meat products; food laws and standards; sensory evaluation of foods.

(10 Hrs.)

UNIT-IV

INTRODUCTION TO FOOD PROCESSING AND PRESERVATION: Food spoilage agents; principles and processing of food preservation; effect of processing on the shelf life and food composition.

(07 Hrs.)

CHEMICAL PRESERVATIVES: Importance of food additives; mechanism of action of class I and II preservatives; factors affecting the choice of preservatives and their uses.

(04 Hrs.)

RECOMMENDED BOOKS:

Authors Title Publishers
Potter Food science CBS
W.C. Frazier. Food microbiology TMH
Fennema, Kerrel Principles of food preservation Marcel Dekkar

FT-3102 FOOD CHEMISTRY

L T P
3 1 0

Maximum Sessional Marks: 25
Maximum End Term Examination Marks: 75

UNIT-I

INTRODUCTION: Food Chemistry, Role of Food Chemists in Food Processing industry. (03 Hrs.)

WATER: Structure, properties of liquid water, water as reactant. (04 Hrs.)

UNIT-II

CARBOHYDRATES: Definition and classification; structure, physical and chemical properties of mono-saccharides and disaccharides. (06 Hrs.)

PROTEINS: Definition, classification, structure, functions of amino acids, proteins and their importance in food, Changes during processing. (06 Hrs.)

UNIT-III

LIPIDS: Definition, structure, classification, functions, physical and chemical properties, rancidity and reversion, Nutritional Significance. (06 Hrs.)

PIGMENTS: Their occurrence, importance, types, changing during processing (05 Hrs.)

UNIT-IV

ENZYMES: Definition, classification, function of enzyme, effect of temperature, pH, Concentration, substrate concentration on enzyme activity, specificity of enzyme, enzyme Inhibition, kinetics of enzyme. (06 Hrs.)

CHEMICAL ADDITIVES: Properties and functions. (04 Hrs.)

RECOMMENDED BOOKS

Authors Title Publishers
A V. V. S Ramarao A text book of biochemistry AVI
L. Mayor Food Chemistry CBS

FT3201 UNIT OPERATIONS IN FOOD PROCESSING

L T P **Sessional Marks: 25**
3 0 0 **End Term Examination Marks: 50**

UNIT – I

INTRODUCTION: Unit Operations – classifications, conservation of mass and energy, numerical on mass and energy balance. (03 Hrs.)

SIZE REDUCTION: Theory communication, Ritinger's law, Kick's law, Bond's law and their application in calculation in energy required in grinding, crushing efficiency, size reduction equipment used in food industry. (08 Hrs.)

UNIT – II

SIEVING: Separation based on size, effectiveness of screens, type of screens, factors affecting the sieving process, fineness module and particle size reduction. (05 Hrs.)

MIXING: Theoretical aspects of solid mixing, mixing index, rate of mixing, theory of liquid mixing, equipment for liquid and solid mixing. (05 Hrs.)

UNIT – III

FILTRATION: Theoretical aspects, fundamental equation of filtration, constant rate and pressure filtration, filter cake compressibility, filtration equipment. (08 Hrs.)

UNIT – IV

SEDIMENTATION: Theory, gravitational sedimentation of particles in liquid and gases, sedimentation equipment. (05 Hrs.)

CENTRIFUGAL SEPERATION: Theory, basic equation, centrifugal clarification, centrifugal filtration, equipment-principle, design features and general. (06 Hrs.)

RECOMMENDED BOOKS:

AUTHOR	TITLE	PUBLISHER
P. Fellows	Food Processing Technology	Wood head pub
R.L. Earle	Unit operation in Food Processing	
McCabe Smith & Harriot	Unit operations of Chemical Engineering	TMH

FT 3202 FOOD MICROBIOLOGY

L T P **Sessional Marks: 25**
3 0 0 **End Term Examination Marks: 50**

UNIT – I

INTRODUCTION: Definition, historical development and significance of food microbiology, microbial growth study; (08 Hrs.)

UNIT – II

Microscope; Classification & morphology of microbes; Techniques of pure culture; Bacteriology of air & water; Anti-microbial agents – physical & chemical – mechanism & action, Gram staining between the gram positive and gram negative bacteria, different method of reproduction, Thermal inactivation of microbes; Factors affecting heat resistance; (12 Hrs.)

UNIT – III

Morphology of fungi and reproduction, type of cell structure, composition of cell wall, method of reproduction, asexual and sexual fungi, competitive physiology of bacteria and fungi. (10 Hrs.)

UNIT – IV

Incident of microorganism in food, factors affecting growth of microbes, Microbiology of milk & milk products like cheese, butter, ice-cream, milk powder; fruits and vegetable products, Microbiology of meat, fish, poultry & egg and their products. Cereal and cereal product. (10Hrs.)

RECOMMENDED BOOKS:

1. Essentials of Microbiology; K. S. Bilgrami; CBS Publishers, Delhi
2. Food Microbiology; WC Frazier; Tata McGraw Hill, Delhi
3. Modern Food Microbiology; James M Jay; CBS Publishers, Delhi
4. Microbiology; Pelczar, Chan and Krieg; Tata McGraw Hill, Delhi
5. Basic Food Microbiology; Bannett, Chapman and Hall
6. Food Microbiology; M. R. Adams
7. Hand Book of Microbiology; Bisen

FT-3203 HANDLING AND STORAGE OF FOOD AND FOOD PRODUCTS

L T P **Sessional Marks: 25**
3 0 0 **End Term Examination Marks: 50**

UNIT-I

INTRODUCTION: Importance of handling and storage of food and food products; Post harvest losses of fruits, vegetables and grains in India; Prevention of losses, storage and its benefits; qualitative and quantitative changes during storage; Public distribution system of grains in India and role of Govt. agencies.

(10 Hrs.)

UNIT-II

HANDLING OF FRUITS, VEGETABLES, CEREALS, PULSES & OILSEEDS: Types and operational principles of handling equipment: conveyors (belt, screw and pneumatic), elevators, pumps, fans, Scoops, semi-trucks; weighing, packaging and sealing machines for granular and powdered materials, handling losses and their control.

(12 Hrs.)

UNIT-III

FRUITS AND VEGETABLE STORAGE: Low temperature storage of fruits and vegetables, storage requirements and types of storages structures, spoilage during storage of fruits and vegetables and their prevention.

(10 Hrs.)

UNIT-IV

STORAGE OF CEREALS AND OTHER GRAINS: Factors affecting quality of grain during storage; types of storage structures for small, medium and large quantities; Causes of spoilage during storage and their prevention

(08 Hrs.)

RECOMMENDED BOOKS:

Authors	**Title**	**Publishers**
Hall, C.W.	Handling and storage of food grains in Tropical and sun tropical areas.	Oxford and IBH
Sinha R.N. and	Grain storage- Part of a System	AVI
W.E. Muir Volkind and Roslov	Modern Potato and Vegetable storage	Amerind

FT-3204 FRUITS AND VEGETABLES TECHNOLOGY

L T P **Sessional Marks: 25**
3 0 0 **End Term Examination Marks: 50**

UNIT-I

INTRODUCTION: Status and scope of fruits and vegetable industry in India, composition and nutritive value of fruits and vegetable, factor effecting composition and quality of fruits and vegetables.

(06 Hrs.)

PHYSIOLOGY: Respiration, transpiration, ripening, senescence, climacteric and non-climacteric fruits and post-harvest changes in fruits and vegetables.

(05 Hrs.)

UNIT-II

RECEPTION AND PREPARATION: Equipment, cleaning methods, sorting, grading, peeling and blanching.

(04 Hrs.)

PRESERVATION BY SUGAR AND SALT: Ingredients and processes technology for the manufacture of jam, jellies, marmalade, preserve, squashes, pickles and chutneys. Tomato ketchup and sauce.

(05 Hrs.)

UNIT-III

THERMAL PROCESSING OF FRUITS AND VEGETABLES: History, definition, various techniques of thermal processing, processing time calculations of selected fruits and vegetables, types of containers and spoilage of canned foods.

(06 Hrs.)

DRYING AND DEHYDRATION: Drying of selected fruits and vegetables, changes during drying and spoilage of dehydrated fruits and vegetable.

(04 Hrs.)

UNIT-IV

FREEZING: Freezing principles and methods, freezing process of selected fruits and vegetables, changes during freezing.

(06 Hrs.)

FPO standards for fruits and vegetable products and utilization of by-products of fruits and vegetables industry.

(04 Hrs.)

RECOMMENDED BOOKS

Authors	Title	Publishers
Girdhari Lal,Sidappa and Tandon	Fruits and Vegetables preservation	ICAR, New Delhi
Luh and Wudruf	Commercial Fruit Processing	AVI

FT 3205 PULSES AND OILSEED PROCESSING TECHNOLOGY

L T P **Sessional Marks: 25**
3 0 0 **End Term Examination Marks: 50**

UNIT - I

INTRODUCTION: Structure, chemical and nutritional composition of major oil seeds and pulses. (06 Hrs.)

UNIT - II

MILLING OF PULSES: Classification of pulses, traditional milling methods (dry and oil milling), modern milling methods (CFTR, pantanagar, CIAE processes), by products of pulse milling and their utilization. (10 Hrs.)

UNIT – III

EXTRACYION OF OIL: Selection and pre-treatment of raw materials, Sources of fats and oils; Extraction of oils – rendering, pressing, solvent extraction; Processing of oils – degumming, refining, bleaching, deodorization, extraction of cottonseed, sunflower, coconut, ground nut, soybean, palm oil. (14 Hrs.)

UNIT – IV

Manufacture of different types of fat/oil derived products: winterization, Hydrogenation and its importance, Shortening- types, manufacture and use, production of peanut butter, byproducts of oil milling and refining and their utilization. (10 Hrs.)

RECOMMENDED BOOKS

1. Bailey's Industrial Oil and Fat Products, Vol 1 & 2; Swern D; 4th ed, 1982, John Wiley & Sons.
2. The Chemistry & Technology of Edible Oils and Fats; Devine J & Williams PN; 1961, Pergamon Press.
3. Food Oils and their Uses; Weiss TJ; 1983, AVI.
4. Post-Harvest tech of cereals, pulses and oilseeds; A. Chakraberty; Oxford & IBH.

FT 3206 DAIRY TECHNOLOGY

L T P **Sessional Marks: 25**
3 0 0 **End Term Examination Marks: 50**

UNIT – I

INTRODUCTION: Status and scope of dairy industry in India, composition of milk, factors affecting composition of milk, energy value of milk, handling, transportation and reception of milk, grading of milk. (06 Hrs.)

PHYSIO-CHEMICAL PROPERTIES OF MILK: density, boiling and freezing point, refractive index, acidity and pH, viscosity, surface tension. (04 Hrs.)

UNIT – II

BLIQUID MILK PROCESSING: filtration and clarification and homogenization, Pasteurization of milk; LTLT, HTST and UHT techniques, pasteurizers(Heating system, cooling system, flow controller, regenerator, flow valve), Packaging of milk; (08 Hrs.)

UNIT – III

MILK PRODUCT: detailed method of drying milk (drum, spray drying), condensed milk, cream, butter, cheese, Chhanna, yogurt, paneer, frozen products (Kulfi, softy, ice-cream). (18 Hrs.)

UNIT – IV

CLEANING AND SANITIZING OF DAIRY EQUIPMENT: Milk plant hygienic and sanitization. (04 Hrs.)

RECOMMENDED BOOKS:

Outlines of Dairy Technology; Sukumar De; Oxford
Dairy Products; Lampart; Tata McGraw Hill

FT 4101 FOOD PACKAGING TECHNOLOGY

L T P **Sessional Marks: 25**
3 0 0 **End Term Examination Marks: 50**

UNIT – I

INTRODUCTION: Functions of packaging; Type of packaging materials; Selection of packaging material for different foods; Selective properties of packaging film; Methods of packaging and packaging equipment.

(08 Hrs.)

UNIT – II

PACKAGING MATERIALS: paper, plastic, glass, metal, natural materials, packaging forms.

(06 Hrs.)

PACKAGING EVALUATION: WVTR, GTR, bursting strength, tensile strength, drop test

(04 Hrs.)

UNIT – III

PACKAGING MATERIALS FOR DIFFERENT FOODS: Meat, fish, poultry, eggs, milk and dairy products, fruits and vegetables, cereal grains and baked foods (06 Hrs.)

PACKAGING MACHINERY: Bottling, canning, form fills and seal machines, bags, their manufacturing and closing. (06 Hrs.)

UNIT – IV

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PACKAGING ENVIRONMENT: Inert gas, vacuum, aseptic packaging, CAP and MAP. Testing of packaging; Rigid and semi rigid containers; Flexible containers; Sealing equipment; Labelling; and shrink packaging; Secondary and transport packaging. (10 Hrs.)

RECOMMENDED BOOKS:

A Handbook of Food Packaging; Frank A. Paine; Blackie Academic

Food Packaging Materials; N.T. Crosby; Applied Science Publishers Ltd.

Plastic Films for Packaging Technology; Calvin J. Bening; Technomic

Food and Packaging Interactions; Joseph H. Hotchkiss; American chemical society

FT 4102 FOOD ANALYSIS AND QUALITY CONTROL

L T P **Sessional Marks: 25**
3 0 0 **End Term Examination Marks: 50**

UNIT - I

INTRODUCTION: Definition of quality. Quality specifications, Quality attributes of different foods. Food laws and regulations. (08 Hrs.)

UNIT – II

ANALYSIS: Quality control in the food industries, Microbial quality of foods; Application of chemical analysis in quality control. Implementation of quality control program. HACCP concept, Instrumental methods for quality control. (12 Hrs.)

UNIT – III

PHYSICO CHEMICAL AND MECHANICAL PROPERTIES: colour, gloss, flavour, consistency, viscosity, texture and their relationship with food quality. (06 Hrs.)

SENSORY QUALITY CONTROL: definition, objectives panel selection, sensory techniques, interpretation of sensory results in statistical quality control.

SAMPLING: definition, technique. (06 Hrs.)

UNIT - IV

FOOD REGULATION: Objectives, requirements and benefit of food grades and standard (BIS, AGMARK, PFA, FPO, CAS). (08 Hrs.)

RECOMMENDED BOOKS:

Food Analysis: Theory and Practice; Pomeranz and Meloan; CBS
Food Analysis and Quality Control; M. Jacob
Handbook of Analysis of Fruit and Vegetable Products; Ranganna; Tata McGraw Hill

CH- 4107 INSTRUMENTATION & PROCESS CONTROL

L T P **Sessional Marks: 25**
3 0 0 **End Term Examination Marks: 50**

UNIT-I

IMPORTANCE OF INSTRUMENTS IN CHEMICAL PROCESS INDUSTRIES: general classification of instrument. Indicating and recording type instrument, Description and construction details, working principle, range and application of following instruments.
PRESSURE AND VACUUM GAUGE: Liquid column gauge, bourdon tube gauge.
THERMOMETER AND PYROMETER: Liquid expansion thermometer, bimetallic thermometer, thermocouple, resistance thermometer, optical and radiation pyrometer.

(12 Hrs.)

UNIT-II

LIQUID LEVEL METER: visual indicators, float actuated level meter, static pressure instrument, Flow meter orifice, venture, pitot tube, rota meter.
Analyser: pH meter, chemical composition analyser, various types of analysers, oxygen analyser and infra-red analyser, orsat analysis.

(10 Hrs.)

UNIT-III

TRANSMISSION: Pneumatic and electrical transmission (inductance transmission only) and their fields of application, Process instrumentation, recording instruments, indicating and recording instruments, transmission of instrument reading, control centre, instrumentation diagram, instrumentation in modern chemical plant.

(10 Hrs.)

UNIT-IV

Basic concept of process control, types of controllers and control valves.

(08 Hrs.)

RECOMMENDED BOOKS:

1. Industrial Instrumentation and Control by S.K. Singh, Tata McGraw Hill Pub.
2. Principles of Industrial Instrumentation by D. Patranabis, Tata McGraw Hill Pub.
3. Principles of Process Control by D. Patranabis, Tata McGraw Hill Pub.
4. Industrial Instrumentation by Eckman, Wiley Eastern Publication.
5. Process System Analysis and Control by Coughnour, McGraw Hill Pub.

FT-4103 CEREAL PROCESS TECHNOLOGY

L T P **Sessional Marks: 25**
3 0 0 **End Term Examination Marks: 50**

UNIT -I

INTRODUCTION: Structure, chemical and nutritional composition of cereals. (04 Hrs.)
WHEAT: Types of wheat; wheat milling, equipment and machinery used in wheat milling; milling products and by-products. (06Hrs.)

UNIT- II

RICE: Varieties of rice; classification of rice; parboiling; milling of rice; different equipment's involved; rice products and by-products.

(06 Hrs.)

MAIZE: Classification of maize; dry & wet milling of maize; different equipment's involved; milling products and by-products.

(04 Hrs.)

UNIT -III

BARLEY: Milling; products and malting technology.

(05 Hrs.)

BAKING INGREDIENTS: Functions and storage; Indian Standards for these ingredients.

(05 Hrs.)

UNIT- IV

MANUFACTURING TECHNOLOGY: Technology of bread, biscuits and cakes; Defects and remedies in the bread and cake; quality consideration and parameters in the baked products.

(06 Hrs.)

BAKERY EQUIPMENT'S: Working of various equipment's like Mixers, proofing chambers, dough dividers, moulder and sheeters, baking ovens, cooling chambers, sealing and packaging machines.

(04 Hrs.)

RECOMMENDED BOOKS

Authors	Title	Publishers
RL Kent	Cereal Technology	AVI
A Chakravorty	Post harvest Technology of Cereals Pulses and Oil Seeds	Oxford and IBH
SB Arora	Hand Book of Bakery Products	SIRI

FT 4104 TECHNOLOGY OF MEAT, FISH AND POULTRY

L T P **Sessional Marks: 25**
3 0 0 **End Term Examination Marks: 50**

UNIT - I

Classification of fresh water fish and marine fish; Commercial handling, storage and transport of raw fish; Average composition of fish; Freshness criteria and quality assessment of fish; Spoilage of Fish; Methods of Preservation of fish: Canning, Freezing, Drying, Salting, Smoking and Curing. (10 Hrs.)

UNIT – II

Fish products - production of fish meal, fish protein concentrate, fish liver oil and fish sauce and other important by-products; Quality control of processed fish; Fish processing industries in India. (08Hrs.)

UNIT – III

Slaughtering technique of animal; Meat cuts and portions of meat, muscle; Colour of meat; Post mortem changes of meat; Meat processing - curing and smoking; Fermented meat products (meat sausages & sauces); Frozen meat & meat storage; By-products from meat industries and their utilization; Meat industries in India. (12 Hrs.)

UNIT - IV

Classification of poultry meat; Composition and nutritional value of poultry meat & eggs; Processing of poultry meat and eggs; Spoilage and control; By-product utilization and future prospects; Poultry farms in India. (10 Hrs.)

RECOMMENDED BOOKS:

1. Processed Meats; Pearson AM & Gillett TA; 1996, CBS Publishers.
2. Meat; Cole DJA & Lawrie RA; 1975, AVI Pub.
3. Egg and poultry meat processing; Stadelman WJ, Olson VM, Shemwell GA & Pasch S; 1988, Elliswood Ltd.
4. Fish as Food; Vol 1 & 2; Bremner HA; 2002, CRC Press.
5. Fish & Fisheries of India; Jhingram VG; 1983, Hindustan Pub Corp.

FT 4201 WASTE MANAGEMENT AND EFFLUENT TREATMENT

L T P **Sessional Marks: 25**
3 0 0 **End Term Examination Marks: 50**

UNIT – I

INTRODUCTION: Philosophy of waste management, by-products and their utilization, magnitude of waste waters, microbiology of waste, other ingredients like insecticide, pesticides and fungicide residues. (10 Hrs.)

UNIT – II

WASTE CHARACTERIZATION: Temperature, pH, oxygen demands, fat, oil and grease content, metal content, forms of phosphorus and sulphur in waste water.
PRE TREATMENTS: Sedimentation, coagulation, flocculation and floatation. (10 Hrs.)

UNIT – III

SECONDARY TREATMENT: Treatment methods of solid wastes: Biological composting, drying and incineration; Design of Solid Waste Management System: Landfill Digester, Vermicomposting Pit. (10 Hrs.)

UNIT - IV

TERTIARY TREATMENTS: Waste water treatment, process-sand, coal and activated carbon filters, phosphorus, sulphur, nitrogen and heavy metal remover.
EFFLUENT DISPOSAL: Environmental protection act specifications for effluent of different food industries, treatment and disposal of solid waste. (10 Hrs.)

RECOMMENDED BOOKS:

1. Essentials of microbiology; K.S. Bilgrami; CBS
2. Food Microbiology; W.C. Frazier; Tata McGraw Hill
3. Industrial Microbiology; Casida; Willey Eastern
4. Food Industry Wastes: Disposal and Recovery; Herzka A & Booth RG; 1981, Applied Science Pub Ltd
5. Wastewater Treatment; Bartlett RE; Applied Science Pub Ltd.

FT-4202 ELEMENTS OF FOOD ENGGINEERING

L T P **Sessional Marks: 25**
3 0 0 **End Term Examination Marks:50**

UNIT-I

INTRODUCTION TO HEAT TRANSFER: Different methods of heat transfer, Fourier's law, steady state unidirectional heat transfer through plain and composite slab, cylindrical and spherical bodies, natural and forced convection, radiation heat transfer. (06Hrs.)

PSYCHOMETRY: Absolute and relative humidity, humid volume, wet bulb temperature, psychometric charts. (04Hrs.)

UNIT-II

HEAT EXCHENGERS: Concept of LMTD, overall heat transfer coefficient and effectiveness of parallel counter flow heat exchanger, different types of heat exchangers. (04 Hrs.)

DRYING: Bound and unbound water, moisture content on dry and wet basis, equilibrium moisture content, CMC, drying rate, constant and failing rate phase calculation, working of different type of driers used in food industry. (06 Hrs.)

UNIT-III

FLUID FLOW OPERATION: Physical properties of fluid, classification of fluid flow, continuity equation, Bernoulli's theorem and its application, concept of Reynolds number and its determination, working features of different type of pumps. (06Hrs.)

VISCOMETY: Newtonian and non- Newtonian fluid, derivation of poiseuille equation, working of different types of viscometer like capillary viscometer, rotational viscometer and falling sphere viscometer.

(04Hrs.)

UNIT-IV

EVAPORATION: Basic principle of evaporators, concept of overall heat coefficient, single and multi-effect evaporators, calculation of heat transfer in single effect evaporators, evaporator's equipment's.

(06Hrs.)

REFRIGERATION SYSTEMS: Refrigeration cycle, Ravers cycle and vapour compression cycle, types of refrigerants and components of refrigerator. (04Hrs.)

RECOMMENDED BOOKS:

Authors	Title	Publishers
Helman &Sing	Introduction to Food Engg.	Academic Press
Smith	Introduction to Food Engg.	Springer .
R.T.Toledo	Fundamentals of process Engg.	CBS

FT 4203 FOOD BEVERAGE TECHNOLOGY

L T P **Sessional Marks: 25**
3 0 0 **End Term Examination Marks: 50**

UNIT – I

INTRODUCTION: Status and scope of beverage industry in India, classification of beverages and their nutritional significance. (08Hrs.)

UNIT – II

TECHNOLOGY OF CARBONATED AND NON-ALCOHOLIC BEVERAGES: definition of soft drinks, different ingredients for soft drinks and their functions, methods of preparation, related equipment's and machinery. (10 Hrs.)

UNIT - III

TEA &COFFEE PROCESSING: Tea types, nutritional significance, methods and processing of Tea and Coffee, related equipment and machinery. (10 Hrs.)

UNIT – IV

ALCOHOLIC BEVERAGE: Ingredients and their role in beer and wine preparation, methods of manufacturing of wine, beer, scotch, whiskey, brandy, Rum, Vodka, and Gin, ; related equipment. (12 Hrs.)

RECOMMENDED BOOKS:

Authors	**Title**	**Publishers**
Potter and Hotchkins	Food Science	CBS Publication.
Ashurst	Chemistry &Technology of soft drinks & fruits juices.	Sheffield Academi Press.

HU-4201 EDP & MANAGEMENT

L T P **Sessional Marks: 25**
3 0 0 **End Term Examination Marks: 50**

UNIT-I

Entrepreneurship, concept, meaning need, entrepreneurial competencies, characteristics, Small scale industries in developing economies. (08 Hrs.)

UNIT-II

Identification of Business opportunities, Role of financial institutions in promoting small scale industries, DIC, commercial banks, SFCS, NSICS, NABARD, etc. (08 Hrs.)

UNIT-III

Preparation of Project report, Technical, Economic, Market feasibility, Market survey, Tasks and Responsibilities of Professional Managers, communication, its importance, process, effectiveness and barriers in effective communication. (12 Hrs.)

UNIT-IV

Basics of Marketing Mgt., Basics of Material Management, Motivation-Maslow's Need hierarchy, Leadership-functions, styles, Managerial grid, Human and Industrial relations, Function of HR, Importance and characteristics of IR, Grievance handling procedure, Factories Act 1948, Industrial Dispute Act 1947. (12 Hrs.)

RECOMMENDED BOOKS:

Management ,- Stephen P.Robbins, Mary (Pearson education Asia)
Dynamics of entrepreneurial development ,- Vasant Desai/Himalaya and Management Pub.House
Entrepreneurship New venture creation,- David H.Holt, PHI
Entrepreneurship & Small Business Management, - Nicholas, Siropholis Haughton Mifflin company Boston- Newyork
Industrial Law- N.D.Kapoor/Sultan chand & sons
Entrepreneurship development in India- C.B.Gupta/Sultan Chand & Sons

ELECTRICAL ENGINEERING (DEE)

DIPLOMA PROGRAMME IN ELECTRICAL ENGINEERING (DEE)

SEMESTER-I August to December (Including Examination)

S.L	SUB CODE	SUBJECT NAME	L	T	P	Sessnl.	Th. Exam.	Total
(A) For Entry of GKCIET Certificate holders								
1	HU 3101	Communication Skills	3	-	-	25	50	75
2	AP 3101	Applied Physics	3	1	-	25	75	100
3	AC 3101	Applied Chemistry	3	1	-	25	75	100
4	AM 3101	Applied Mathematics	3	1	-	25	75	100
5	AP 3151	Applied Physics Lab	-	-	2	50	-	50
6	AC 3151	Applied Chemistry Lab	-	-	2	50	-	50
7	HU3151	Communication Lab	-	-	2	50	-	50
(B) For Entry of 10+2 Pass outs								
1	ME 3151	Basic Engg Drawing Lab	-	-	4	100	-	100
2	WS 3151	General Workshop Practice	-	-	8	200	-	200
3	EE 3101	Electrical Measurements & Instrumentation	3	-	-	25	50	75
4	EE 3102	Basic Electrical Engg.	2	-	-	25	25	50
5	EE 3151	Electrical Measurements & Instrumentation lab	-	-	2	50	-	50
6	EE3152	Basic Electrical Engg. Lab	-	-	2	50	-	50
Common for both (A) and (B)								
1	EC 3101	Electronic Circuit & Devices I	3	-	-	25	50	75
2	EE 3103	Electrical Engineering Materials	3	-	-	25	50	75
3	EC3151	Electronic Circuit & Devices Lab I	-	-	2	50	-	50
4	CS 3151	Computer Application	-	-	3	75	-	75
Total: For GKCIET Certificate holders			**18**	**3**	**11**	**425**	**375**	**800**
For 10+2 Pass outs			**11**	**0**	**21**	**625**	**175**	**800**

Semester II January to May (Including Examination)

S.L	SUB CODE	SUBJECT NAME	L	T	P	Sessnl.	Th. Exam.	Total
1	CS 3201	C Programming	3	-	-	25	50	75
2	EC 3201	Digital Electronics	3	-	-	25	50	75
3	EE 3201	Network Theory	3	-	-	25	50	75
4	EE 3202	Electrical Machine I	3	-	-	25	50	75
5	EC 3201	Electronics Circuit & Device II	3	-	-	25	50	75
6	EE 3203	Generations, Transmissions, Distributions	3	-	-	25	50	75
7	EE 3251	Electrical Installation & Practice Lab	-	-	2	50	-	50
8	CS 3251	C Programming Lab	-	-	2	50	-	50
9	EC 3251	Digital Electronics Lab	-	-	2	50	-	50
10	EE 3251	Network Theory Lab	-	-	2	50	-	50
11	EE 3252	Electrical Machine Lab.	-	-	2	50	-	50
12	EC 3251	Electronics Circuit & Device Lab II	-	-	2	50		50
13	EE 3203	Generations, Transmissions, Distributions Lab.	-	-	2	50	-	50
Total			**18**	**0**	**14**	**500**	**300**	**800**

SEMESTER-III A Industrial Training June to August

S L	SUB CODE	SUBJECT NAME	L	T	P	Sessnl.	Th. Exam.	Total
1.	IT 4170	Industrial Training and Viva-voce	0	0	0	50	0	50

SEMESTER-III B August to December (Including Examination)

S L	SUB CODE	SUBJECT NAME	L	T	P	Sessnl.	Th. Exam.	Total
1	EE 4101	Elect. Machine II	3	-	-	25	50	75
2	EE 4102	Sub-Station, Switchgear& Protection.	3	-	-	25	50	75
3	EC 4101	Microprocessor	3	-	-	25	50	75
4	EE 4103	Power Electronics	3	-	-	25	50	75
5	EE 4104	Electrical Estimating & Costing	2	-	-	25	25	50
6	EE 4105	Fundamentals of Instrumentation Engg.	2	-	-	25	25	50
7	EE 4151	Elect. Machine Lab II	-	-	2	50	-	50
8	EE 4152	Sub-Station, Switchgear & Protection Lab	-	-	2	50	-	50
9	EC 4151	Microprocessor Lab	-	-	2	50	-	50
10	EE 4153	Power Electronics Lab	-	-	2	50	-	50
11	EE 4154	Electrical Estimating Lab	-	-	2	50	-	50
12	EE 4155	Fundamentals of Instrumentation Engg Lab	-	-	2	50	-	50
13	EE 4153	Pre Project Work	-	-	2	50	-	50
		Total	**16**	**0**	**14**	**550**	**250**	**800**

Semester IV January to May (Including Examination)

S L	SUB CODE	SUBJECT NAME	L	T	P	Sessnl.	Th. Exam.	Total
1	EE 4201	Control Engg.	3	-	-	25	50	75
2	EE 4202	Utilisation of Electric Power	3	-	-	25	50	75
3	EC 4201	Micro Controller & PLC	3	-	-	25	50	75
4	HU 4201	E D P & Management	3	-	-	25	50	75
5	EE 4251	Control Lab	-	-	4	100	-	100
6	EE 4252	Utilisation of Electric Power Lab	-	-	2	50	-	50
7	EC 4251	Micro Controller & PLC Lab	-	-	4	100	-	100
8	EE 4253	Project Work	-	-	4	100	-	100
9	EE 4254	Fault Finding & Trouble Shooting Lab	-	-	6	150	-	150
		Total:	**12**	**0**	**18**	**600**	**200**	**800**

HU 3101 COMMUNICATION SKILLS

L T P **Maximum Sessional Marks: 25**
3 0 2 **Maximum End Term Examination Marks: 50**

UNIT - I

REPORT WRITING: Reports and their importance, Types of Routine Reports, Structure of Reports, Bibliography & References, Proof-reading Symbols & their Functions, Expressions from Foreign Languages (10 Hrs.)

UNIT –II

COMMUNICATION TECHNIQUES: Importance of Communication, One Way and Two Way Communication, Essentials of Good Communication, Barriers to Communication and Techniques to overcoming Barriers, Telephonic Communication

(10 Hrs.)

UNIT -III

GRAMMAR: Common Errors in writing, Change of Narration, Change of Voice, Use of Idioms & Phrases. (10 Hrs.)

UNIT –IV

WRITING SKILLS: Applications for jobs, Essay-writing, Equivalent Terminology (100 to 150 administrative technical terms in English with their equivalent meanings in Hindi or Punjabi)
LIBRARY ACTIVITIES: Collecting Reference materials from Books & Journals

(10 Hrs.)

RECOMMENDED BOOKS

Title Author Publisher
Oxford Guide to Writing & Speaking John Seely Oxford
English Grammar & Composition Wren & Martin ELBS
Writing Remedies Edmond H. Weiss Univ. Press.

AP–3101 APPLIED PHYSICS

L T P **Maximum Sessional Marks: 25**
3 1 2 **Maximum End Term Examination Marks: 75**

UNIT – I

ROTATIONAL MOTION: Center of Mass, Centre of mass of a two-particle system, motion of center of mass and momentum conservation, Rotational motion of a single particle in two dimensions. Torque, angular momentum and its geometrical and physical meaning, law of conservation of angular momentum, centripetal force, banking of tracks and bending of cyclist, motion in vertical circle. Numerical Problems

(10 Hrs.)

UNIT – II

MOMENT OF INERTIA: Moment of inertia of rigid body, radius of gyration, theorem of parallel and perpendicular axes, moment of inertia of a straight rod, circular ring, circular disc, cylinder (solid and hollow) sphere, relation between torque and moment of inertia, Kinetic energy and angular momentum , motion of cylinder and sphere rolling without slipping on an inclined plane. Numerical Problems

(10 Hrs.)

UNIT – III

KINETIC THEORY OF GASES: Boyle's and Charles's laws, gas equation, pressure exerted by gas, K.E. of molecules, Kinetic interpretation of temperature and derivation of gas laws from kinetic theory of gases. Numerical Problems.

(04 Hrs.)

WAVE MOTION and ELECTROMANETIC WAVES: Longitudinal and transverse waves, reflection of waves, standing waves, beats and Doppler Effect History of e.m. waves. Hertz experiment, production, properties of e.m. waves, transverse nature and velocity of e.m. waves, propagation of radio waves in earth's atmosphere. Numerical Problems.

(06 Hrs.)

UNIT – IV

ELECRONICS AND PHOTONS: Discharge through gases at varying pressure, cathode rays and their properties, specific charge on electron by J.J. Thomson, Millikan's Oil drop method.

(04 Hrs.)

ATOMIC AND NUCLEAR PHYSICS: Photoelectric effect, laws and experimental verification of laws, photocell and its applications, production of x-rays, soft and hard x-rays, uses of x-rays, Radioactivity laws, half-life and average life, decay , mass defect, binding energy, Nuclear Fission and Fusion. Numerical Problems.

(06 Hrs.)

RECOMMENDED BOOKS

Text Book
APPLIED PHYSICS R K Gaur
REFERENCE BOOK
Resnick and Halliday Fundamentals of PHYSICS

AC-3101 APPLIED CHEMISTRY

L T P **Maximum Sessional Marks: 25**
3 1 2 **Maximum End Term Exam Marks: 75**

UNIT - I

Organic Chemistry: Functional Group I: (Halides and hydroxy compounds): Nomenclature of compounds containing halogen atoms and hydroxyl groups: haloalkanes, haloarenes; alcohols and phenols. physical, chemical properties and use; Functional Group II: (Ethers aldehydes, ketones, carboxylic acids and their derivatives). Nomenclature of Ethers aldehydes, ketones, carboxylic acids and their derivatives, physical, chemical properties and uses (acyl halides, acid anhydrides, amides and esters); Functional Group II: (Cyanides, isocyanides,, nitro compounds and amines) Nomenclature of Cyanides, isocyanides, nitro compounds and amines and their methods of preparation, physical, chemical properties and uses. (10 Hrs.)

UNIT - II

Transition Metals and Coordination Chemistry: Transition Metals: Electronic configuration, general characteristic properties, oxidation states of transition metals. First row transition metals and general properties of their compounds oxides, halides and sulfides.

Coordination Compounds: Nomenclature, isomerism in coordination compounds, bonding in coordination compounds, stability of coordination compounds, application of coordination compounds, compounds containing metal-carbon bond; application of organo- metalics.

(10 Hrs.)

UNIT - III

Chemical Thermodynamics: First law of Thermodynamics: Internal energy, enthalpy, and application of first law of thermodynamics, Second and third law of thermodynamics: Entropy, Free energy, spontaneity of a chemical reaction, Free-energy change and chemical equilibrium.

(06 Hrs.)

Surface Chemistry: Surfaces: Adsorption, Colloids (preparation and general properties), emulsions, micelles; Catalysis: Homogeneous and heterogeneous, structure of catalyst.

(04 Hrs.)

UNIT – IV

Bio-molecules: Carbohydrates: Monosaccharaides, disaccharides, polysaccharides; Amino acids and peptides: Structure and classification; Proteins and Enzymes: Structure of proteins, role of enzymes Nucleic acids: DNA and RNA; Lipids: Structure, membranes and their functions.

(06 Hrs.)

Chemistry in Action: Dyes: Classification of dyes with examples; Chemicals in medicines: Antipyretics, Antibiotics, analgesics, antiseptics, disinfectants, anti-malarial, tranquilizers, germicides and anesthetics, (only definition and examples); Rocket propellants: Types of propellants- solid, liquid and hybrid. (04 Hrs.)

Recommended Books:

1. Chemistry for class XI and XII, published by NCERT
2. Organic Chemistry, Morrison & Boyd
3. Physical Chemistry, G. W. Castellan
4. Inorganic Chemistry, Ramesh Kapoor

AM 3101 APPLIED MATHEMATICS

L T P **Maximum Sessional Marks: 25**
3 1 0 **Maximum End Term Examination Marks: 75**

UNIT-I

Successive differentiation, Leibnitz's theorem. Fundamental theorems: Rolle's theorem & Lagrange's mean value theorem. Expansion of function using Taylor and Maclaurin's series. Indeterminate forms, L Hospital's Rule. (10 Hrs.)

UNIT-II

Ordinary differential equations, its order and degree. Linear and non-linear differential equations. Formation of differential equation. General and particular solution of differential equation by variable separation method, homogeneous differential equation of first order and their solution, Solution of linear differential equation. Exact differential equation, differential equations reducible to these forms. (10 Hrs.)

UNIT-III

Introduction to matrices; addition; subtraction and multiplication of matrices, inverse of 2x2 and 3x3 matrix by adjoin method and solution of linear simultaneous equations. Determinants, minors, cofactors, expansion of a determinant, properties of determinants, solution of linear simultaneous equations containing three variables by Cramer's rule. (10 Hrs.)

UNIT-IV

Organization of data. Measures of Central Tendency- Mean, median, mode. Measures of Dispersion - Standard deviation. Karl Pearson's coefficient of correlation. Probability and its laws. Conditional probability. Baye's theorem (without proof). Random Variable, Binomial and Poisson distributions. (10 Hrs.)

RECOMMENDED BOOKS:

Text Book:

Erwin Kreyszig, Advanced Engineering Mathematics, Wiley Eastern Ltd

Reference Books:

Schaum's Outline Series, Probability & Statistics, Tata McGraw Hill
Thomas & Finney, Calculus, Pearson Education

EE-3101 ELECTRICAL MEASUREMENT AND INSTRUMENTATION

L T P **Maximum Sessional Marks: 25**
3 0 2 **Maximum End Term Examination Marks: 50**

UNIT-I

Introduction: Elements of generalized measurement system, characteristics of instruments, accuracy, precision, sensitivity, range span. Construction and working of CRT, Block diagram of CRO, measurement of voltage and frequency with CRO

(10 Hrs.)

UNIT-II

Basic Indicating Instruments: Classification of analog, concept of deflecting, controlling and damping torque, control and damping system, construction and principle of moving iron and moving coil instruments, construction of ammeter and voltmeter and extension of their range and Electro dynamometer instruments, Principles of operation PMMC ohm meters and their types.

(10 Hrs.)

UNIT-III

Measurement of Resistance: Potentiometers: Basic principles, types of potentiometers, their functions and applications, Classification of resistance, measurement of low, medium and high resistance, ammeter-voltmeter method, wheat-stone bridge, digital LCR meter for measurement of resistance, insulation tester.

(10 Hrs.)

UNIT-IV

Transducer : Definition of transducer and sensors, classification of transducers, active and passive, primary and secondary transducers, LVDT, strain-gauge, RTD, piezoelectric transducers and their applications.

(10 Hrs.)

RECOMMENDED BOOKS:

Title	**Author**	**Publisher**
Text Book		
Electrical and Electronics Measurement and Instrumentation	AK Sawhney	Dhanpat Rai
Reference Books		
Electrical Measurement	JB Gupta	SK Kataria
Electronic Measurement and Instrumentation	Dr.Rajendra Prasad	S.Chand
Experiments in Basic Electrical Engineering	S.K. Bhattacharya and KM Rastogi	New Age
Electronic Instrumentation and Measurement Techniques	WD Cooper & AD Helfrick	PHI

EE-3102 BASIC ELECTRICAL ENGINEERING

L T P **Maximum Sessional Marks: 25**

2 0 2 **Maximum End Term Examination Marks: 25**

UNIT-I

DC Circuits : Definition and units of electric current, potential and potential difference, Ohms law, resistance, conductance, resistivity and conductivity, their units and dependence on temperature in conductor .Power and energy, heating effect of electric current and conversion of mechanical to electrical units and vice versa .Kirchhoff's voltage and current laws and their applications in simple DC circuits .Series and parallel combination of resistors, wattage consideration, simple problems. (10 Hrs.)

UNIT-II

Electro Magnetism : Concept of magnetic field production by flow of current ,Oersteds experiment , concept of magneto motive force {MMF} ,flux, reluctance , permeability , Analogy between electric and magnetic circuits. Force on a moving charge and current in a magnetic field, force between two current carrying parallel conductors .Magnetic field around a current carrying straight conductor , circular loop and solenoids. Faradays laws, lenzs law and rules of electromagnetic induction, principals of self and mutual induction, self mutually induced e.m.f; simple numerical problems. Energy stored in magnetic field , concept of current growth decay and time constant in an inductive {RL} circuit. Energy stored in an inductor, series and parallel combinations of inductors. Concept of hysteresis loop. (10 Hrs.)

UNIT-III

AC Circuits: Concepts of generation of alternating voltage and current, difference between AC and DC. Terms related to AC waves - instantaneous, average, RMS and peak values. Form factor {definition only}. Equation of sinusoidal waveform, representation of alternating quantities, concept of phase difference. Representation of sinusoidal quantities by phasor diagram of alternating voltage applied to a pure resistance , pure inductance and pure capacitance , phasor diagrams for simple , R, L, C circuits {series and parallel} concept of impedance , impedance triangle, phase angle . Numericals problems, phasor diagram for RL, RC series circuits. (10 Hrs.)

UNIT-IV

Network Theorems: Thevenins theorem, Norton's theorem, superposition theorem, maximum power transfer theorem, application of network theorems in solving DC circuit problems. (10 Hrs.)

RECOMMENDED BOOKS

Title	**Author**	**Publisher**
Text Book		
Electrical Technology	B.L. Theraja	S. Chand
Reference Books		
Basic Electricity	BR Sharma	Satya Prakashan
Basic Electrical Engineering	PS Dhogal	Tata Mc Graw Hill
Electrical Engineering	JB Gupta	S.K.Kataria
Experiments in basic Electrical engineering	SK Bhattacharya, KM rastogi	New Age
Electrical Technology	Edward Hughes	Longman
Principles of Electrical and Electronics	J.S. Dhillon , Daljinder Singh	Kalyani

EC-3101 ELECTRONIC CIRCUITS & DEVICES I

L T P **Maximum Sessional Marks: 25**

3 0 2 **Maximum End Term Examination Marks: 50**

UNIT-I

SEMICONDUCTORS: Structure of an atom, Atomic crystal structure of Germanium and Silicon, Energy band diagrams of Silicon and Germanium, Covalent bonds, generation and recombination, Effect of temperature on conductivity of semiconductors, Conductors, semiconductors, insulators, difference between conductors, insulators and semiconductors, Extrinsic semiconductor materials-doping of impurity in P and N type semiconductors and their conductivity, minority and majority carriers, drift and diffusion currents. (10 Hrs.)

UNIT-II

SEMICONDUCTR DIODES: P-N junction diode, mechanism of current flow in P-N Junction, drift and diffusion current depletion layer, potential barrier, behavior of P-N junction characteristics, zener and avalanche breakdown, concept of junction capacitance in forward and reverse bias conditions, semiconductor diode characteristics, Diode (P-N junction) as rectifier; half wave rectifier; full wave rectifier including bridge rectifier, relationship between DC output voltage and AC input voltage; rectification efficiency and ripple factor for rectifier circuits, filter circuits, physical explanations of the working of the filters and typical applications of each type, different types of diodes brief idea and typical applications of power diodes, zener diodes varactor diodes and point contact diodes; important specifications of rectifier diode and zener diode. (10 Hrs.)

UNIT-III

TRANSISTORS: Concept of bipolar transistor as two junction three terminal device having two kinds of current carriers PNP and NPN transistors, their symbols and mechanisms of current flow; explanation of fundamental current relations, Transistor type, Transistor action, Transistor configurations, Characteristics, Different modes of operation and comparison. Transistor as an amplifier in CE configuration; DC load line, its equation and drawing it on collector characteristics; determination of small signal voltage and current gain of a basic transistor amplifier using CE output characteristics and DC load line; concept of power gain as product of voltage gain and current gain. Single stage CE amplifier circuit with proper biasing components, AC load line and its use in Calculation of current and voltage gain of a single amplifier circuit, Expressions for voltage gain, current gain, input and output impedance for a single stage CE amplifier circuit in h. parameters, appropriate approximation. (10 Hrs.)

UNIT-IV

FIELD EFFECT TRANSISTOR (FET): Construction, operation, characteristics and equivalent circuit of JFET and its circuit application, Construction, operation, characteristics and equivalent circuit of MOSFET in depletion, enhancement modes and its circuit applications, CMOS advantages and applications, Comparison of JFET, MOSFET, BJT ,Simple FET amplifier circuit and its working principles (without analysis). (10 Hrs.)

RECOMMENDED BOOKS

Title	**Author**	**Publisher**
Text Book		
Basic Electronics and Linear Circuitis	N NBhargava and Kulshreshta	McGraw Hill
Reference Books		
Electronics Devices	Miliman and Halkias	McGraw Hill Circuits

EE- 3103 ELECTRICAL ENGINEERING MATERIALS

L T P **Maximum Sessional Marks: 25**
3 0 0 **Maximum End Term Examination Marks: 50**

UNIT –I

Conducting Materials: Atomic structure, composition and application of conducting materials, effect of temperature on resistivity, properties and uses of Nickel, Nichrome , Manganese, Carbon, Graphite etc, metal and alloys for fuses, properties and specification of wire, cable, etc. (10 Hrs.)

UNIT –II

Insulating Materials: Electrical, Thermal and Mechanical properties of various insulating materials, transformer oil, quartz etc, polarization and dielectric constant, dielectric properties in alternating fields. (10 Hrs.)

UNIT – III

Magnetic Materials: Classification of magnetic materials, diamagnetism, paramagnetism, Ferro and anti-ferromagnetism, ferrimagnetism, Wiss fields and magnetic domains, magnetic energy, hard and soft magnetic materials, types and uses, B-H curve and Hysteresis loss. (10 Hrs.)

UNIT – IV

Electrical Components: Different types of resistors, capacitor, choke coil and reactors, electromagnetic and electrostatic shielding. (4 Hrs.)

Special materials, classification, properties and uses and ceramic materials, semi conducting materials, contact materials, chemicals used for cleaning the contacts. Introduction of super conductors, types and their applications. (6 Hrs.)

Books:

Electrical Engineering Materials, A.J. Dekker, Prentice Hall, New Delhi, 1998.
Materials & Devices for Electrical Engineering and Physicists. R.A. Colclaser and SD Nagle, McGraw Hill International, Singapore, 1987.

CS 3201 C PROGRAMMING

L T P **Maximum Sessional Marks: 25**
3 0 2 **Maximum End Term Examination Marks: 50**

UNIT – I

Programming Languages: High level languages, Low level languages, machine level language, assembly language; Translators: Compiler, Interpreter, Assembler; Procedural language, Algorithm, Flow Chart, Introduction to C, Structure of a C program, Compiling C programs, Executing C programs, loader, linker (06 Hrs.)

UNIT – II

C character set, Keywords, Variables or Identifiers, Constants, Data types, Operators and Expressions, if-else statement, switch statement, while loop, for loop, do-while loop, break statement, continue statement, goto statement, Storage classes. (12 Hrs.)

UNIT – III

Functions, Standard library functions, Function declaration or prototype, function call, function definition, User defined functions, passing arguments to functions, return statement, recursive functions. (10 Hrs.)

UNIT – IV

Arrays: One dimensional and two dimensional; Pointers: definition, pointer arithmetic, pointer to an array; Strings, Structures, Union, enumerated data type. (06 Hrs.)

File Programming: Opening a file, closing a file, Text and binary modes, fprintf(), fscanf(), putw(), getw(), fputc(), fgetc(), getc(), putc(), fputs(), fgets(), Command line arguments. (06Hrs.)

Recommended Books:

TITLE	AUTHOR	PUBLISHER
Programming with C	Byron Gottfried	Tata Mc-Graw-Hill
Programming in ANSI C	E Balagurusamy	Tata Mc-Graw-Hill
Let Us C	YashvantKanetkar	BPB Publications

EC-3201 DIGITAL ELECTRONICS

L T P **Maximum Sessional Marks:25**
3 0 2 **Maximum End Term Exam Marks:50**

UNIT-I

Number system: Binary, Octal and Hexadecimal representation andtheir conversion, BCD, ASCII, EBDIC, Gray codes and their conversion, Signed binary numbers representation with 1'sand2's complement methods, Binary arithmetic.
Boolean algebra: Various logic gates and their truth tables and circuits, Representation in SOP and POS forms, Minimization of logic expressions by algebraic method, K-map method.
(10 Hrs.)

UNIT-II

Combinational circuits: Adder and sub tractor circuit, Circuit of Encoder, Decoder, Comparator, Multiplexer, De-Multiplexer. (10 Hrs.)

UNIT-III

Memory systems: RAM, ROM, PROM, EPROM, EEPROM
Sequential circuits: Basic memory elements, S-R,J-K, D, and T Flip-flop, various types of Registers & Counters . (10 Hrs.)

UNIT-IV

Different types of A/D and D/A conversion techniques.
Logic families: TTL, ECL, MOS & CMOS, their operation and specification. (10 Hrs.)

Text Books:
1. Digital Principles & Application, 5th Edition, Leach &Malvino, McGraw Hill Company.
2. Modern Digital Electronics, 2nd Edition, R.P. Jain. Tata McGraw Hill CompanyLimited
3. Fundamental of Digital Circuits, A. Anand Kumar, PHI.
Reference Books:
1. Digital Logic Design, Morries Mano, PHI.
2. Digital Integrated Electronics, H. Taub& D. Shilling, McGraw Hill Company.
3. Digital Electronics, James W. Bignell& Robert Donovan, Thomson Delman Learning.
4. Fundamental of logic Design, Charles H. Roth, Thomson Delman Learning

EE-3201 NETWORK THEORY

L T P **Maximum Sessional Marks: 25**
3 0 2 **Maximum End Term Exam Marks: 50**

UNIT – I

DC Circuits : Concepts of electricity, Definition and units of following terms, Potential and potential difference; node, loop, mesh, unilateral, bilateral, linear circuit, non-linear circuit, active & passive element elements Current; Resistance, Ohm's law and its practical applications, Connection of resistance in series and parallel, star-delta conversion, Kirchoff's laws and their applications to simple circuits, source conversion, nodal analysis ,mesh analysis Thevenin's theorem, Norton's theorem, Super position theorem, Max. power transfer theorem, Millman's theorem, reciprocity theorem (10 Hrs.)

UNIT – II

Laplace transforms: Concept of Laplace transformation Impulse, Step & Sinusoidal response of RL, RC, circuits. Transient analysis of different electrical circuits with and without initial conditions. Concept of Convolution theorem and its application. Solution of Problems with DC & AC sources.

Fourier method of waveform analysis: concept of Fourier series Application in circuit analysis, Solution of Problems. (10 Hrs.)

UNIT – III

Graph theory and Networks equations: Concept of Tree, Branch, Tree link, Incidence matrix, Tie-set matrix and Cut set matrix .Solution of Problems. (10 Hrs.)

UNIT – IV

Two port networks analysis: concept of two port network**,** Open circuit & Short circuit parameter, Transmission parameters and their inter relations. Driving point impedance & Admittance. Solution of Problems. (10 Hrs.)

Text Books:

1. Networks and Systems, D. Roy Chowdhury, New Age International Publishers
2. Network Analysis and Synthesis, C.L. Wadhwa, New Age International Publishers
3. Circuit and Networks: Analysis and synthesis, A. Sudhakar& S.S. Palli
4th edition. Tata McGraw Hill Education Pvt. Ltd.
4. Circuit theory, Dr. AbhijitChakrabarty, DhanpatRai& Co Pvt. Ltd.

Reference Books:

1. Network Analysis, M.E. Valkenburg, Pearson Education .
2. Fundamental of Electric circuit theory, D. Chattopadhay& P.C. Rakshit, S. Chand.

EE-3202 ELECTRICAL MACHINE-I

L T P **Maximum Sessional Marks: 25**

3 0 2 **Maximum End Term Exam Marks: 50**

UNIT-I

DC Machines: EMF generated in the armature. Methods of Excitation, Armature reaction & its effect in the performance, Methods of decreasing the effects of Armature reaction, Effect of Brush shift.

Commutation process, Resistance commutation, Delayed commutation, Voltage commutation, Improvement of Commutation. (10 Hrs.)

UNIT-II

Generator: Operating Characteristics of DC Generators: Separately Excited generators, Shunt Generators, Series Generators and Compound Generators, parallel operation, Generator application.

Motor: Torque equation of D.C motor, Operating Characteristics of Shunt, Series &Compound motors. Losses and efficiency of DC machines, Hopkinson's and Swinburne's test of D.C Machine, Motor application. (10 Hrs.)

UNIT-III

3-Phase Induction machine:

Induction motor as a Transformer, Concept of rotating magnetic field, slip Frequency of rotor voltage & current, relation between rotor copper loss & rotor input, concept of air gap power, torque of an induction motor, condition for max. torque, comparison between squirrel cage & wound rotor induction machine, Equivalent circuit, Performance equations, Induction motor phasor diagram Toque-slip characteristic, Determination of equivalent circuit parameters. Methods of starting of squirrel Cage and Wound rotor Motors, Speed control of Induction motor Application of Polyphase Induction motor. (10 Hrs.)

UNIT-IV

1-Phase Transformer:: Overview of electromagnetic induction, self and mutual induction, construction and working principle of single phase transformer, construction of different types (core and shell type) of transformers, e.m.f. equation, turn ratio, transformer on no-load, losses. Methods of determining losses-short circuit and open circuit tests, efficiency, rating, auto transformers. (10 Hrs.)

Text Books:

1 Electrical Machinery, P.S. Bhimra, 6th Edition, Khanna Publishers.

2 Electric machines, D.P. Kothari & I.J Nagrath, 3rd Edition, Tata McGraw-Hill Publishing Company Limited.

3 Electrical Machines, P.K. Mukherjee & S. Chakrabarty, DhanpatRai Publication.

Reference Books:

1. Electric Machinery & Transformers, Bhag S. Guru and H.R. Hiziroglu, 3rd Edition, Oxford University press.

2. Electrical Machines, R.K. Srivastava, Cengage Learning

3. Theory of Alternating Current Machinery, Alexander S Langsdorf, Tata McGraw Hill Edition.

4. The performance and Design of Alternating Current Machines, M.G.Say, CBS Publishers & Distributors.

5. Electric Machinery & transformer, Irving L Koskow, 2nd Edition, Prentice HallIndia

EC-3202 ELECTRONICS CIRCUIT & DEVICE-II

L T P **Maximum Sessional Marks: 25**
3 0 2 **Maximum End Term Exam Marks: 50**

UNIT – I

Transistor biasing & stability: Q-point, Self-Bias-CE, Compensation techniques, h-model of Transistor, Expression of voltage gain, current gain, input & output impedance.
Transistor amplifier: RC coupled amplifier, Function of all components, Equivalent circuit, derivation of voltage gain, Current gain, Input impedance &output impedance, Frequency response characteristics, Lower & upper half frequencies, Bandwidth. (10 Hrs.)

UNIT – II

Feedback Amplifier & Oscillators: Concept of Feedback, Negative & Positive feedback, Voltage/Current, Series/Shunt feedback, Berkhauson criterion, Colpit, Hartley's, Phase shift, Wien Bridge. (10 Hrs.)

UNIT – III

Operational amplifier: Ideal OPAMP, Differential amplifier, Constant current source (Current mirror etc.), Level shifter, CMRR, importance of feedback loop (positive & negative), inverting & non-inverting Amplifiers, Voltage follower/Buffer circuits.
Application of Operational amplifiers: Adder, Integrator & Differentiator, Comparator, Voltage to current & current to voltage converter. (10 Hrs.)

UNIT – IV

Power amplifier: Class A, B, AB, C, Conversion efficiency, push-pull amplifier, Tuned amplifier.
Multivibrator: Monostable, Bistable multivibrator, Monostable & Astable operation using 555 timer. (10 Hrs.)

Text Books:

1. Microelectronic Circuits, Sedra& Smith, Oxford University Press.
2. Integrated Electronics, Milman&Halkias, McGraw Hill Company.
3. Electronic devices & Circuits, Balbir Kumar &Shail B. Jain, PHI.
4. Op-amps and Linear IC's, R.A. Gayakwad, PHI.

Reference Books:

1. Microelectronic Circuit- Analysis & Design, Rashid, Cenage Learning.
2. Electronic Circuits: Discrete & Integrated, 3rd Edition, Schilling &Belove, McGraw Hill Company.
3. Electronic principles, 6th Edition, Malvino, McGraw Hill Company.
4. Operational Amplifier & Linear IC's, Bell, Oxford University Press.
5. 2000 Solved Problems in Electronics, Jimmie J. Cathey, McGraw Hill Inc.
6. Electronic Devices -System & Application, Robert Diffenderfer, Cengage Learning.
7. Op- Amps & Linear Integrated Circuits, Ravi Raj Dudeja& Mohan Dudeja, Umesh Publication.

EE-3203 GENERATIONS, TRANSMISSIONS & DISTRIBUTIONS

L T P **Maximum Sessional Marks: 25**
3 0 2 **Maximum End Term Exam Marks: 50**

UNIT – I

Generation of Electric Power:
Different methods of power generation, General layout of a typical coal fired power station, hydroelectric power station, Nuclear power station, their components and working principles, comparison of different methods of power generation. Introduction to Solar & Wind energy system, Load curves.
Tariff: Guiding principle of Tariff, different types of tariff.
Indian Electricity Rule-1956: General Introduction. (10 Hrs.)

UNIT – II

Overhead line construction: Line supports, Towers, Poles, Sag, Tension and Clearance, Effect of Wind and Ice on Sag. Dampers.
Insulators: Types, Voltage distribution across a suspension insulator string, String efficiency, Methods of improving voltage distribution across Insulator strings, Electrical tests on line Insulators.
Corona: Principle of Corona formation, Critical disruptive voltage, Visual critical corona discharge
Potential, Corona loss, advantages & disadvantages of Corona. Methods of reduction of Corona. (12 Hrs.)

UNIT – III

Cables: Types of cables, cable components, capacitance of single core & 3 core cables, dielectric stress, optimum cable thickness, grading. (10 Hrs.)

UNIT – IV

Performance of lines: Short, medium (nominal T) and long lines and their representation. A,B,C,D constants, Voltage regulation, Ferranti effect.
Distribution systems: Different Types of distribution system. (10 Hrs.)

Text Books:
1. Electrical Power System, Subir Roy, Prentice Hall
2. Power System Engineering, Nagrath&Kothery, TMH
3. Elements of power system analysis, C.L. Wodhwa, New Age International.
4. Electrical Power System, AshfaqHussain, CBS Publishers & Distributors
Reference Books:
1. Electric Power transmission & Distribution, S.Sivanagaraju, S.Satyanarayana, Pearson Education.
2. A Text book on Power system Engineering, Soni, Gupta, Bhatnagar&Chakrabarti, Dhanpat Rai& Co.
3. Electric Power distribution system Engineering, 2nd Edition, T. Gonen, CRC Press.

EE-4101 ELECTRICAL MACHINE -II

L T P **Maximum Sessional Marks: 25**
3 0 2 **Maximum End Term Exam Marks: 50**

UNIT – I

3-Phase Transformer: Determination of polarity and connections (star/star, star/delta, delta/star), Phasor groups. Effect of unbalanced loading, 3 winding transformer: Parameter estimation, application, Parallel operation of Transformers, Introduction to Tap changing transformer and its function. (10 Hrs.)

UNIT – II

Special Transformers: Potential transformer, Current transformer, open delta, Scott connection. (08 Hrs.)

UNIT – III

Synchronous machines: Construction, Types, Excitation systems, Generator & Motor modes, Armature reaction, Theory for salient pole machine, Two reaction theory, Voltage regulation (EMF,MMF, ZPF). Operating characteristics of Alternators and their ratings. Power angle characteristics of Synchronous machines.

Parallel operation of Alternators, Synchronous machine connected to infinite bus, effect of change of excitation and speed of prime mover. Starting of Synchronous motor, V-curve. Damper winding, Hunting. Short circuit transients. Applications. (12 Hrs.)

UNIT – IV

Single Phase Induction Motor: Construction, Double revolving field theory, Cross field theory, Starting methods, Speed-Torque characteristics, Phasor diagram, Condition of Maximum torque, Determination of equivalent circuit parameters, Testing of Single phase motors, Applications. Single phase AC series motor, Compensated and uncompensated motors. (10 Hrs.)

Text Books:

1. Electrical Machinery, P.S. Bhimra, Khanna Publishers.
2. Electrical Machines, Nagrath&Kothary, TMH
3. Electrical Machines, Theory & Applications, M.N. Bandyopadhyay, PHI

Reference Books:

1. Electric Machinery & Transformer, Bhag S. Guru and H.R. Hiziroglu, 3rd Edition, Oxford University press.
2. Electric Machinery &Transformes, Irving L. Kosow, PHI
3. Electric Machinery, A.E.Fitzgerald, Charles Kingsley,Jr. & Stephen D. Umans, 6th Edition, Tata McGraw HillEdition.
4. Electrical Machines, R.K. Srivastava, Cengage Learning
5. Theory of Alternating Current Machinery, Alexander S Langsdorf, Tata McGraw Hill Edition
6. The performance and Design of Alternating Current Machines, M.G.Say, CBS publishers& distributors.
7. Problems in Electrical Engineering, Parker smith, 9th Edition, CBS publisher.

EE-4102 SUB-STATION, SWITCHGEAR & PROTECTION

L T P **Maximum Sessional Marks: 25**
3 0 2 **Maximum End Term Exam Marks: 50**

UNIT – I

Sub-station: Sub-station, classification of Sub-station, comparison between outdoor and indoor Sub-station, pole mounted Sub-stations, underground Sub-station ,symbol for equipment in Sub-station, equipment in a transformer Sub-station, bus-bar arrangement in sub-station, terminal &through Sub-station, key diagram of 66/11KV sub-station, key diagram of 11KV/400V indoor sub-station, (10 Hrs.)

UNIT – II

Protective relays: Classification of electromagnetic (attracted armature & induction type) relays, Different important terms related to relay, Directional relay, Distance relay, Differential relay, Basic aspects of static and digital relays. (10 Hrs.)

UNIT – III

Circuit breakers: circuit breaking transients, transient recovery voltage, current chopping and resistance switching, circuit breaker rating, Arc and Arc extinction. Circuit breaker types, oil circuit breaker, Vacuum circuit breaker, Air blast circuit breaker, SF6 circuit breaker and operating mechanism, Advantages and disadvantages of different types. (10 Hrs.)

UNIT – IV

Power System Protection: Basic requirements and type of protection, phase and amplitude comparator. Protective zones, protection of alternator, protection of transformer, protection against over voltage. (10 Hrs.)

Text Book:

1. Power system Engineering, D.P. Kothari & I.J. Nagrath, MC Graw Hill
2. Power system protection & switch gear- B.Rabindranath&M.Chander.

References:

1. Power system analysis, operation and control, A. Chakrabarty& S. Haldar,PHI
2. Power Systems Analysis, A.R. Bergen & V. Vittal, 2nd Edition, Pearson Education.
3. Power systems Stability, Vol-I, II, III, E.W.Kimbark, Wiley India.
4. switch gear protection & power system- S.S.Rao ,khanna publishers

EC-4101 MICROPROCESSOR

L T P **Maximum Sessional Marks: 25**
3 0 2 **Maximum End Term Exam Marks: 75**

UNIT – I

Introduction to computer architecture and organization; Architecture of a typical microprocessor; Bus Configuration; The CPU module; ROM and RAM families. Introduction to assembly language and machine language programming; Instruction set of a typical microprocessor (e.g. 8085) , Subroutines and stacks. (12 Hrs.)

UNIT – II

Timing diagrams; Memory interfacing; interfacing input-output ports; Interrupts and interrupt handling; Serial and parallel data transfer schemes; Programmed and interrupt driven data transfer; Direct memory access. (10 Hrs.)

UNIT – III

Programmable peripheral devices; Programmable interval timer; Analog input-out using AD and DA converters. (10 Hrs.)

UNIT – IV

Assembly language programming of a typical microprocessor; Use of compiler, assembler, linker and debugger. (08 Hrs.)

Text Book :

1. Microprocessor Architecture, Programming and Application with the 8085, 5th edition, Gaonkar.R.,Penram International.
2. Advanced Microprocessors and Peripherals, Ajoy Kumar Ray &Kishor M Bhurchandi, **TataMcGraw-Hill.**
3. Microprocessors and Interfacing, 2nd Edition, Hall D.V., McGraw Hill.
4. Microprocessor and Programmed Logic, Short, Pearson Education.

EE-4103 POWER ELECTRONICS

L T P **Maximum Sessional Marks:25**
3 0 2 **Maximum End Term Exam Marks:50**

UNIT – I

Concept of power electronics, application of power electronics, uncontrolled converters, advantages and disadvantages of power electronics converters, power electronics systems, Power diodes, Power transistors, Power MOSFETS, IGBT.

PNPN devices: Thyristor, brief description of members of Thyristor family with symbol, V-I characteristics and applications. Two transistor model of SCR, SCR turn-on methods, switching characteristics, gate characteristics, ratings, SCR protection, gate triggering circuits. Different commutation techniques of SCR. (12 Hrs.)

UNIT – II

Phase controlled converters: Principle of operation of single phase and three phase half wave, half controlled, full controlled converters with R and R-L, Single phase dual converters. (08 Hrs.)

UNIT – III

DC-DC converters: Principle of operation, control strategies, step up choppers, types of choppers circuits based on quadrant of operation.
Inverters: Definition, classification of inverters based on nature of input source, methods of commutation and connections. Principle of operation with R and R-L loads, three phase full bridge inverters, methods of voltage control. (10 Hrs.)

UNIT – IV

AC controllers: Principle of on-off and phase control, single phase controllers with R and R-L loads, Principle of operation of Cyclo-Converters.
Applications: Speed control of AC and DC motors. (10Hrs.)

Text Book :

1. Power Electronics, M.D. Singh and K.B. Khanchandani, Tata McGrawhill, 2007.
2. Power Electronics, V.R. Moorthi, Oxford, 2005
3. Power Electronics, M.H. Rashid, Pearson Education, 3rd edition.
4. Power Electronics, P.S. Bhimra, Khanna Publishers, Third edition

Reference books:

1. Modern Power Electronics & AC drives, B.K. Bose, Prentice Hall
2. Element of Power Electronics, Phillip T Krein, Oxford, 2007
3. Power Electronic systems, J.P. Agarwal, Pearson Education, 2006
4. Power Electronics, M.S. Jamal Asgha, PHI, 2007
5. Analysis of Thyristor power conditioned motor, S.K. Pillai, University press.

EE-4104 ELECTRICAL ESTIMATING AND COSTING

L T P **Maximum Sessional Marks: 25**
2 0 2 **Maximum End Term Exam Marks: 25**

UNIT – I

Introduction : Electrical Symbols; Conductors; Insulators; Wires and Cables; Types of wires used for internal wiring; Types of house wiring; Conduit accessories and fittings; Lighting accessories; protective devices for wiring ,Miniature circuit breaker; Fuses and their types, determination of size & ratings of fuse wire, Light and fan circuits, service main connection.

Illumination Schemes in Buildings and Calculations: Basic definitions; Electric lamps and their types, constructions & working principles, Design of indoor lighting schemes; Method of lighting calculations. (10 Hrs.)

UNIT – II

Selection of Conductor Size: Specifications of Cables, Conductor size calculations for underground cables, Overhead line conductors and house wiring. (08 Hrs.)

UNIT – III

General principles of estimating & Costing Estimating, purpose of estimating & costing , electrical schedule, determination of required quantity of materials, determination of materials cost & labour, purchase order payment bill ,tender form.

Domestic Installations: Important Definitions , measurement of points and wiring; Electric substation and wiring installations; Electric installations in buildings; Control at commencement of supply; Types of switch boards; Capacity of Circuit; Internal wiring estimates; Sequence to be followed in carrying out the estimate; Definition and positioning of equipment; Location of various outlets in house wiring. (12 Hrs.)

UNIT – IV

Industrial wiring Installations : Electrical Installations in small industries; Power circuits and estimation, Selection of wires; Selection, rating and installation of necessary equipment on the main switch board , Estimation of material required and costing for industrial installations. Pole-mounted sub-station. (10 Hrs.)

Text Books:

Electrical installation estimating & costing, J.B.Gupta-S.K.Kataria Publishers.
Electrical installation estimating & costing, raina& Bhattacharya- Newage Pub.
Electrical estimating& costing, Surjit Singh - DhanpatRai& Co.

EE-4105 FUNDAMENTALS OF INSTRUMENTATION ENGG.

L T P **Maximum Sessional Marks: 25**
2 0 2 **Maximum End Term Exam Marks: 25**

UNIT – I

Generalized Instrumentation Systems: Scope and necessity of instrumentation, Names of important process variables and their units, Building blocks of instrumentation system, Various test signals, Errors, Sources and classification of errors, the remedial action, Grounding and shielding.

(10 Hrs.)

UNIT – II

Performance characteristics of Instruments: Static and dynamic characteristics of instruments, Concept of time and frequency response specifications, time constant, response time, natural frequency, damping coefficient, time response of first order systems.

(10 Hrs.)

UNIT – III

Display and Recording Devices: Operating mechanism in indicators – PMMC instruments, Moving iron instruments, Multi-meter, Dynamometer instruments, Strip chart recorders, Circular chart recorders, X-Y recorder, Basics of printing devices, Scanning and data logging.

(10 Hrs.)

UNIT – IV

Instrument Selection: Factors affecting instrument selection, accuracy, precision, linearity, resolution, sensitivity, hysteresis, reliability, serviceability, Static and dynamic response, Environmental effects, Calibration of instruments. (10 Hrs.)

Text Book:

Electronic Measurement and Instrumentation	Dr.Rajendra Prasad	S.Chand

Reference Books :

Instrumentation Measurement and Analysis	BC Nakra, KK Choudhary	TMH
Electrical and Electronics Measurement and Instrumentation	AK Sawhney	DhanpatRai
Electronic Instrumentation and Measurement Techniques	WD Cooper, AD Helfrick	PHI

EE-4201 CONTROL ENGINEERING

LT P **Maximum Sessional Marks: 25**
3 0 4 **Maximum End Term Exam Marks: 50**

UNIT – I

Introduction to control system: Concept of feedback and Automatic Control, Effects of feedback, Objectives of control systems. Definition of linear and nonlinear systems. Elementary concepts of sensitivity and robustness. Types of control systems: Servomechanisms , examples of feedback control systems. Mathematical modeling of dynamic systems. Electrical analogy of spring-mass-dashpot system. Transfer Function concepts, poles and zeroes of a transfer function. Block diagram representation of Control Systems. Block Diagram Algebra Signal Flow Graph. Mason's gain formula. (12 Hrs.)

UNIT– II

Time domain analysis: Time domain analysis of a standard second order closed loop system. Concepts of un-damped natural frequency, damping, overshoot, rise time and settling time. Dependence of time domain performance parameters on natural frequency and damping ratio. Step and impulse response of first and second order systems. Effects of poles and zeroes on transient response. Stability of linear system by pole location. Routh-Hurwitz criteria. (10 Hrs.)

UNIT – III

Stability analysis: Root locus techniques, Construction of Root Loci for simple systems. effects of gain on the movement of poles and zeros.

Frequency domain analysis of linear systems : Bode plots, Polar Plots .Nyquist criteria, measures of relative stability – phase and gain margins. Determining margins in Bode Plots. (10 Hrs.)

UNIT – IV

Improvement of system performance through compensation, Lead, lag and lead-lag compensation , PI, PD and PID control. (08 Hrs.)

Text Books :

1. Ogata, K : Modern Control Engineering, 4e, Pearson Education.
2. Nagrath I. J&Gopal, M: Control Systems Engineering, New Age International publication.
3. Roy Choudhury, D., Control system Engineering, PHI
4. Kuo, B.C. Automatic Control System, PHI

Reference Books:

1. Control Systems (TMH WBUT Series), Purkait, Satpati, Mondal&Mallik,TMH
2. Bandyopadhyaya, Control Engineering Theory and Practice, PHI
3. Nise, Norman S, Control System Engineering, 3rd Edition, John Wiley & Sons.
4. Dorf R C & Bishop R.H., Modern Control System, 11e : Pearson Education
5. Graham C Goodwin, Stefan F. Graebe, Mario E. Salgado, Control System Design, PHI

EE-4202 UTILISATION OF ELECTRIC POWER

L T P **Maximum Sessional Marks: 25**
3 0 2 **Maximum End Term Exam Marks: 50**

UNIT – I

Traction: System of Traction Electrification, Train movement & energy consumption (Speed-time curves, Crest speed, Average speed & Schedule speed), Tractive effort, Factors affecting energy consumption (Dead weight, Acceleration weight & Adhesion weight), Protective devices.

Electric Traction motor & their control: Starting, braking with special emphasis on power electronic controllers, Current collector, A brief outline of linear Induction motor principle in Traction. (12 Hrs.)

UNIT – II

Illumination: Laws of illumination, Polar cuvees, Photometry, Integrating sphere, Types of **Lamps:** Conventional and Energy Efficient, Basic principle of Light control, Different lighting scheme & their design methods, Flood and Street lighting. (10 Hrs.)

UNIT – III

Heating: Types of heating, Resistance heating, Induction heating, Arc furnace, Dielectric heating, Microwave heating. (08 Hrs.)

UNIT – IV

Welding: Resistance welding, Arc welding, Ultrasonic welding, Electron bean welding, Laser beam welding, Requirement for good welding, Power supplies for different welding schemes. (10 Hrs.)

Text Book :

1. Wadha C L: Generation, Distribution and Utilization of electrical energy - New Age InternationalLtd.
2. Partab H: Art and Science of Utilization of Electrical Energy, DhanpatRai& Sons.
3. E.Openshaw Taylor – Utilisation of Electric Energy – Orient Longman.
4.J.B.Gupta,Utilization of electrical power-S.K.Kataria.
5.R.K.Rajput,Utilization of electrical Power-Laxmi Publishers.

EC-4201 MICRO CONTROLLER & PLC

LT P **Maximum Sessional Marks: 25**
3 0 4 **Maximum End Term Exam Marks: 50**

UNIT – I

8051 microcontroller : Introduction, architecture of 8051 microcontroller, I/P & O/P port in 8085 micro controller, memory organisation 8051,addressing mode of 8051,the 8051 instruction set ,timer operation in 8051,serial port operation in 8051,micro controller 8051 interrupts ,assembler & complier ,assembler directives, design and interface, key pad interface,7-segment display interfacing, interfacing of stepper motor application of micro-controller. (10 Hrs.)

UNIT – II

Introduction to PLCs: Introduction, history of PLC, definition of PLC, concept of relay in control process, control relay as latch ,ladder diagram, limitation of relay & relay based logic circuit, advantage of PLC over relay logic, comparison between hardware logic & programmable logic ,programming language ,steps of programming ,types of programming for PLC, working principle of PLC, architecture of PLC(memory, input module , output module), (10 Hrs.)

UNIT – III

Instruction set: instruction set, basic instructions, programme flow control instructions, timer instruction, timer instruction, counter instruction, sequencers-sequencing instructions, comparison instructions, Arithmetic instructions in ladder logic, math instructions-functions in PLC.
(10 Hrs.)

UNIT – IV

Ladder logic programming: Ladder logic programming, run in a ladder logic programme program execution sequence in ladder logic ,run condition, ladder diagram programs
(10 Hrs.)

Text Book :

The 8051 Microcontroller and Embedded System(using Assembly and C)	Mohammed Ali Mazidi&RolinD.Mckinlay	PHI

Reference Books :

Design with Micro-controllers	C Nagaraj Murthy, SRamgopal, Johan	MC Graw Hill
The 8051 Micro-controller Architecture programming and application	Kenneth J.Ayala	Penramintermationl

HU-4201 EDP & MANAGEMENT

L T P **Maximum Sessional Marks: 25**
3 0 0 **Maximum End Term Examination Marks: 50**

UNIT-I

Entrepreneurship, concept, meaning need, entrepreneurial competencies, characteristics, Small scale industries in developing economies. (08 Hrs.)

UNIT-II

Identification of Business opportunities, Role of financial institutions in promoting small scale industries, DIC, commercial banks, SFCS, NSICS, NABARD, etc. (10 Hrs.)

UNIT-III

Preparation of Project report, Technical, Economic, Market feasibility, , Market survey, Tasks and Responsibilities of Professional Managers, communication, its importance, process, effectiveness and barriers in effective communication. (10 Hrs.)

UNIT-IV

Basics of Marketing Mgt., Basics of Material Management, Motivation-Maslow's Need hierarchy, Leadership-functions, styles, Managerial grid, Human and Industrial relations, Function of HR, Importance and characteristics of IR, Grievance handling procedure, Factories Act 1948, Industrial Dispute Act 1947. (12 Hrs.)

Text Books:

Management,- Stephen P.Robbins, Mary (Pearson education Asia)
Dynamics of entrepreneurial development,- Vasant Desai/Himalaya and Management Pub. House
Entrepreneurship New venture creation,- David H. Holt, PHI
Entrepreneurship & Small Business Management, - Nicholas, Siropholis Haughton Mifflin company Boston- New York
Industrial Law N.D. Kapoor/Sultan Chand & sons
Entrepreneurship development in India C.B. Gupta/Sultan Chand & Sons

MECHANICAL ENGINEERING (DME)

DIPLOMA PROGRAMME IN MECHANICAL ENGINEERING (DME)

SEMESTER I August to December (Including Examination)

SN	SUB CODE	SUBJECT NAME	L	T	P	Sessnl.	Th. Exam.	Total
(A) For Entry of GKCIET Certificate holders								
1	HU 3101	Communication Skills	3	-	-	25	50	75
2	AP 3101	Applied Physics	3	1	-	25	75	100
3	AC 3101	Applied Chemistry	3	1	-	25	75	100
4	AM 3101	Applied Mathematics	3	1	-	25	75	100
5	AP 3151	Applied Physics Lab	-	-	2	50	-	50
6	AC 3151	Applied Chemistry Lab	-	-	2	50	-	50
7	HU 3151	Communication Lab	-	-	2	50	-	50
(B) For Entry of 10+2 Pass outs								
1	EE 3105	Electrical Tech & Electronics	3	-	-	25	50	75
2	WS 3151	General Workshop Practice	-	-	8	200	-	200
3	IT 3151	Fundamentals of IT Lab	-	-	4	100	-	100
4	ME 3151	Basic Engg Drawing Lab	-	-	4	100	-	100
5	EE 3155	Electrical Tech & Electronics Lab	-	-	2	50	-	50
Common for both (A) and (B)								
1	ME 3102	Applied Mechanics	3	1	-	25	75	100
2	ME 3103	Manufacturing Processes-I & Metrology	4	1	-	50	75	125
3	ME 3152	Applied Mechanics Lab	-	-	2	50	-	50
Total :		**For GKCIET Certificate holders**	**19**	**5**	**8**	**375**	**425**	**800**
		For 10+2 Pass outs	**10**	**2**	**20**	**600**	**200**	**800**

SEMESTER II January to May (Including Examination)

SN	SUB CODE	SUBJECT NAME	L	T	P	Sessnl.	Th. Exam	Total
1	CS 3201	Computer Programming	2	-	-	25	25	50
2	ME 3201	Strength of Materials	3	1	-	25	75	100
3	ME 3202	Thermal Engineering-I	3	1	-	25	75	100
4	ME 3203	Machine Tools-I	3	-	-	25	50	75
5	EE 3222	Basic Electrical Engineering & Electronics	2	-	-	25	25	50
6	CS 3251	Computer Programming	-	-	2	50	-	50
7	ME 3251	Strength of Materials Lab	-	-	2	50	-	50
8	ME 3252	Thermal Engineering Lab-I	-	-	2	50	-	50
9	ME 3253	Mechanical Engineering Workshop Practical-I	-	-	6	150	-	150
10	EE 3252	Basic Electrical Lab.	-	-	2	50	-	50
11	ME 3254	Mechanical Engineering Drawing-I	-	-	3	75	-	75
		Total	**13**	**2**	**17**	**550**	**250**	**800**

SEMESTER-III A Industrial Training June to August

SN	SUB CODE	SUBJECT NAME	L	T	P	Sessnl.	Th. Exam.	Total
1	IT 4170	Industrial Training and Viva-voce	-	-	-	50	-	50

SEMESTER-III B August to December (Including Examination)

SN	SUB CODE	SUBJECT NAME	L	T	P	Sessnl.	Th. Exam	Total
1	ME 4101	Machine Design	3	-	-	25	50	75
2	ME 4102	Thermal Engineering-II	3	-	-	25	50	75
3	ME 4103	Machine Tools-II	2	-	-	25	25	50
4	ME 4104	Fluid Mechanics	2	-	-	25	25	50
5	ME 4105	Manufacturing Process-II	2	-	-	25	25	50
6	ME 4151	Mechanical Engineering Drawing-II	-	-	4	100	-	100
7	ME 4152	Thermal Engineering Lab-II	-	-	3	75	-	75
8	ME 4153	Mechanical Engineering Workshop-II	-	-	6	150	-	150
9	ME 4154	Fluid Mechanics & Machine Lab	-	-	3	75	-	75
10	ME 4170	Pre Project Work	-	-	2	50	-	50
		Total :	**12**	**0**	**18**	**625**	**175**	**800**

SEMESTER-IV January to May (Including Examination)

SN	SUB CODE	SUBJECT NAME	L	T	P	Sessnl.	Th. Exam	Total
1	ME 4201	Fluid Machines	3	1	-	25	75	100
2	ME 4202	Theory of Machine	3	1	-	25	75	100
3	ME 4203	Fundamental of Automobile Engineering	3	1	-	25	75	100
4	ME 4204	Industrial Engineering	2	-	-	25	25	50
5	HU 4201	EDP & Management	3	-	-	25	50	75
6	ME 4251	Auto Engineering Lab	-	-	4	100	-	100
7	ME 4252	Auto CAD Practice	-	-	4	100	-	100
8	ME 4253	Advance Mechanical Engineering Drawing	-	-	3	75	-	75
9	ME 4270	Project Work	-	-	4	100	-	100
		Total :	**14**	**3**	**15**	**500**	**300**	**800**

HU 3101: COMMUNICATION SKILLS

L T P **Maximum Sessional Marks: 25**
3 0 0 **Maximum End Term Examination Marks: 50**

UNIT - I

REPORT WRITING: Reports and their importance, Types of Routine Reports, Structure of Reports, Bibliography & References, Proof-reading Symbols & their Functions, Expressions from Foreign Languages (10 Hrs.)

UNIT –II

COMMUNICATION TECHNIQUES: Importance of Communication, One Way and Two Way Communication, Essentials of Good Communication, Barriers to Communication and Techniques to overcoming Barriers, Telephonic Communication. (10 Hrs.)

UNIT -III

GRAMMAR: Common Errors in writing, Change of Narration, Change of Voice, Use of Idioms & Phrases. (10 Hrs.)

UNIT –IV

WRITING SKILLS: Applications for jobs, Essay-writing, Equivalent Terminology (100 to 150 administrative technical terms in English with their equivalent meanings in Hindi or Punjabi)

LIBRARY ACTIVITIES: Collecting Reference materials from Books & Journals.
(10 Hrs.)

RECOMMENDED BOOKS

Title	Author	Publisher
Guide to Writing & Speaking	John Seely	Oxford
English Grammar & Composition	Wren & Martin	ELBS
Writing Remedies	Edmond H. Weiss	Univ. Press

AP 3101: APPLIED PHYSICS

L T P **Maximum Sessional Marks: 25**
3 1 0 **Maximum End Term Exam Marks: 75**

UNIT – I

ROTATIONAL MOTION: Center of Mass, Centre of mass of a two-particle system, motion of centre of mass and momentum conservation, Rotational motion of a single particle in two dimensions. Torque, angular momentum and its geometrical and physical meaning, law of conservation of angular momentum, centripetal force, banking of tracks and bending of cyclist, motion in vertical circle. Numerical Problems. (10 Hrs.)

UNIT – II

MOMENT OF INERTIA: Moment of inertia of rigid body, radius of gyration, theorem of parallel and perpendicular axes, moment of inertia of a straight rod, circular ring, circular disc, cylinder (solid and hollow) sphere, relation between torque and moment of inertia, Kinetic energy and angular momentum , motion of cylinder and sphere rolling without slipping on an inclined plane. Numerical Problems. (10 Hrs.)

UNIT – III

KINETIC THEORY OF GASES: Boyle's and Charles's laws, gas equation, pressure exerted by gas, K.E. of molecules, Kinetic interpretation of temperature and derivation of gas laws from kinetic theory of gases. Numerical Problems. (04 Hrs.)

WAVE MOTION and ELECTROMANETIC WAVES: Longitudinal and transverse waves, reflection of waves, standing waves, beats and Doppler effect History of e.m. waves. Hertz experiment, production, properties of e.m. waves, transverse nature and velocity of e.m. waves, propagation of radio waves in earth's atmosphere. Numerical Problems. (06 Hrs.)

UNIT – IV

ELECRONICS AND PHOTONS: Discharge through gases at varying pressure, cathode rays and their properties, specific charge on electron by J.J. Thomson, Millikan's Oil drop method. (04 Hrs.)

ATOMIC AND NUCLEAR PHYSICS: Photoelectric effect, laws and experimental verification of laws, photocell and its applications, production of x-rays, soft and hard x-rays, uses of x-rays, Radioactivity laws, half life and average life, decay , mass defect, binding energy, Nuclear Fission and Fusion. Numerical Problems. (06 Hrs.)

RECOMMENDED BOOKS

Text Book
APPLIED PHYSICS - R K Gaur

Reference Book
Fundamentals of Physics

AC 3101: APPLIED CHEMISTRY

L T P **Maximum Sessional Marks: 25**
3 1 0 **Maximum End Term Exam Marks: 75**

UNIT - I

Organic Chemistry: Functional Group I: (Halides and hydroxy compounds): Nomenclature of compounds containing halogen atoms and hydroxyl groups: haloalkanes, haloarenes; alcohols and phenols. physical, chemical properties and use; Functional Group II: (Ethers aldehydes, ketones, carboxylic acids and their derivatives). Nomenclature of Ethers aldehydes, ketones, carboxylic acids and their derivatives, physical, chemical properties and uses (acyl halides, acid anhydrides, amides and esters); Functional Group II: (Cyanides, isocyanides,, nitro compounds and amines) Nomenclature of Cyanides, isocyanides, nitro compounds and amines and their methods of preparation, physical, chemical properties and uses. (10 Hrs.)

UNIT - II

Transition Metals and Coordination Chemistry: Transition Metals: Electronic configuration, general characteristic properties, oxidation states of transition metals. First row transition metals and general properties of their compounds oxides, halides and sulfides.

Coordination Compounds: Nomenclature, isomerism in coordination compounds, bonding in coordination compounds, stability of coordination compounds, application of coordination compounds, compounds containing metal-carbon bond; application of organo-metalics.

(10 Hrs.)

UNIT - III

Chemical Thermodynamics: First law of Thermodynamics: Internal energy, enthalpy, and application of first law of thermodynamics, Second and third law of thermodynamics: Entropy, Free energy, spontaneity of a chemical reaction, Free-energy change and chemical equilibrium.

(06 Hrs.)

Surface Chemistry: Surfaces: Adsorption, Colloids (preparation and general properties), emulsions, micelles; Catalysis: Homogeneous and heterogeneous, structure of catalyst.

(04 Hrs.)

UNIT – IV

Bio-molecules: Carbohydrates: Monosaccharides, disaccharides, polysaccharides; Amino acids and peptides: Structure and classification; Proteins and Enzymes: Structure of proteins, role of enzymes Nucleic acids: DNA and RNA; Lipids: Structure, membranes and their functions.

(06 Hrs.)

Chemistry in Action: Dyes: Classification of dyes with examples; Chemicals in medicines: Antipyretics, Antibiotics, analgesics, antiseptics, disinfectants, anti-malarial, tranquilizers, germicides and anesthetics, (only definition and examples); Rocket propellants: Types of propellants- solid, liquid and hybrid. (04 Hrs.)

Recommended Books:

1. Chemistry for class XI and XII, published by NCERT
2. Organic Chemistry, Morrison & Boyd
3. Physical Chemistry, G. W. Castellan
4. Inorganic Chemistry, Ramesh Kapoor

AM 3101: APPLIED MATHEMATICS

L T P **Maximum Sessional Marks: 25**
3 1 0 **Maximum End Term Examination Marks: 75**

UNIT-I

Successive differentiation, Leibnitz's theorem. Fundamental theorems: Rolle's theorem & Lagrange's mean value theorem. Expansion of function using Taylor and Maclaurin's series. Indeterminate forms, L Hospital's Rule. (10 Hrs.)

UNIT-II

Ordinary differential equations, its order and degree. Linear and non-linear differential equations. Formation of differential equation. General and particular solution of differential equation by variable separation method, homogeneous differential equation of first order and their solution, Solution of linear differential equation. Exact differential equation, differential equations reducible to these forms. (10 Hrs.)

UNIT-III

Introduction to matrices; addition; subtraction and multiplication of matrices, inverse of 2x2 and 3x3 matrix by adjoint method and solution of linear simultaneous equations. Determinants, minors, cofactors, expansion of a determinant, properties of determinants, solution of linear simultaneous equations containing three variables by Cramer's rule. (10 Hrs.)

UNIT-IV

Organization of data. Measures of Central Tendency- Mean, median, mode. Measures of Disperson - Standard deviation. Karl Pearson's coefficient of correlation. Probability and its laws. Conditional probability. Baye's theorem (without proof). Random Variable, Binomial and Poisson distributions. (10 Hrs.)

RECOMMENDED BOOKS:

Text Book:

Erwin Kreyszig, Advanced Engineering Mathematics, Wiley Eastern Ltd

Reference Books:

Schaum's Outline Series, Probability & Statistics, Tata McGraw Hill
Thomas & Finney, Calculus, Pearson Education

EE 3105: ELECTRICAL TECHNOLOGY & ELECTRONICS

L T P **Maximum Sessional Marks : 25**
3 0 0 **Maximum End Term Examination Marks : 50**

UNIT - I

DC Circuits : Definition and units of electric current, potential and potential difference, Ohms law, resistance, conductance, resistivity and conductivity, their units and dependence on temperature in conductor. Power and energy, heating effect of electric current and conversion of mechanical to electrical units and vice versa. Kirchoff's voltage and current laws and their applications in simple DC circuits. Series and parallel combination of resistors, wattage consideration, simple problems. (10 Hrs.)

UNIT - II

Semiconductor Diodes : P-N junction diode, mechanism of current flow in P-N junction, drift and diffusion current depletion layer, potential barrier, behavior of P-N junction characteristics, zener and avalanche breakdown, concept of junction capacitance in forward and reverse bias conditions, semiconductor diode characteristics, Diode (P-N junction) as rectifier, half wave rectifier, full wave rectifier. (10Hrs.)

UNIT -III

Transistors : Concept of bipolar transistor as two junction three terminal device having two kinds of current carriers PNP and NPN transistors, their symbols and mechanisms of current flow, explanation of fundamental current relations, Transistor type, Transistor action, Transistor configurations, Characteristics, Different modes of operation and comparison. Transistor as an amplifier in CE configuration. (10 Hrs.)

UNIT - IV

Field Effect Transistor (FET) : Construction, operation, characteristics and equivalent circuit of JFET and its circuit application, Construction, operation, characteristics and equivalent circuit of MOSFET in depletion, enhancement modes and its circuit applications, CMOS advantages and applications, Comparison of JFET, MOSFET, BJT, Simple FET amplifier circuit and its working principles (without analysis). (10 Hrs.)

Recommended Books:

Title	Author(s)	Publisher
Text Book		
Electrical Technology & Electronics	B. L. Theraja	S. Chand
Reference Books		
Basic Electricity	B. R. Sharma	Satya Prakashan
Basic Electricial Engineering	P. S. Dhogan	Tata Mc Graw Hill
Electrical Engineering & Electronic	J. B. Gupta	S. K. Kataria

ME-3102: APPLIED MECHANICS

L T P **Maximum Sessional Marks: 25**
3 1 0 **Maximum End Term Examination Marks: 75**

UNIT-1

Fundamentals of Mechanics: Fundamental concept of mechanics and applied mechanics, Idealization of mechanics, Basic dimensions and units of measurements, Concept of rigid bodies, Laws of Mechanics

Laws for Forces: Scalars and Vectors, Vector operations, Vector addition of forces, Force and its effects, characteristics of force vector, Bow's notation

Force systems: Force systems. Free body diagrams, Resultant and components of forces, concept of equilibrium; parallelogram law of forces, equilibrium of two forces; super position and transmissibility of forces, Newton's third law, triangle law of forces, different cases of concurrent, coplanar two forces systems, extension of parallelogram law and triangle law to many forces acting at one point - polygon law of forces, method of resolution into orthogonal components for finding the resultant, graphical methods, special case of three concurrent, coplanar forces, Lami's theorem. (12 Hrs.)

UNIT-II

Moments & Couples: Concept & Principle of moment, Varignon's theorem, Moment of forces about a specified axis, concept of couple - properties and effect, Moment of couple, Movement of force on rigid body, Resultant of force and couple system, Reduction of force and couple system, Parallel forces - like and unlike parallel forces, calculation of their resultant

Trusses: Simple trusses, analysis of simple truss, Method of Joints, Method of sections.

Friction: Concept of friction, Characteristics of Dry friction, Laws of Coulomb friction, limiting friction, coefficient of friction; sliding friction and rolling friction, Belt friction, Ladder friction. (10 Hrs.)

UNIT-III

Centre of Gravity: Concept of gravity, gravitational force, centroid and centre of gravity, centroid for regular lamina and centre of gravity for regular solids. Position of centre of gravity of compound bodies and centroid of composite area. CG of bodies with portions removed.

Moment of Inertia: Definition, Moment of inertia of plane sections from first principles, Theorems of moment of inertia, Moment of inertia of standard sections and composite sections; Mass moment inertia of circular plate, Cylinder, Cone, Sphere, Hook. (10 Hrs.)

UNIT-IV

Kinematics of particle: Types of motion, linear motion with uniform velocity, uniform & varying acceleration, motion under gravity, motion of projectiles, relative motion of a particle.

Kinetics of particle: Newton's laws of motion, equation of motion, equation of motion for system of particles, D'Alembet's Principle, Motion of connecting bodies. Concept of momentum, Impulse momentum principle, Conservation of momentum, Principle of work and energy.

(08 Hrs.)

Text/Reference Books:

1. Shanes and Rao (2006), Engineering Mechanics, Pearson Education,
2. Hibler and Gupta (2010),Engineering Mechanics (Statics, Dynamics) by Pearson Education
3. Reddy Vijaykumar K. and K. Suresh Kumar(2010), Springer‟s Engineering Mechanics
4. Bansal R.K.(2010), A Text Book of Engineering Mechanics, Laxmi Publications
5. Khurmi R.S. (2010), Engineering Mechanics, S. Chand & Co.
6. Tayal A.K. (2010), Engineering Mechanics, Umesh Publications

ME 3103: MANUFACTURING PROCESS-I & METROLOGY

L T P **Maximum Sessional Marks: 50**
4 1 0 **Maximum End Term Examination Marks :75**

UNIT – I

Foundary: Introduction to casting, advantages and limitations. Introduction to moulding processes. Sand moulding - materials, properties of moulding sand, sand moulding procedure, pattern - types and materials, pattern allowances, core prints, cores, Elementary and brief description of various melting furnaces.

Welding: Welding processes - classification of welding processes. Gas welding, tools and equipment, types of flames, filter rods, flux. Arc welding, procedures, equipment, application, type of electrodes, specification of electrode, selection of electrode, flux, welding parameters and equipments.Introduction to SMAW, GTAW, GMAW and submerged arc welding.Introduction to resistance welding, spot, seam, projection, pressure, friction welding.Introduction to soldering and brazing. (12 Hrs.)

UNIT – II

Fundamental of Metals and Alloys: Introduction, atom, structure of solids, formation of grains, imperfections in crystals, deformation of metals, property changes by deformation, recovery, recrystallization and grain growth, fracture, metal alloys, solidification of an alloy, equilibrium diagrams, iron - carbon equilibrium diagram.

Properties, Testing and inspections of metals: Introduction, stress and strain, mechanical properties, testing of metals, destructive testing, tensile testing, compression test, hardness tests, impact testing, fatigue testing, creep and stress rupture testing, non-destructive testing.

(12 Hrs.)

UNIT - III

Introduction to metrology: Standards of measurement, classification of measuring instruments, linear measurement (non-precision), linear measurement (precision), comparators, angular measurement, taper measurement, surface measurement, use of gauges. (08 Hrs)

UNIT -IV

Limits, Fits and Tolerance: Introduction, interchangeability, elements of interchangeable system, fits, allowances, clearances and interference, types of fits, hole and shaft basis system, geometric dimensioning and tolerances, limit systems, The Indian standard system. (08 Hrs.)

Recommended Books:

Title	Author(s)	Publisher
Text		
Workshop Technology Vol.-I	Hazra Chowdhry	Media Promoters
References		
Manufacturing Material and Process		LindbergPrentice Hall
Workshop Technology	S. K. Garg	Laxmi Publication

CS 3201: COMPUTER PROGRAMMING

L T P **Maximum Sessional Marks: 25**
2 0 0 **Maximum End Term Examination Marks: 25**

UNIT - I

Programming Languages : High level languages, Low level languages, machine level language, assembly language : Translators : Compiler, Interpreter, Assembler; Procedural language, Algorithm, Flow Chart, Introduction to C, Structure of a C Program, Compiling C programs, Executing C programs, loader, linker. (08Hrs.)

UNIT - II

C character set, Keywords, Variables or Identifiers, Constants, Data types, Operators and Expressions, if-else statement, switch statement, while loop, for loop, do-while loop, break statement, continue statement, go to statement, Storage classes. (10 Hrs.)

UNIT - III

Functions, Standard library functions, Function declaration or prototype, function call, function definition, User defined functions, passing arguments to functions, return statement, recursive functions (10 Hrs.)

UNIT - IV

Arrays : One dimensional and two dimensional; Pointers; definition, pointer arithmethic, pointer to an array; strings, structures, Union, enumerated data type. (06 Hrs.)

File Programming : Opening a file, closing a file, Text and binary modes, fprintf(), fscanf(), putw(), getw(), fputc(), fgetc(), getc(), putc(), fputs(), fgets(), Command line arguments. (06 Hrs.)

Recommended Books :

TITLE	AUTHOR	PUBLISHER
Programming with C	Byron Gottfried	Tata Mc-Graw-Hill
Programming in ANSI C	E Balagurusamy	Tata Mc-Graw-Hill
Let Us C	Yashvant Kanetkar	BPB Publications

ME 3201: STRENGTH OF MATERIALS

L T P **Maximum Sessional Marks: 25**
3 1 0 **Maximum End Term Examination Marks: 75**

UNIT- I

Stress and Strain: Normal stress and strain, shear stress and strain, concept of bearing stress, Hooke's law and Poission‟s ratio, Modulus of elasticity in tension, compression, shear. Bulk modulus. Stress-strain diagrams for ductile and brittle materials, Extension of axial loaded members : uniform and non uniform bars, Extension of tapered bar, Extension due to self weight, Composites section, Concept of temperature stress, Derivation of relation between elastic constant E, G, and K, Concept of strain energy.

Principal Stresses: Stresses in two perpendicular planes. Determination of normal and shear stress components on any plane passing through a point. Concept of principal stresses and principal planes and their importance. Derivation of equations for principal stresses and determination of normal and shear stress components on a plane with Mohr's construction. Concept of pure shear and complementary shear. (12 Hrs.)

UNIT- II

Bending Moment and Shear force: Types of beams, Loads and reactions, Concept of Bending moment and shear force, Bending moment and shear force diagrams for determinate beams and different loads, Concept of point of contra-flexure, Relation between loads, shear forces and bending moments. Loading and bending moment diagrams from shear force diagrams. Simple cases

Bending Stresses in Beams: Concept of pure bending, derivation of straight beam formula, section modulus, determination of bending stresses under different loads for different section of beams, Shear stress. (12 Hrs.)

UNIT- III

Torsion: Torsion of circular solid straight shafts, hollow circular shafts, derivation of torsion equation, Power transmitted by solid and hollow shaft, comparison of solid and hollow shaft

Springs: Helical springs, Close coiled helical spring subjected with axial load and axial twist, Determination of spring stiffness for series and parallel combinations.

(08 Hrs.)

UNIT- IV

Columns and Struts: Concept of column & Stability End condition, Equivalent length, Euler‟s theory for long columns and its limitations , Euler's formula and Rankine Gordon formula for different end conditions, Slenderness ratio, factors effecting strength of a column, Columns subjected to eccentric loading: Rankine‟s method, Euler‟s method. (08 Hrs.)

Recommended Books

Title	Author(s)	Publisher
Text		
Strength of Materials	R.K. Rajput	S. Chand
Reference		
Mechanics of Materials	R.C. Hibbeler	Pearsons Education
Mechanics of Materials	Fardinard P. Beer and E. Russell	McGraw Hill
Mechanics of Materials	James M. Gere	Cengage Learning

ME 3202: THERMAL ENGINEERING-I

L T P **Maximum Sessional Marks: 25**
3 1 0 **Maximum End Term Examination Marks: 75**

UNIT - I

Introduction and Scopes: thermodynamics systems, surroundings, open system and closed systems, thermodynamics states, process and cycles, microscopic and microscopic point of view, properties- Intensive and Extensive properties, thermodynamic equilibrium, Quasi-state processes, Zeroth law of thermodynamics, heat and work transfer, path function and point function, P-V diagrams, work done at moving boundary for a quassi-static process. First law of thermodynamics for a closed system undergoing process, different types of non-flow processes and their thermodynamic analysis from first law, first law of thermodynamic for an open systems, internal energy enthalpy steady flow energy equation and its application to different flow processes.

Second Law of Thermodynamics: limitations of first law of thermodynamics, concept of heat engines and heat pump, classical statement of second law of thermodynamics and their equivalence, concept of reversible and irreversibility processes, factors affecting reversibility of a process.

(12 Hrs.)

UNIT- II

Properties of Perfect Gas: introduction, laws of perfect gas- Boyle's law, Charles' law, Gay-Lussac law, joule's law, characteristic equation of a gas, Avogadro's Law, specific heat of gas, relation between specific heats, ratio of specific Heats,

Thermodynamics Process of Perfect Gas*:* introduction, classification of thermodynamics processes, work done during a non-flow process, heating and expansion of gases in non-flow processes-(reversible and irreversible) - isochoric, isobaric, hyperbolic, isothermal, isentropic and polytrophic processes. (12 Hrs.)

UNIT- III

Entropy of perfect gas: introduction, relation between heat and entropy, importance of entropy, available and unavailable energy, units of energy, clausius inequality, principle of increase of entropy, general expression for change of entropy of a perfect gas, change of entropy of a perfect gas during various thermodynamics processes. (08 Hrs.)

UNIT- IV

Introduction to Heat Transfer: Fourier's law of heat conduction, thermal conductivity of materials, one dimensional heat conduction problems through plain and composite walls, Newton law of cooling, concept of free and force covections and simple problems, Radiation heat transfer, Stefan–Boltzman law. (08 Hrs.)

Text/References:

1. Engineering Thermodynamics - P. K. Nag, TMGH
2. Introduction to Thermodynamics - Rogers & Mayhew, Pearson
3. Heat and Thermodynamics – Zemansky, MGH
4. Fundamentals of Thermodynamics - Sontag. Borgnakke, MGH

ME 3203: MACHINE TOOLS – I

L T P **Maximum Sessional Marks: 25**
3 0 0 **Maximum End Term Examination Marks: 50**

UNIT - I

Metal cutting and cutting tools: introduction, types of cutting tools, orthogonal and oblique cutting, mechanics of cutting and chip formation, chip thickness ratio, cutting forces in orthogonal cutting, work done and power required in cutting, measurement of force, types of chip, chip breakers, cutting tool nomenclature, cutting speed and feed, tool life and wear, cutting tool materials, cutting fluid.

The lathe: Principle; lathe, description, function, specifications, work holding tools, cutting tools. Operations - plain and step turning, facing, parting off, taper turning, eccentric turning, drilling, reaming, boring, threading and knurling, cutting fluid-its purpose and types, lathe accessories (steady rest, taper turning attachment, tool post grinder), types of lathes, brief description of capstan and turret lathes. (12 Hrs.)

UNIT -II

capstan and turret lathes: introduction, difference between a capstan and turret and an engine lathe, types of machine, principal parts of capstan and turret lathe, capstan and turret lathe mechanism, lathe size, work and tool holding devices, capstan and turret lathe operations, cutting speed, feed, and depth of cut.

Drilling machines: Principle, classification description, operations of drilling machines reaming, counter boring, counter sinking, hole milling, tapping, types of drills and their features, drill holding devices. Reamer, reamer nomenclature, taps, taps nomenclature, cutting speed, feed, depth of cut, machining time in drilling. (12 Hrs.)

UNIT- III

Boring machines: introduction, types of boring machines, parts and size of horizontal boring machines, boring machines mechanism, work holding devices, horizontal boring machines operations, boring tool, precision boring machine, jig boring operations.

(08 Hrs.)

UNIT- IV

Grinding machines: Types and working of cylindrical, surface, centreless grinding. Tool and cutter grinder, various elements of grinding wheel abrasive, grade, structure, bond, codification of grinding wheel, selection of grinding wheel, dressing, grinding wheel, abrasives, bond and bonding process, grit, grade and structure of wheels, wheels shape and size. (08 Hrs.)

Recommended Books:

Title	Author(s)	Publisher
Text		
Elements of workshop Technology Vol-II	SK Chaudhry and Hajra	Asia Publishing House.
Reference		
Workshop Technology	M. Adithan and AB Gupta	Dhanpat Rai and Sons
Workshop Technology	Chapman	CBS
Production Engineering	PC Sharma	S Chand and Company

EE 3222: BASIC ELECTRICAL ENGINEERING & ELECTRONICS

L T P **Maximum Sessional Marks: 25**
2 0 0 **Maximum End Term Examination Marks: 25**

UNIT - I

Direct Current machines:

Construction, types of armature winding, physical concepts of winding pitches, derivation of EMF equation. Armature reaction and its effect on the performance, methods adopted for compensation of armature reaction. . Characteristics of DC generator.

Direct Current motors: types of DC motors. Torque equation, speed torque characteristics: shunt, series and compound motors. Starting & speed control of DC motors. 3- Point starter. (12Hrs.)

UNIT - II

AC Circuits: Concepts of generation of alternating voltage and current, difference between AC and DC. Term related to AC waves – instantaneous average, RMS and peak values. From factor {definition only}. Equation of sinusoidal wave from, representation of alternating quantities, concept of phase difference. Representation of sinusoidal quantities by phasor diagram of alternating voltage applied to a pure resistance, pure inductance and pure capacitance.

(10 Hrs.)

UNIT - III

SEMI CONDUCTORS: Structure of an atom, Atomic and crystal structure of Germanium and Silicon, Energy band diagrams of Silicon and Germanium, Covalent bonds, generation and recombination, Effect of temperature on conductivity of semiconductors, Conductors, semiconductors, insulators, difference between conductors and semiconductors. Extrinsic semiconductor materials-doping of impurity in P and N type semiconductors. (10 Hrs.)

UNIT - IV

Uni- Junction transistor (UJT): Symbol, Construction, operating principle, characteristics of UJT, applications of UJT. UJT as a relaxation oscillator. Simple problem.

Silicon controlled rectifier (SCR): Symbol, Construction, operating principle, characteristics of SCR, and applications of SCR. (08Hrs.)

RECOMMENDED BOOKS:

Title	Author	Publisher
Text Book		
Electrical Technology & Electronics	B.L. Theraja	S. Chand
Basic Electricity	BR Sharma	Satya Prakashan
Basic Electrical Engineering	PS Dhogal	Tata Mc Graw Hill
Electrical Engineering & Electronics	Jb Gupta	S.K. Kataria

ME 4101: MACHINE DESIGN

L T P **Maximum Sessional Marks: 25**
3 0 0 **Maximum End Term Examination Marks: 50**

UNIT- I

Introduction to Design: Design criteria for machine elements, factor of safety, stress concentration factor, stress concentration under static load. Materials and their Properties: Static strength, strength, hardness and hardenability, impact properties, creep and temperature properties, different engineering materials and their properties. Design of riveted joints, bolted joints and welded joints. (10 Hrs.)

UNIT- II

Keys and couplings: Design of different keys, design of coupling-rigid coupling and flexible coupling. (10 Hrs.)

UNIT -III

Shafts: Introduction, design under static loading, transmission of shafting, design for torsional rigidity.
Cotter and knuckle joint: Design of Cotter and knuckle joint . (10 Hrs.)

UNIT- IV

Mechanical spring: Stresses in helical springs, deflection equation, design against static load, helical torsion spring, multi leaf nipping.
Design of belt and pulley Power screw: Design of belt and pulley Power screw design with square thread, such as screw jack. Illustrative problems with solutions. (10 Hrs.)

Text/References:

1. Machine Design (SI) – Hall, TMH
2. Design of Machine elements - V.B.Bandari, Tata Mc Graw Hill, New Delhi.
3. Design of machine elements - J.E.Shiegley, Mc Graw Hill.
4. Design of machine elements - M.F.Spott, PHI.
5. Machine Design – Sharma & Agarwal, Khanna Publishers.

ME 4102: THERMAL ENGINEERING -II

L T P **Maximum Sessional Marks: 25**
3 0 0 **Maximum End Term Examination Marks: 50**

UNIT- I

I.C Engine and Cycles : Types, classification, CI and SI engines, Mechanical constructional details of two stroke petrol engine and diesel engine, four stroke petrol and diesel engines, valve timing diagrams, Carnot cycle, Otto Cycle, diesel and dual cycle, derivation of efficiency and comparison of these cycles.

Performance of IC engines: Brake, indicated, frictional powers, brake mean effective pressure ,indicated map, engine efficiencies, air standard, brake, indicated, mechanical, volumetric ,scavenging, efficiency, characteristics of power, fuel consumption with engine speed, calculation of powers, efficiency and SFC for two and four stroke engine. LCV, HCV (12 Hrs.)

UNIT- II

Formation and properties of Steam: Steam formation, wet steam, dry steam and saturated steam, dryness fraction, superheated steam; degree of superheat, latent heat of vaporization, Enthalpy of steam, entropy; entropy increase during evaporation, temperature entropy diagram mollier diagram (H-S diagram) Steam generator,

Steam Boilers Classifications, comparison of fire tube and water tube boilers, construction and features of Lancashire boiler, locomotive and Babcock and Wilcox Boilers, Introduction to modern boilers. (12 Hrs.)

UNIT- III

Vapour power cycles:- introduction, simple steam power cycle, Rankine cycle, actual vapour cycle processes, piping losses, turbine losses, comparison of Rankine and carnot cycle, Reheat cycle , regenerative cycle. (08 Hrs.)

UNIT- IV

Air compressors:- introduction, classification, working of single stage reciprocating air compressor, workdone by a single stage reciprocating air compressor with and without clearance volume, power required to drive a compressor, multistage compression, advantages of multistage compression, types of rotary compressor, comparison between rotary and reciprocating compressors. (08 Hrs.)

Recommended Books

Title	Author(s)	Publisher
Text		
Thermal Engg	R.K.Rajput	Laxmi publication
Reference		
Heat and Thermodynamics	PL Ballany;	Khanna Publisher
Thermal Science	Domkundwar	S.Chand Publishers
Heat Engineering	Kumar and Vasandani	S.ChandPublications
I.C.Engine	Ganesan	McGraw Hill

ME 4103: MACHINE TOOLS - II

L T P **Maximum Sessional Marks: 25**

2 0 0 **Maximum End Term Examination Marks: 25**

UNIT- I

Milling: Introduction, types, constructional features, specifications of knee type milling machine, milling operations, milling cutters types, cutting speed and feeds, indexing simple, job handling devices, introduction to machining centre

Broaching: Introduction, types of broaching machines, types of broaches and their use. Broaching machines size, broaching fixtures, broaching operations, advantages and limitations of broaching. (12 Hrs.)

UNIT- II

Jigs and Fixtures: Importance and use of jigs and fixtures, principles of location, locating devices, purpose of clamping elements, types of clamping elements, types of drilling jigs, turning, milling and welding fixtures, fixture design consideration (elementary).

Shaping, Planning and Slotting: Working principle of shaper, planer and slotter, quick return mechanism, tools & specifications. (12 Hrs.)

UNIT- III

Non-traditional machining:- introduction, classification of machining processes, abrasive jet machining(AJM), ultrasonic machining (USM), chemical machining(CHM), electro-chemical machining(ECM), electro-discharge machining(EDM), electron beam machining(EBM), LASER beam machining (LBM), ion beam machining(IBM). (08 Hrs.)

UNIT- IV

Numerical control machines tool:- introduction, N.C and C.N.C machines, comparison between N.C and C.N.C machines, advantages of C.N.C machines, types of C.N.C machines, basic components of C.N.C , classification of C.N.C: a)based on feed back control b)open loop control c)closed loop control d) based on motion features: 1. Point to point control system 2. Straight line control system 3. Contouring control system. Fundamental of manual part programming: axis identification coordinate system, zero point, codes(G0, G1, G2, G3, G4, G70, G71, G90, G91, G92, G94, G95), M-codes(M30), feed function. (08 Hrs.)

Recommended Books:

Title	Author(s)	Publisher
Text		
Elements of workshop Technology	SK Chaudhry and Hajra	Asia Publishing House.
Reference		
Workshop Technology	M. Adithan and AB Gupta	Dhanpat Rai and Sons
Workshop Technology	Chapman	CBS
Production Engineering	PC Sharma	S Chand and Company
CNC Programming: Basics & Tutorial Textbook	Michael J Peterson	
Parametric Programming For CNC Machine Tools And Touch Probes	Mike Lynch	The Society of Manufacturing Engineers

ME 4104: FLUID MECHANICS

L T P **Maximum Sessional Marks: 25**
2 0 0 **Maximum End Term Examination Marks: 25**

UNIT- I

Fluid Mechanics & Fluid Properties: Concept of fluid, fluid mechanics and hydraulics, properties of fluid i.e. viscosity, specific weight, specific volume, specific. Gravity and their measurement
Static Pressure: Pascal's law, concept of static pressure, intensity of pressure and pressure head, total Pressure on a plane surface and centre of pressure. (10 Hrs.)

UNIT- II

Measurement of pressure: Concept of atmospheric pressure, gauge pressure, absolute pressure, vacuum, Measurement of pressure, Gauges: Piezometer, simple manometer, differential manometer, U-tube manometer, inverted U-tube manometer, micro manometer and Bourdon pressure gauge.
Flow of fluids: Types of flow, laminar and turbulent, rate of discharge, law of continuity, energy of fluid - potential, pressure and kinetic, Bernoulli's theorem and its applications, discharge measurement by venturimeter and orifices, pitot tube and pitot static tube. (10 Hrs.)

UNIT- III

Buoyancy and Floatation:- introduction, buoyancy, centre of buoyancy, Meta-centre, Meta-centric Height, Analytical method for Meta-centre height, conditions of equilibrium of a floating and sub-merged Bodies,
Laminar and Turbulent flows:- Determination of Reynolds number, critical velocity, flow losses in pipes(at entrance , exit, contraction, expansion and bending). Laws of fluid friction, darcys equation for head loss due to pipe friction. (10 Hrs.)

UNIT- IV

Notches and weirs:- introduction, classification of notches and weirs, discharge over a rectangular notch, discharge over a triangular notch, discharge over a trapezoidal notch. Discharge over a broad- crested weir.
Open channel flow:- chezys and Mannings formula. (10 Hrs.)

Recommended Books:

Title	Author(s)	Publisher
Text		
Fluid Mechanics & Hydraulic Machines	R.K.Bansal	Laxmi Publications
Reference		
Hydraulics & Fluid Mechanics Hydraulic Machines	Modi & Seth	Standard Publishers
Fluid Mechanics & Hydraulic Machines	R.K Rajput	S.Chand & Company
Fluid Mechanics & Fluid Machinery	D. S. Kumar	S.K Kataria & Sons
Hydraulics & Hydraulic Machines	Jagadish Lal	Metropolitan
Fluid Mechanics	A.K Jain	Khanna Publishers
Theory & problems of Fluid Mechanics	K Subramanya	Tata McGrawHill

ME 4105: MANUFACTURING PROCESS II

L T P **Maximum Sessional Marks: 25**
2 0 0 **Maximum End Term Examination Marks: 25**

UNIT- I

Ferrous metals and nonferrous metals: Physical and mechanical properties viz. strength, elasticity, ductility, toughness, malleability, brittleness, hardness, stiffness, fatigue, Classification of iron and steel; pig iron, cast iron, wrought iron, steel, alloy steel, stainless steel and carbon steels, Non- ferrous metals, Introduction to aluminium ,copper, zinc, lead, tin ,nickel ,magnesium and its alloys; their physical and mechanical properties of all the above alloys, Plastics; Introduction, types of plastics, properties ,composition and their applications Types of Tool steels.

Heat treatment processes: Principle of heat treatment of steels, TTT curves, Annealing, Normalizing, Hardening, Case hardening, tempering, Austempering, Martempering, Flame hardening, Induction hardening, Carburizing, Nitriding, cyaniding of steels, case hardening. (12 Hrs.)

UNIT- II

Metal forming process:- introduction, hot working, hot rolling , piercing, drawing, deep drawing, hot spinning, extrusion, cold working, cold rolling, cold bending, squeezing, peening, sizing, coining and hobbing. (08 Hrs.)

UNIT- III

Smithing and forging:-introduction, forging materials, forging temperatures, hand tools, smith forging operations, hand forging, power forging, impression die forging, drop hammers, press hammers.

Plastics and their processing:- introduction, types of plastics, elastomers, Materials for processing plastics, plastics moulding processes. (12 Hrs.)

UNIT- IV

Power metallurgy:- introduction, manufacturing of metal powders, blending of powders, compacting, pre sintering, sintering, secondary operations, metal injections moulding, advantages and limitations. (08 Hrs.)

Recommended Books

Title	**Author(s)**	**Publisher**
Text		
Materials and metallurgy	OP Khanna	Dhanpat rai
Reference		
Mechanical metallurgy	Dieter	McGraw Hill
Manufacturing processes	V. Raghvan	Prentice Hall
Introduction to physical metallurgy	Sidney H Avner	Tata McGraw-Hill

ME 4201: FLUID MACHINES

L T P **Maximum Sessional Marks: 25**
3 1 0 **Maximum End Term Examination Marks: 75**

UNIT- I

Impact of jet: Impact of jet, Impulse momentum principle, Force exerted on fixed vertical plate. Force exerted by a jet on fixed inclined flat plate, on fixed curved plate. Force exerted on hinged plate, force exerted by a jet on moving plate, force exerted by a jet of water on a series of vanes. Problems. (10 Hrs.)

UNIT- II

Hydraulic turbines: Classification of turbines, Impulse & Reaction turbines; Constructional details, working principle, Power, efficiency of Pelton wheel ,Radial flow reaction turbines, axial flow reaction turbines, draft tube, specific speed, unit speed, unit discharge, unit power, Francis and Kaplan turbines. (10 Hrs.)

UNIT- III

Pumps: Classification of pumps, Working principle, Discharge, work done and power requirement of reciprocating & Centrifugal pump, Definition of heads and efficiencies of a centrifugal pump, Minimum speed for starting a centrifugal pump, multistage centrifugal pump, specific speed of a centrifugal pump, priming of a centrifugal pump, characteristic curve of centrifugal pump, maximum suction lift, net positive suction head, Effect of air vessels, Cavitation. (10 Hrs.)

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Unit IV

Hydraulic Machines: Working principles, description and application of hydraulic accumulator, hydraulic intensifier, hydraulic lift, hydraulic jack, hydraulic ram, hydraulic press, hydraulic crane. (10 Hrs.)

Recommended Books:

Title	**Author(s)**	**Publisher**
Text		
Fluid Mechanics & Hydraulic Machines	R.K.Bansal	Laxmi Publications
Reference		
Hydraulics & Fluid Mechanics Hydraulic Machines	Modi & Seth	Standard Publishers
Fluid Mechanics & Hydraulic Machines	R.K Rajput	S.Chand & Company
Fluid Mechanics & Fluid Machinery	D. S. Kumar	S.K Kataria & Sons
Hydraulics & Hydraulic Machines	Jagadish Lal	Metropolitan
Fluid Mechanics	A.K Jain	Khanna Publishers

ME 4202: THEORY OF MACHINES

L T P **Maximum Sessional Marks: 25**
3 1 0 **Maximum End Term Examination Marks: 75**

UNIT- I

Simple mechanism: Link, kinematic Pair, Kinematic chain, structure, mechanism, machine, inversion, simple example of mechanism with lower pairs four bar chains, slider crank chains, double slider crank chain example of mechanism with higher pairs.

Velocity and acceleration in mechanism: Velocity diagrams of four bar and single slider crank mechanism by relative velocity method and instantaneous center method. Acceleration diagram of four bar chain and reciprocating engine mechanism. (10 Hrs.)

UNIT- II

Dynamics of reciprocating parts: Analytical method for velocity and acceleration of piston, piston effort, crank pin effort, turning moment diagram, fluctuation of energy and speed, energy of a flywheel, calculation of weight of flywheel.

Balancing: Static and dynamic balancing. balancing of single rotating mass by a single mass in the same plane, by two masses rotating in different planes, balancing of several masses rotating in the same plane, balancing of several masses rotating in different parallel planes, partial primary balancing of a single cylinder reciprocating engine. (10 Hrs.)

UNIT III

Transmission of power: Flat and V-belt drives, velocity ratio of belt drives, slip in belt, creep in belt, length of open and cross belt drives, power transmitted by a belt, ratio of driving tension, centrifugal tension. Condition for the transmission of maximum power. Initial tension in belt. Chain drives-type of chain drives, roller chain and inverted tooth chain. Gear drivers; types of gear wheels. Proportions of gear tooth, gear trains-simple gear trains, compound gear trains; reverted gear train and simple epicyclic gear train (velocity ratio by tabular method) (10 Hrs.)

UNIT- IV

Governors: Types of governors-dead weight; watt and porter governor, spring loaded governors; hrtnell and Wilson hartnell governor(simple problems), governors with gravity and spring control, concept of sensitiveness, ,stability, isochronisms and hunting.

Vibrations: Causes of vibration in machine, their effect and method of reducing them, important terminology-time period, cycle, frequency, free vibration, forced vibration, damped vibration(elementary concept only). (10 Hrs.)

Recommended Books:

Title	Author(s)	Publisher
Text		
Theory of Machines	R K Bansal	Laxmi
Reference		
Theory of Machines	S.S.Rattan	TMH.
Theory of Machines	Jagdish Lal	Standard.
Theory of Machines	Beven	TMH
Theory of Machines	Ballaney P L	Khanna

ME 4203: FUNDAMENTAL OF AUTOMOBILE ENGINEERING

L T P **Maximum Sessional Marks: 25**
3 1 0 **Maximum End Term Examination Marks: 75**

UNIT - I

Introduction: Classification of Automobiles, history and development of automobiles, classification of IC engine, components of an automobile.

Engine and engine power: Fuels and combustion, air fuel mixture and carburetor, Fuel feed systems, Fuel Injection System, ignition systems, Firingorder and its significance. Knock in CI and SI engines, comparison of knock in CI & SI engines. Different types of combustion chamber. Combustion Chambers-Air cell chamber, Supercharging and Turbocharging. (10 Hrs.)

UNIT - II

Transmission : Different types of gear box, resistance, variation of the tractive efforts and total resistance with speed; propeller shaft and rear axle – Universal joints, final drive, differential, force on rear axle, rear axle drives and supporting; suspension system – types, shock absorbers. Front axle and steering mechanism – assembly, alignment, steering linkages, characteristics,connections, gear, gear ratio.

Brakes: Introduction, classification, system of drum, disk, hydraulic, air, mechanical and electric brakes, servo and power operated braking system.Clutch: Function, principles of operation and main components of clutch, types of clutches, clutch lining material, Lubrication and lubricant, cooling systems. (10 Hrs.)

UNIT - III

Batteries: Charging System, starting and generating system. Ignition Systems: Types, Construction & working of battery coil and magneto ignition systems. Types and construction of spark plugs, electronic ignition systems, Lighting System & Accessories.

Automotive Electronics: Current trends in automobiles, Vehicle motion control, Crank angle position sensors-Fuel metering/vehicle speed sensor and detonation sensor-Altitude sensor, flow sensor. Throttle position sensors. Introduction of Electronic Fuel Injection and Ignition Systems and Digital Engine Control System. (10 Hrs.)

UNIT - IV

Automotive Air Pollution & Control: Introduction, air pollution from SI and CI engine exhaust. Air pollution control techniques, Test Procedure & Instrumentation for Emission Measurement and Emission Standards, Emission standards. (10 Hrs.)

Text/References:

1. Automobile Mechanics – Crouse, TMGH
2. Automobile Chassis and body – Crouse, TMGH
3. Automobile Engg (Vol. I&II) - Kirpal Singh, Standard Publishers

ME 4204: INDUSTRIAL ENGINEERING

L T P **Maximum Sessional Marks: 25**
2 0 0 **Maximum End Term Examination Marks: 25**

UNIT-I

Production, Planning and Control: Definition and importance, types of production -job, batch and Mass, forecasting, routing, scheduling, dispatching and follow up. Break even analysis. Application of CPM and PERT techniques. (08 Hrs.)

UNIT-II

Inventory Control: Definition, types of inventory - Codification and standardization ABC analysis. Economic ordering quantity Procurement cost, carrying charges, lead-time, re-order point, simple Problems. Definitions, types of inspection and procedure Statistical quality control. (08 Hrs.)

UNIT-III

Work Study: Definition, advantages and procedure of work-study. Difference between productions and productivity, Factors to improve productivity Method Study: - Definition, objectives and procedure of method study. Symbols, flow process chart (man-machine-material), flow diagram, machine chart, two hand chart Critical examination. (12 Hrs.)

UNIT-IV

Plant Location and Layout: Definition, factors affecting the site selection of plant Factor affection plant layout Types of layout - process, product, combination and fixed position layout Techniques in making layout-Flow diagram, templates, distance volume matrix, travel chart Line balancing, workstation.

Material Handling: Principles of economic material handling Hoisting equipment.
(12 Hrs.)

RECOMMENDED BOOKS:

1. Industrial Engineering & Management by O.P.Khanna, - Dhanpat Rai & Sons.
2. Industrial Engg & Production Management by Telsang - S. Chand &Co
3. Industrial Engineering & Management by C.N.M Reddy - New Age International Publication.

HU 4201: EDP & MANAGEMENT

L T P **Maximum Sessional Marks: 25**

3 0 0 **Maximum End Term Examination Marks: 50**

UNIT-I

Entrepreneurship, concept, meaning need, entrepreneurial competencies, characteristics, Small scale industries in developing economies. (10Hrs.)

UNIT-II

Identification of Business opportunities, Role of financial institutions in promoting small scale industries, DIC, commercial banks, SFCS, NSICS, NABARD, etc. (10Hrs.)

UNIT-III

Preparation of Project report, Technical, Economic, Market feasibility, , Market survey, Tasks and Responsibilities of Professional Managers, communication, its importance, process, effectiveness and barriers in effective communication. (10Hrs.)

UNIT-IV

Basics of Marketing Mgt., Basics of Material Management, Motivation-Maslow‟s Need hierarchy, Leadership-functions, styles, Managerial grid, Human and Industrial relations, Function of HR, Importance and characteristics of IR, Grievance handling procedure, Factories Act 1948, Industrial Dispute Act 1947. (10Hrs.)

Text Books:

Management , - Stephen P.Robbins, Mary (Pearson education Asia)

Dynamics of entrepreneurial development, - Vasant Desai/Himalaya and Management - Pub.House

Entrepreneurship New venture creation, ` - David H.Holt, - PHI

Entrepreneurship & Small Business Management, - Nicholas, Siropholis Haughton Mifflin company Boston- Newyork

Industrial Law N.D.Kapoor/Sultan chand & sons

Entrepreneurship development in India C.B.Gupta/Sultan Chand & Sons

PROPOSED DIPLOMA COURSE CURRICULUM

Diploma in Civil Engineering.

Department of Civil Engineering

Semester I August to December (Including Examination)

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional	Theory	Total
(A) For Entry of GKCIET Certificate Holders								
1	HU 3101	Communication Skills	3	0	0	25	50	75
2	AP 3101	Applied Physics	3	1	-	25	75	100
3	AC 3101	Applied Chemistry	3	1	-	25	75	100
4	AM 3101	Applied Mathematics	3	1	0	25	75	100
5	AP 3151	Applied Physics Lab	-	-	2	50		50
6	AC 3151	Applied Chemistry Lab	-	-	2	50		50
7	HU 3151	Communication Lab	0	0	2	50		50
(B) For Entry of 10 + 2 Pass out								
1	EE 3122	Basic Electrical Engineering	3	0	0	25	50	75
2	CE 3101	Surveying-I	3	0	0	25	50	75
3	CE 3102	Principles of Civil Engineering	3	0	0	25	50	75
4	EE 3152	Basic Electrical Engineering Lab	0	0	2	50		50
5	CE 3151	Surveying-I Lab	0	0	2	50		50
6	CE 3152	Engineering Graphics	0	0	3	75		75
7	CS 3151	Computer Application Lab	0	0	2	50		50
8	WS 3151	General Workshop Practice	0	0	3	75		75
Common for both (A) and (B)								
1	CE 3103	Fluid Mechanics	3	1	-	25	75	100
2	CE 3104	Engineering Mechanics	3	1	-	25	75	100
3	CE 3153	Fluid Mechanics Lab	-	-	3	75		75
For GKCIET Certificate Holders			**18**	**5**	**09**	375	425	800
For 10 + 2 Pass outs			**15**	**2**	**15**	500	300	800

Semester II January to May (Including Examination)

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional	Theory	Total
	HU 3221	Engineering Economics and Accountancy	2			25	25	50
1	CE 3201	Building Materials and Construction	3	-	-	25	50	75
2	CE 3202	Strength of Materials	3	1	-	25	75	100
3	CE 3203	Surveying-II	3	-	-	25	50	75
4	CE 3204	Concrete Technology	3		-	25	50	75
5	CS 3201	C Programming	3			25	50	75
6	CE 3252	Strength of Materials Lab	-	-	3	75		75
7	CE 3253	Surveying-II Lab	-	-	3	75		75
8	CE 3254	Concrete Technology Lab	-	-	3	75		75
9	CE 3255	Building Planning and Drawing			2	50		50
10	CS3251	C Programming Lab	-	-	3	75		75
			17	**1**	**14**	500	300	800

Semester-IIIA Industrial Training (June to August)

Sl. No	Subject Code	Subject Name	L	T	P	Sessional	Theory	Total
1	**IT 4170**	**Industrial Training and Viva -voce**	**0**	**0**	**0**	**50**	**-**	**50**

Semester IIIB August to December (Including Examination)

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional	Theory	Total
1	CE 4101	Structural Analysis	3	1	-	25	75	100
2	CE 4102	Water Resource Engineering	3	0	0	25	50	75
3	CE 4103	Geo Technical Engineering	3	-	-	25	50	75
4	CE 4104	Transportation Engineering	3			25	50	75
5	CE 4105	Estimation and costing	3			25	50	75
6	CE 4106	Maintenance and Rehabilitation of structures	2			25	25	50
7	CE 4151	Application of AutoCAD in Civil Engineering-I	-	-	2	50		50
8	CE 4153	Geo Technical Engineering Lab	-	-	3	75		75
9	CE 4154	Transportation Engineering Lab	-	-	3	75		75
10	CE 4155	Building Planning Estimation Sessional			2	50		50
11	CE 4191	Civil Engineering Project			2	50		50
			17	**1**	**12**	475	325	800

Semester IV January to May (Including Examination)

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional	Theory	Total
1	CE 4201	Design of RCC Structures	3	1	0	25	75	100
2	CE 4202	Design of Steel Structure	3	1	0	25	75	100
3	CE 4203	Environmental Engineering	3	0	0	25	50	75
4	CE 4204	Construction and project Management	3	0	0	25	50	75
5	CE 4205	Elective[Construction methods and Machinery]	3	0	0	25	50	75
6	CE4252	Application of AutoCad in Civil Engineering-II	0	0	2	50		50
7	CE 4253	Environmental Engineering Lab	0	0	3	75		75
8	CE 4292	Project-II	0	0	8	200		200
9	CE 4254	Grand Viva-voce	0	0	2	50		50
			15	**2**	**15**	500	300	800

CE 3101 SURVEYING-I

L T P **Sessional Marks: 25**
3 0 0 **End Term Examination Marks: 50**

Unit- I

Introduction, Classification of survey, chain surveying- principle, instruments used, procedure, Problems and errors in chain survey.

(7 lectures)

Unit- II

Compass surveying: types, description and uses, measurement of bearing in WCB and QB systems, local attraction and related problems.

(7 lectures)

Unit-III

Plane table surveying: methods of plane tabling, two-point and three-point problems and their solutions, error in plane tabling

(7 lectures)

Unit- IV

Levelling: differential levelling, booking and reduction of levels, related problems and practice.

(7 lectures)

Text/Reference books

Sl. No	Name of the Book	Author	Publishers
1	Surveying Vol-I	B.C. Punmia	Laxmi Publications, New Delhi
2	Surveying and Levelling	N.N. Basak	Tata McGraw Hill, New Delhi
3	Surveying and Levelling	R. Subramanian	Oxford University Press
4	Plane Surveying	Alok De	S.Chand & Co Pvt.Ltd.

CE 3102 PRINCIPLES OF CIVIL ENGINEERING

L T P **Sessional Marks: 25**
3 0 0 **End Term Examination Marks: 50**

Unit- I

Stones, bricks, tiles, lime, cement, sand, concrete, steel, timber, paints, bituminous materials etc. 12 Lectures

Unit-II

Foundation, masonry works, lintels, Door, Windows, roofs, flooring, damp proofing, plastering etc. 12 Lectures

Unit-III

Water supply and Sanitary services, construction details of septic tank, soak pit 10 Lectures

Unit-IV

Construction of roads, railway and bridges 8 Lectures

Text/Reference books

Sl. No	Name of the Book	Author	Publishers
1	Building Construction	Sushil Kumar	Standard Publications, Delhi
2	Engineering Materials	Sushil Kumar	Standard Publications, Delhi
3	Plumbing Design & Practice	S.G.Dedalikar	Tata McGraw Hill
4	Basic Civil Engineering	Satheesh Gopi	Pearson

CE 3152 ENGINEERING GRAPHICS

L T P **Sessional Marks: 75**
0 0 3 **End Term Examination Marks: 00**

Lines, Lettering & Dimensioning; Engineering curves: Conic sections, Cycloid, Involute, Spiral, Helix etc.

Projection of Points straight lines & Planes

Projection of solids, auxiliary views and sectional views.

Development of surfaces, and isometric drawings/views

Text/Reference books

Sl. No	Name of the Book	Author	Publishers
1	Elementary Engineering Drawing	N.D. Bhatt and V.M. Panchal	Charotar Publishing House
2	Engineering Drawing	Venugopal	Willey Eastern Ltd.
3	Engineering Drawing & Graphics Technology	French T.E., Vierck C.J. & Forester R.J.	McGraw Hill International

CE 3103 FLUID MECHANICS

L T P **Sessional Marks: 25**
3 1 0 **End Term Examination Marks: 50**

Unit- I

Properties of fluid: Mass density, relative density, viscosity, fluid pressure, preaure head. Fluid statics- Pressure at a point, units of measurement, manometers, forces on plane areas, lines of action of force.

Fundamentals of fluid flow-steady, unsteady, uniform, non-uniform, one dimensional, two dimensional flows; Streamline, stream tube, equation of continuity, Energy equation and its applications.

(12 lectures)

Unit-II

Fluid flow in pipes- Reynolds number, critical velocity, laminar flow, turbulent flow shearing stresses at pipe wall, velocity distribution, loss of head for laminar flow, steady incompressible flow through simple pipe systems, Darcy-Weisbach equation, simple pipe flow problems, losses of head for sudden expansion and sudden contraction

(10 lectures.)

Unit- III

Fluid measurements-velocity measurement, Pitot tube, coefficient of discharge, coefficient of velocity, coefficient of contraction, orifices, orifice meter, venturimeter, time to empty tanks, weirs and notches

(10 lectures.)

.

Unit-IV

Introduction to open channel flow-prismatic and non-prismatic channels, equation of continuity for steady flow, uniform flow, Manning's formula, simple problems of steady uniform flow in rectangular and trapezoidal channels.

(10 lectures.)

Text/Reference books

Sl. No	Name of the Book	Author	Publishers
1	Hydraulics and Fluid Mechanics including Hydraulics Machines	P.N. Modi and S.M. Seth	Standard Book House, Delhi
2	Theory and Problems of Fluid Mechanics	K. Subramanya	Tata McGraw Hill, New Delhi
3	Fluid Mechanics through Problems	R. J. Garde	New Age International, New Delhi
4	A Text Book of Fluid Mechanics	R.K. Rajput	S.Chand & Co.

CE 3104 ENGINEERING MECHANICS

L T P **Sessional Marks: 25**
3 1 0 **End Term Examination Marks: 75**

Unit- I

Concept of Mechanics, Forces and Moments, Moment about a point and about a line, Equivalent force systems and resultants, Free Body Diagram, Equilibrium in space - reactions from supports and connections, Equilibrium of particles and rigid bodies, Frictions.
Trusses: Method of Joints and Method of Sections, Frames and Machines - Force system acting on a detached member, Method of solution.

(9 Lectures)

Unit- II

Principle of virtual work - displacements, works due to a force and a couple, virtual displacement, applications; Potential energy and stability - conservative systems, principles of potential energy, stability of equilibrium.

(7 Lectures)

Unit- III

Kinematics of Particles- Rectilinear motion, Cylindrical and Polar Coordinates, Normal and Tangential Coordinates, Relative motion, Fixed frame of reference and rotating frame.

(6 Lectures)

Unit- IV

Curvilinear Motion: Position vector, velocity, and Acceleration, Free flight of a projectile, Tangential and Normal Components, Radial and Transverse Components, Cylindrical components

(7 Lectures)

Unit- V

Kinetics of particles - Newton's second law, force and acceleration, linear and angular momentum, conservation of momentum, impulses, principle of motion of the mass centre, Kinetic energy and conservation of energy.

(7 Lectures)

Unit- VI

Plain kinematics of rigid bodies - translation, rotation and general plane motion, velocities in relative motion, instantaneous centre of velocity, accelerations in relative motion.

(6 Lectures)

Text/Reference books

Sl. No	Name of the Book	Author	Publishers
1	Mechanics of Materials	R.C. Hibbeler	McGraw Hill
2	A text Book of Engineering Mechanics	A.R. Basu	Dhanpat Rai & Co
3	Introduction to Solid Mechanics	Irving H Shames	Prentice Hall of India

HU3221 ENGINEERING ECONOMICS AND ACCOUNTANCY

L T P **Sessional Marks: 25**
2 0 0 **End Term Examination Marks: 25**

Unit-I

Introduction: Definition of Economics- scope and nature of economic science, Economic decision and technical decision, Economic efficiency and Technical efficiency, Forms of business organization.

Capitalistic, Communist and mixed economics, Developing and developed economics, Characteristics of Indian economy

7 Lectures

Unit-II

Demand and revenue analysis: Meaning of demand, Determinants of demand, Exception to the law of demand. Elasticity of demand- Meaning, Price Elasticity of demand.

Demand Forecasting: Basic concepts and tools used in Analysis of demand forecasting for new demands, existing products and consumer products.

7 Lectures

Unit-III

Cost and Production Analysis: Cost concept: Classification of cost- Cost output relationship- Cost function and its determinants, Estimation of Cost function, uses of Cost function. Production: Meaning, Factors of production- Land, Labour, capital and organization.

7 Lectures

Unit-IV

Financial Accounting: Meaning, Nature and scope of Financial Accounting, Accounting concepts & conventions, Business Transactions, Different types of Vouchers, Analysis of Transactions, Recording in Journals and cash books, Posting of Ledgers, Preparation of Trial balance, Preparation of Final Accounts (Trading Account, Profit & Loss A/C and Balance Sheet).

7 Lectures

Text/Reference books

Sl. No	Name of the Book	Author	Publishers
1	Fundamentals of Economic: Principles and problems	A. Banerjee & D. Maumder	ABS Publishing House
2	Economics for Business	John Sloman & Mark Sutdiffe	Pearson Education
3	Accountancy (Vol.1)	Dr. S.K. Paul	New Central Book Agency
4	Modern Economic Theory	K.K. Dewett	S.Chand
5	Practice in Accountancy	S. P. Basu & Monilal Das	S. P. Basu & Monilal Das
6	Fundamentals of Engineering Economics	Pravin Kumar	Willey India

CE 3201 BUILDING MATERIALS & CONSTRUCTION

L T P **Sessional Marks: 25**
3 0 0 **End Term Examination Marks: 50**

Unit- I

Building components and types of structure: Building components with their functions- Substructure, superstructure; Types of Structure- load bearing structure framed structure composite structure

Masonry materials: Building stones- Classification of rocks requirements of good building stone processing of natural stone uses of stone; Brick- Classification of bricks composition of clay brick strength of brick testing of bricks some special types of bricks(Fire clay bricks refractory bricks hollow bricks fly ash bricks; Mortars- classification (lime mortar cement mortar composite mortar special mortar) Proportion function and properties of mortar; Timber and Timber based materials: uses and characteristic of good timber defects in good timber plywood particle board veneer sun mica artificial timber rubber wood; Miscellaneous materials- Glass plastic fibres aluminium steel asphalt bitumen water proofing and termite proofing materials admixture in concrete bonding agent epoxy resins polishing material etc. **(12Lectures)**

Unit- II

Construction of Substructure: Job Layout- Site clearance and Precautions while marking layout on ground, Preparing job layout, layout for load bearing and framed structure by centre line method; Earthwork- Excavation for foundation, Shoring and strutting, earthwork for embankment, material for plinth filling, tools and plants used for earthwork; Foundation- Types of foundations, bearing capacity of soil. **(10 Lectures)**

Unit- III

Superstructure: Stone masonry- terms used, types of stone masonry, construction; Brick masonry- Requirements, different kind of bonds in brick masonry, Junction of wall, brick laying, precautions in brick masonry, tools and plants used in brick masonry, comparison between stone and brick masonry; Doors and Windows- Components and construction of different kind of doors and windows, sizes of doors and windows, Protective treatment for doors and windows, Fixture and fastenings for doors and windows; functions, types and construction of sill ,lintel and weather shed; Vertical communication- different means, requirement and types of staircase; Scaffolding and shoring- purpose, type, purpose and types of shoring, underpinning, safety precautions. **(10 Lectures)**

Unit- IV

Building and wall finishes: Floors and roofs- types of floors and roofs finishes, process of laying and construction of floor finishes; Water proofing treatment- materials used and its specification, procedure, precaution taken while water proofing; Termite proofing- principles and methods of termite proofing, materials used in termite proofing; Damp proofing- Sources, its effects, materials used, methods of damp proofing treatment; Wall finishes: plastering, pointing, painting.

Building maintenance: Cracks- Causes and types of cracks, identification and repair of cracks; Settlement- causes and remedial measures, plinth protection; Demolition- necessity, method of demolition, precaution during demolition. **(10 Lectures)**

Text /Reference books

Sl. No	Name of the Book	Author	Publishers
1	Building Construction	B.C. Punmia	Laxmi Publications
2	Building materials	S.K. Duggal	New age International
3	Building Construction Engineering	Gurcharan Singh	
4	Building Construction	S. K. Sharma	Tata McGraw-Hill

CE 3202 STRENGTH OF MATERIALS

L T P **Sessional Marks: 25**
3 1 0 **End Term Examination Marks: 75**

Unit- I

Simple stress and strain: Concept of simple stress and strain, normal and shearing stress and strain, stress-strain relationship, Hook's law, Elastic Constants and their relationships,poisson's ratio, stress- strain diagram for uniaxial loading.

Principal stress and strain, principal plane, mohr's circle of stress and strain, related problems.

(14 Lectures)

Unit-II

Concept of Shear force and bending moment, Relations between load, shearing force and bending moment, shear force and bending moment diagrams for simply supported beams, overhanging beams and cantilever subjected to point load, UDL, uniformly varying load and couples, point of contra-flexure, related numerical problems.

(14 Lectures)

Unit- III

Torsion of circular shafts, Stress and deflections in closed helical springs subjected to axial forces, members subjected to flexural loads, Columns-Euler's , Rankine and Secant formulae, relative problems.

(14 Lectures)

Unit-IV

Theory of simple bending, concept of pure bending, stresses in beams, assumptions in theory of bending, neutral axis, bending stresses and their nature, Bending and shear stress distribution over cross sections of determinate beams.

(14 Lectures)

Text /Reference books

Sl. No	Name of the Book	Author	Publishers
1	Analysis of Structures-Vol I	Vazirani&Ratwani	Khanna Publishers
2	Strength of Materials	Ramamrutham	Dhanpat Rai
3	Strength of Materials	S. S. Bhavikatti	Vikas Publishing House Pvt. Ltd
4	Mechanics of Materials	Punmia, Jain, Jain	Laxmi Publications (P) Ltd.

CE 3203 SURVEYING-II

L T P **Sessional Marks: 25**
3 0 0 **End Term Examination Marks: 50**

Unit- I

Theodolite- description, adjustment of transit theodolite, measurement of angles and setting out lines. Contouring: Principles, methods and applications, contour gradient.

(10 Lectures)

Unit-II

Trigonometrical levelling- Height and distance of objects with accessible and in accessible base, terrestrial refraction, determination of difference in elevation.

(11 Lectures)

Unit-III

Tacheometry-Principles, field observations, reduction of readings, applications.

(10 Lectures)

Unit-IV

Curve surveying- different methods of setting out curves- simple curves compound curves, reverse curve, transition curve & vertical curves, related problems.

(11 Lectures)

Text /Reference books

Sl. No	**Name of the Book**	**Author**	**Publishers**
1	Surveying Vol.-I & II	B.C. Punmia	Laxmi Publications
2	Surveying Vol.- I & II	S. K. Duggal	Tata McGraw Hill
3			
4			

CE 3204 CONCRETE TECHNOLOGY

L T P **Sessional Marks: 25**
3 0 0 **End Term Examination Marks: 50**

Unit- I

Properties of Aggregates and Testing: Objectives, Classification, Characteristics and properties of aggregates.

Types, Properties and Testing of Cement: Objective, composition, varieties, and advantages.

Water : Qualities of water and its uses as per IS 456- 2000, mixing and Curing

(10 Lectures)

Unit- II

Properties of Concrete: Importance, Production of concrete, operations involved, grades, Ingredients, yield of concrete. Properties of green and hardened concrete, Rheology and mix proportioning.

(12 Lectures)

Unit-III

Admixtures: Objective, Types of admixture and compounds, quality control- influencing parameters, advantages, measure of variability and statistical quality control.

(10 Lectures)

Unit-IV

Special Concrete: Ferro- Cement, Polymer Concrete composition, lightweight and fibre reinforced concrete.

(10 Lectures)

Text /Reference books

Sl. No	Name of the Book	Author	Publishers
1	Concrete Technology	M.S. Shetty	S.Chand& Company
2	Concrete Technology	M.L. Gambhir	Tata McGraw Hill
3	Concrete for Construction	V.K. Raina	Tata McGraw Hill
4			

CE 4101 STRUCTURAL ANALYSIS

L T P **Sessional Marks: 25**
3 1 0 **End Term Examination Marks: 75**

Unit-I

Introduction to structural analysis and classification of structures, Review of BMD and SFD, BMD by parts, compound beams and determinate frames.

(14 Lectures)

Unit- II

Deflecftion by moment area, conjugate beam and energy methods, Betti's law, Castigliano's theorems. Application of Castigliano's theorem to find deflections.

(14 Lectures)

Unit-III

Three Hinged Arch, Cables and Suspension Bridges.

Influence line diagram for reaction, Shear, Bending moment and their maximum and minimum values for determinate beams, arches and trusses.

(14 Lectures)

Unit-IV

Degree of indeterminacy and stability, principles of superposition, Analysis of indeterminate beams by strain- energy and virtual works method.

(14 Lectures)

Text /Reference books

Sl. No	Name of the Book	Author	Publishers
1	Structural Analysis, 6th Edition	R.C. Hibbeler	Pearson Education
2	Analysis of Structures Vol. I & II	V.N. Vazarani& M. M. Rattwani	Khanna Publications
3			
4			

CE 4102: WATER RESOURCE ENGINEERING

L T P **Sessional Marks: 25**
3 0 0 **End Term Examination Marks: 50**

Unit-I

Water resource development: socio economic, environmental and ecological objectives. Hydrological cycle-precipitation, mass curve, hydrograph, point rainfall, depth-area-duration relationships, maximum precipitation. Evapotranspiration and infiltration.

(10 Lectures)

Unit-II

Stream flow measurement, measurement of stage and velocity, rainfall-runoff characteristics and co-relation flow duration curve, flow mass curve. Hydrograph-definition, influencing factors and components, base flow separation, effective rainfall, unit hydrograph, use and limitations.

(12 Lectures)

Unit-III

Soil-sub system analysis, Ground water sub system, specific yield and specific retention, Darcy's law, hydraulic conductivity, transmissibility-steady flow in a well, Drainage system managements.

(10 Lectures)

Unit-IV

Crops and crops season, soil-water relationships, field capacity, infiltration, consumptive use, requirement and frequency of irrigation, canal irrigation, canal outlets. Water logging and canal lining, river training works.

(10 Lectures)

Text /Reference books

Sl. No	Name of the Book	Author	Publishers
1	Engineering Hydrology	K. Subramanya	Tata Mc Graw Hill
2	Hydrology, Principles, Analysis and Design	H.M.Raghunath	New Age international
3	Irrigation and Water Power Engineering	Punmia and Pandey.	Laxmi Publications
4	A Text Book of Hydrology	Rani Reddy	Laxmi publications

CE 4103 GEOTECHNICAL ENGINEERING

L T P **Sessional Marks: 25**
3 0 0 **End Term Examination Marks: 50**

Unit- I

Introduction, Preliminary definitions and relationships, Index properties of soil, Classification of soils, Soil structure and Clay mineralogy.

(10 Lectures)

Unit-II

Permeability of soil: Introduction, Darcy's law of permeability, Coefficient of permeability and its determination by constant head and falling head permeability test, factors effecting permeability, related problems.

Seepage analysis: Introduction, seepage velocity, seepage pressure, related terminology, and quick sand condition related problems.

(12 Lectures)

Unit-III

Soil Compaction: Introduction, purpose of compaction, standard proctor test, modified proctor test as per IS code, compaction curve, optimum moisture content, Maximum dry density, factors affecting compaction, Field method of compaction, California bearing ratio.

(10 Lectures)

Unit-IV

Shear strength of soils: Theoretical considerations and tests.
Introduction to shallow and deep foundations, Introduction to soil exploration.

(10 Lectures)

Text /Reference books

Sl. No	Name of the Book	Author	Publishers
1	Soil Mechanics and Foundation Engineering	B. C. Punmia	Laxmi Publications
2	Soil Mechanics and Foundation Engineering	VNS Murthy	Dhanpat Rai & Sons
3	Principles of Geotechnical Engineering	B. M. Das	Thomson
4	Soil Mechanics and Foundation Engineering	P.P. Raj	Pearson

CE 4104 TRANSPORTATION ENGINEERING

L T P **Sessional Marks: 25**
3 0 0 **End Term Examination Marks: 50**

Unit-I

Roads: Introduction, Highway development in India, Classification of road patterns, master plan, Road Network and Characteristics.

(10 Lectures)

Unit-II

Geometric Design- Factors considerations, traffic control devices, related practice.

(12 Lectures)

Unit-III

Railways: Geometrics for Broad gauge, Cant deficiency, Sleeper density, Design of Ballast depth. Points and Crossings, Station and Yards, Signals.

(10 Lectures)

Unit-IV

Airport: Characteristics, Planning consideration

(10 Lectures)

Text /Reference books

Sl. No	Name of the Book	Author	Publishers
1	Highway Engineering	S.K. Khanna and CEG Justo	Nem Chand & Brothers
2	Road, Railway and Bridges	Birdi & Ahuja	Standard Book House
3	A Text book of Railway Engineering	S.C. Saxena	Dhanpat Rai & Sons
4	Airport:Planning and Design	Khanna and Arrora	Nem Chand & Brothers.

CE 4105 ESTIMATION AND COSTING

L T P **Sessional Marks: 25**
3 0 0 **End Term Examination Marks: 50**

Unit-I

Introduction to Estimating and Costing: Meaning of the terms estimating and costing, purpose , factors affecting estimate, types of estimate, explanation of relevant technical terms, degree of accuracy, mode of measurement as per BS 1200, related problems.

(10Lectures)

Unit-II

Building estimate: detailed estimate of earthwork, brick flat soling, foundation concrete, brick in substructure, earthwork in filling, DPC, plinth level,plinth filling, brickwork in superstructure, formwork RCC, reinforcement (by percentage of components of structure), lime terracing, or other similar roof treatment, finishing items, floorings by Centre line method & short wall method.

(12Lectures)

Unit-III

Estimate of other structure: estimate for a single span slab culvert/ pipe culvert, manhole, simple fink type roof truss.

(10Lectures)

Unit-IV

Rate Analysis: Term rate analysis and its purposes, factors effecting rate analysis, relevant terminology, rate analysis for construction, materials and various items of works.

(10Lectures)

Text /Reference books

Sl. No	Name of the Book	Author	Publishers
1	Estimating, Costing, Specification & Valuation	M.Chakraborty	M. Chakraborty, Calcutta
2	Estimating & Costing in Civil Engineering	B.N.Dutta	UBS Publishers
3	Estimating and Costing	S. C. Rangwala	Charotar Publications
4	Estimating and Costing	G.S.Birdie	Dhanpat Rai and Sons.

CE 4106 MAINTENANCE & REHABILITATION OF STRUCTURES

L T P **Sessional Marks: 25**
2 0 0 **End Term Examination Marks:25**

Unit- I

Introduction, classification of maintenance, concept of rehabilitation, strengthening, retrofitting, Repairing: Types ,inspection, mechanical approach.
Causes & detection of damages, materials used for repairs.

(7 Lectures)

Unit-II

Maintenance of Masonry walls: Damp wall, causes & effects, remedies; Cracks in walls, remedial and preventive measure.
Repairs to foundation: Remedies, types & process of settlement, foundation sinking, strengthening of foundation.

(7 Lectures)

Unit-III

Water proofing, Concept of repairs and strengthening of RCC structures: Basic idea, Physical examination of common defects, structural repairs & strengthening by new developments; Damages due to fire and remedies involved.

(7 Lectures)

Unit-IV

Advanced damaged detection technique, strengthening method, maintenance of water supply leaking pipe, joints and sewerage system, closed drains, road, road berms.
Estimate of annual repairs, special repairs and maintenance works.

(7 Lectures)

Text /Reference books

Sl. No	Name of the Book	Author	Publishers
1	Maintenance and Repairs of Buildings	P.K.Guha	New Central Book Agencies
2	Maintenance Engineering for Civil Engineers	B.S. Nayak	Khanna Publications
3	Building Failures- Diagonosis and Avoidance	Ransom W.H.	E and F.N. Span
4	Building repairing hand book		CPWD
5	SP- 25 Building cracks and repairs		BIS

CE 4201 DESIGN OF RCC STRUCTURES

L T P **Sessional Marks: 25**
3 1 0 **End Term Examination Marks: 75**

Unit-I

Introduction to Working Stress Method, Philosophy of Limit State Design; Different limit states, Characteristic strengths and loads, Codal provisions, design values/parameters.

(14 Lectures)

Unit-II

Design of flexure of singly reinforced rectangular beams, doubly reinforced rectangular beams, singly reinforced T and L beams, doubly reinforced rectangular beams.

(14 Lectures)

Unit-III

Design of beams for shear, torsion, development of bond, control of deflections in beams and slabs.

(14 Lectures)

Unit-IV

Design of slabs: one way, two way and continuous slabs.
Axially loaded short and long columns. Square, rectangular and strip footings.

(14 Lectures)

Text /Reference books

Sl. No	Name of the Book	Author	Publishers
1	Reinforced Concrete: Limit State Design	Ashok K. Jain	Nem Chand & Brothers
2	Reinforced Concrete Design	Pillai & Manon	Tata McGraw Hill
3	Reinforced Concrete Design	N Krishna Raju and R.N. Pranesh	New Age Publications
4	Reinforced Concrete	M. L. Gambhir	MacMillan India Ltd

CE 4202 DESIGN OF STEEL STRUCTURES

L T P **Sessional Marks: 25**
3 1 0 **End Term Examination Marks: 75**

Unit-I

Properties of steel and rolled steel sections, Design of Riveted connections. Design of welded and bolted connections.

(14 Lectures)

Unit-II

Design of tension and simple compression members.
Design of compression members with splicing, lacing, and battening

(14 Lectures)

Unit-III

Design of Beam-Column connections; Design of laterally supported beams.

(14 Lectures)

Unit-IV

Column bases and foundations and Roof trusses.

(14 Lectures)

Text /Reference books

Sl. No	Name of the Book	Author	Publishers
1	Design of Steel Structures	L.S. Negi	Tata McGraw Hill
2	Design of Steel Structures	P. Dayaratnam	Wheeler Publishing
3	Design of Steel Structures	Kazmi and Jindal	Prentice Hall of India
4	Design of Steel Structures Vol. I	Ram Chandra	Standard Book House

CE 4202 ENVIRONMENTAL ENGINEERING

L T P **Sessional Marks: 25**
3 0 0 **End Term Examination Marks: 50**

Unit-I

Introduction, Estimation of quantity of water, per capita demand, design period, population forecasting. Sources of water and their suitability with regard to quality and quantity, storage capacity of reservoirs, water quality parameters, standards.

(12 Lectures)

Unit-II

Treatment of water-screenings, sedimentation, coagulation and flocculation, filtration and disinfection, distribution system, methods of water supply and storage.

(10 Lectures)

Unit-III

Sewerage system, estimation of quantity of sewage, dry weather flow (DWF), wet weather flow (WWF), variation in flows, nomographs, hydraulic design of sewers, pumping of sewage.

(10 Lectures)

Unit-IV

Characteristic of sewage, strength of sewage, population equivalent, treatment of sewage- primary and secondary treatments, oxidations ponds, sewage disposal, self- purification of streams, sludge digestion and disposal, concept of air pollution control.

(10 Lectures)

Text /Reference books

Sl. No	Name of the Book	Author	Publishers
1	Environmental Engineering Vol. I: Water Supply Engineering	S.K.Garg	Khanna Publications
2	Environmental Engineering Vol. II: Sewage Disposal and Air Pollution Engineering	S.K. Garg	Khanna Publications
3	Wastewater Engineering: Treatment, Disposal and Reuse	Metcalf & Eddy	Tata McGraw Hill
4	Water Supply and Sanitary Engineering	G.S.Birdi and J.S. Bindie	Dhanpat Rai Publishing Co.

CE 4204 CONSTRUCTION AND PROJECT MANAGEMENT

L T P **Sessional Marks: 25**
3 0 0 **End Term Examination Marks: 50**

Unit-I

Scientific management, need of management, function and application of management, organization, site and construction management.

(10 Lecture)

Unit-II

Control and monitoring of progress, Cost control, Inspection and quality control.

(10 Lecture)

Unit-III

Network analysis, PERT and CPM.

(12 Lecture)

Unit-IV

Labour welfare and labour law. Departmental procedure and accounts, PWD accounts. Stores and material management.

(10 Lecture)

Text /Reference books

Sl. No	Name of the Book	Author	Publishers
1	Construction Management and Accounts	Harpal Singh	Tata McGraw Hill
2	Construction Management Practice	V.K. Raina	Tata McGraw Hill
3	Management in Construction Industry	P.P. Dharwadker	Oxford & IBH
4	Construction Planning & Management	P.S. Gahlot & B.M. Dhir	New Age International

CE 4205 CONSTRUCTION METHODS AND MACHINERY [ELECTIVE]

L T P **Sessional Marks: 25**
3 0 0 **End Term Examination Marks: 50**

Unit-I

Engineering and construction economy, steps involved in construction.

(10 Lectures)

Unit- II

Supervision of concreting in hot and cold climate, quality control, precautions to be taken in construction of high-rise buildings.

(12 Lectures)

Unit-III

Erection of steel structure. Use of compressed air in construction.

(10 Lectures)

Unit-IV

Standard and special equipment, selection, operation and maintenance of equipment.
Construction accidents; types and causes, effective preventive measures.

(10 Lectures)

Text /Reference books

Sl. No	Name of the Book	Author	Publishers
1	Construction Equipments, Job Planning	S.V. Deodhar	Khanna Publishers
2	Construction of Structures & Management of Works	S.C. Rangawala	Charotar Publishing House
3	Construction Planning Equipments and Methods	R.L. Peurifoy, W.B. Ledbetter and C.J. Schexnayder	McGraw Hill

Proposed Course Curriculum

DIPLOMA IN COMPUTER SCIENCE AND ENGINEERING

Department of Computer Science & Engineering

First Semester (July/August – December)

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional	Theory	Total
	(A) For Entry of GKCIET Certificate Holders							
1	HU 3101	Communication Skills	3	0	0	25	50	75
2	AM 3101	Applied Mathematics	3	0	0	25	50	75
3	HU 3151	Communication Lab	0	0	2	50	-	50
	(B) For Entry of 10 + 2 Pass out							
1	CS 3102	ComputerBasics& Internet	3	1	0	25	75	100
2	EE 3102	Basic Electrical Engineering	2	0	0	25	25	50
3	EE 3152	Basic Electrical Engineering Lab	0	0	2	50	-	50
	Common for both (A) and (B)							
4	CS 3103	Basics of Operating System	3	0	0	25	50	75
5	CS 3104	Programming Methodology	3	1	0	25	75	100
6	CS 3153	Operating Systems Lab	0	0	3	75	-	75
7	CS 3154	Programming Methodology Lab	0	0	3	75	-	75
8	CS 3177	Office Automation Lab	0	0	6	150	-	150
9	EC 3101	Electronic Circuit & Devices – I	3	0	0	25	50	75
10	EC 3151	Electronic Circuit & Devices Lab I	0	0	2	50	-	50
Total For GKCIET Certificate Holders			**15**	**1**	**16**	**525**	**275**	**800**
		Total For 10 + 2 Pass outs	**14**	**2**	**16**	**525**	**275**	**800**

Second Semester (January – May)

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional	Theory	Total
1	CS 3202	Computer Peripherals & Interfacing	3	1	0	25	75	100
2	CS 3203	Introduction to Databases	3	1	0	25	75	100
3	CS 3204	Network Operating Systems	3	0	0	25	50	75
4	CS 3205	Basic Mathematics for Computer Science	3	1	0	25	75	100
5	EC 3201	Digital Electronics	3	0	0	25	50	75
6	CS 3252	Computer Peripherals & Interfacing Lab	0	0	4	100	-	100
7	CS 3253	Database Lab	0	0	4	100	-	100
8	CS 3254	Network Operating Systems Lab	0	0	4	100	-	100
9	EC 3251	Digital Electronics Lab	0	0	2	50	-	50
		Total	**15**	**3**	**14**	**475**	**325**	**800**

Vetted.
Tanmay De

Dr. Tanmay De
Associate Professor & Head
Computer Science & Engg. Deptt.
National Institute of Technology
Durgapur - 713209, W.B., India

Third Semester – A. Industrial Training (June – August)

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional	Theory	Total
1	IT 4170	Industrial Training & Viva-Voce	0	0	0	50	0	50

Third Semester – B. (August – December)

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional	Theory	Total
1	CS 4101	Computer System Architecture	3	1	0	25	75	100
2	CS 4102	Object Oriented Programming	3	0	0	25	50	75
3	CS 4103	Visual Programming	3	0	0	25	50	75
4	CS 4104	Basics of Data Communication and Networking	3	1	0	25	75	100
5	CS 4152	Object Oriented Programming Lab	0	0	4	100	-	100
6	CS 4153	Visual Programming Lab	0	0	4	100	-	100
7	CS 4154	Networking Lab	0	0	4	100	-	100
8	CS 4155	Troubleshooting & Maintenance of Computers Lab	0	0	4	100	-	100
		Total	**12**	**2**	**16**	**500**	**250**	**800**

Fourth Semester (January – May)

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional	Theory	Total
1	CS 4201	Network Security	3	0	0	25	50	75
2	CS 4202	PC Organization	3	0	0	25	50	75
3	CS 4203	System Software	3	1	0	25	75	100
4	HU 4201	EDP & Management	3	0	0	25	50	75
5	CS 4270	Project Work	0	0	9	225	-	225
6	CS 4252	PC Organization Lab	0	0	4	100	-	100
7	CS 4255	Web Technology Lab	0	0	6	150	-	150
		Total	**12**	**1**	**19**	**575**	**225**	**800**

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CS 3102COMPUTER BASICS & INTERNET

L T P
3 1 0

Maximum Sessional Marks: 25
Maximum End Term Examination Marks: 75

UNIT – I

Computer: Definition, Application, Block Diagram, Mainframe, Microcomputer, Minicomputer, Supercomputer; Processor types, Data and Information, Concepts of bit/byte etc., Memory: RAM, ROM, Cache, Disk Drive, Flash Memory, Primitive operations on memory; Bus System,Input Devices: Keyboard, Mouse, Scanner; Output Devices: VDU, Printer;

(~~14~~ Hrs)
10 hrs.

UNIT – II

Number System: Binary, Hexadecimal, Octal and their inter Conversion, Signed binary numbers and their representation, Floating Point representation, Binary arithmetic: Addition Subtraction, multiplication, Division, modulo Operation; Software: Need for Software, System Software and Application Software

(~~14~~ Hrs)
08 hrs.

UNIT – III

Computers as communication Device: Concepts of Networking, Need for Networking, Network Types: LAN, MAN, WAN, Elements of Network, Topology: MESH, RING, TREE, BUS, STAR, Concept and evolution of Internet, Working of Internet, Specification and technical details for establishing Internet

(~~12~~ Hrs)
08 hrs.

UNIT – IV

ISPs, domain name, DNS and introduction to DNS server, Role of TCP/IP, Server and Client, Introduction to IP addressing, TCP/IP, HTTP, FTP, SMTP, Telnet, Usenet, IRC, e-mail, snailmail, network threats, blog, web bot, Formation ofvirtual community on internet, Security threats: viruses, worms and Trojan, phishing,firewalls and gateways, Concept of World Wide Web and its evolution, web page, web browser, web hosting and webserver, web portals, hypertext, hyperlinks and hypermedia, address formation on internet,URL, using search engines, Internet in education, banking, reservation etc.E-commerce: introduction to B2B and B2C, shopping cart, online shopping, selling productsand services, Introduction to Video Conferencing and E-governance

(~~16~~ Hrs)
14 hrs.

Reference & Text Books

Title	Author	Publisher
Computer Fundamental	Anita Goel	Pearson Education
Computer Fundamentals	Pradeep Sinha	BPB Publication
Internet 6 in 1	Kraynak, J. W. Habraken	PHI
Internet Basics for Beginners	Shaun Fawcett	Final Draft
Using the World Wide Web	David Wall et. al.	PHI

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CS-3103BASICS OF OPERATING SYSTEM

L T P
3 0 0

Maximum Sessional Marks: 25
Maximum End Term Examination Marks: 50

UNIT- I

Introduction : A brief history of Operating system, definition, Operating systemclassification: single user, multi-user, Batch Processing, Time-sharing, Real time and MultiprocessingOperating systems: Functions of Operating system, UserInterfaces – GUI and CLI, Kernel, Device Driver.

(10 Hrs)

UNIT- II

MS-DOS structure, boot sequence: OS files, Command Processor, booting from Flash Hard Disk (HD), warm and cold reboot, Introduction to Windows, history, creation andrunning of application, A tour of windows OS, Basic File system Concepts: Requirement for file system, file: definition, example, types, basic operations on files; Directory: Need for directory, directory structure – child and parent directory, basic operations on directory, file system commands

(10 Hrs)

UNIT-III

Internal and external DOS Commands, Config, Batch and Autoexec.bat Files.Process concepts. Introduction to CPU scheduling: Need for scheduling, FCFS, SJF, SRTF, and Round Robin Scheduling. Context switch, Introduction to Memory Management: Overlays, Paging, Segmentation and Virtual memory concepts.

(12 Hrs)

UNIT- IV

Introduction toUnix/ Linux, Basic shell commands of Unix/Linux, Introduction to Assembler, Linker, Loader, Macro processor, Interpreter, Compiler.

(10 Hrs)

Reference & Text Books

Title	Author	Publisher
Operating System Principles	Silberschatz, Galvin, Gagne	Wiley India Pvt. Ltd.
Operating Systems (A Practical Approach)	Er. Rajiv Chopra	S.Chand
Modern Operating Systems	Andrew S. Tanenbaum	PHI Learning

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T-Dc 23/02/16

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CS 3104 PROGRAMMING METHODOLOGY

L T P
3 1 0

Maximum Sessional Marks: 25
Maximum End Term Examination Marks: 75

UNIT- I

Program & Process, Algorithm and Program Development: Steps in development of a program, Flow Chart,Algorithm Development:Pseudo code and writing Algorithm, Program debugging, Program Structure: I/O statements, assignment statements; variables; arithmetic, logicaland relational operators – their precedence. Data types, standard I/O functions, formatted I/O.Control Statements: for statement, if--else, while, do-while, break, switch statements.
(16 Hrs)

UNIT-II

Functions and Arrays: Function declaration, parameters, parameter passing, call-by-value,call-by-reference, storage classes (local, global and static variables), functionprototype, Single and multi-dimensional arrays, character arrays.
(~~16~~ 10 Hrs)

UNIT-III

Pointers: Introduction to Pointers and Pointers to various data types. Pointer to Function, Pointer to Array
(~~12~~ 08 Hrs)

UNIT-IV

Introduction to Structures: Definition of a structure, pointers to structures, union, arrays of structures, Pre-processor

(~~12~~ 08 Hrs)

Title	Author	Publisher
C in Depth	S.K. Srivastava, Deepali Srivastava	BPB
Let Us C	Y. Kanetkar	BPB
The C Programming Language (ANSI C Version)	Kernighan, Ritchie	PHI Learning
Programming in ANSI C	E. Balaguruswamy	Mc-Graw Hill

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T.Sc 23/02/16

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CS 3202COMPUTER PERIPHERALS & INTERFACING

L T P
3 1 0

Maximum Sessional Marks: 25
Maximum End Term Examination Marks: 75

UNIT – I

Display Devices: Video display EGA/VGA/SVGA/PCI adapters and their architecture. Overview of Raster scan, vector graphic, their main difference and relative advantages. Concept of reduction and bandwidth of monitors refreshing of screen. Explanation of working of monochrome and color monitors.

(14 Hrs) 10

UNIT – II

Printers: Types of printers: impact and non-impact printer; specifications andcharacteristics. Construction and working principles of; Dot matrix printer, Laser Printer.Desk Jet printer & Plotter.

(14 Hrs) 10

UNIT – III

Secondary Memories: Types of secondary memories, Online/offline memories, Online:Hard Disk drives (HDD), Drive parameters (heads, sectors cylinders), seek/latency time,access time, HDD Controller, Off Line: Magnetic tape drive; floppy disk drive (FDD);principle of operation of magnetic tape drive, access time; type of FDD, working principle ofFDD, floppy disk controllers.

Other Devices: Optical Storage Media: CD Drives; Principle of operation and working; CDwriter. Working principle of various input devices such as keyboards, mouse, Scanner,Tablets, touch screen, light pen, digitizers and joystick.

(14 Hrs) 10

UNIT – IV

Power Supply Controllers: Constant Voltage Transformer (CVT); Uninterrupted PowerSupply (UPS) Online / offline/line interactive, principle of working and maintenance, troubleshooting.

(14 Hrs) 12

Title	Author	Publisher
Troubleshooting Electronic Equipment: Includes Repair and Maintenance (English)	R.S. Khandpur	Mc-Graw Hill Education
Inside the PC	Peter Norton	Sams

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CS 3203INTRODUCTION TO DATABASES

L T P **Maximum Sessional Marks: 25**
3 1 0 **Maximum End Term Examination Marks: 75**

UNIT – I

Basic Concepts: Need for data storage and retrieval, Architecture and Structure ofDatabase Management Systems (DBMS). Data independence, Architecture of a Databasesystem, entities, attributes, relationships and their functionality.

(~~14~~ Hrs)
10

UNIT – II

Data Models:Relational Data Model, Network Data Model, Hierarchical Model; Relational Model: Relations, domains, attributes, keys, integrity principles.

(~~14~~ Hrs)
08

UNIT – III

Data Organization: Objectives of data organization, logical and physical organization, Schema, Sub-Schema.

(~~14~~ Hrs)
08

UNIT – IV

Introduction to PL/SQL, Introduction to Normalization: 1NF, 2NF, 3NF, BCNF, forms, views, reports, types queries. Introduction to Concurrency Control in ~~Database~~ DBMS.
(14 Hrs)

Title	Author	Publisher
Fundamentals of Database Systems	R. Elmasri, S. B. Navathe	Pearson
An Introduction to Database Systems	C. J. Date	Pearson

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CS 3204NETWORK OPERATING SYSTEMS

L T P
3 0 0

Maximum Sessional Marks: 25
Maximum End Term Examination Marks: 50

UNIT – I

Introduction to Linux Operating System: History of Linux and UNIX, Linux overview, Linuxreleases, Open Linux. Installing Linux, Hardware, software and information requirements:opening disk space for Linux partitions; creating the open Linux install disks; installing Linux:installing and configuring X-windows; installing sound drivers. Linux Start-up and Setup:User accounts; accessing the Linux system: Linux commands; online manual; onlinedocumentation; installing software packages

(12Hrs)

UNIT – II

Shell: The command line: special characters and file arguments; standard input/ output andredirection; pipes; redirecting and piping with standard errors; shell scripts; jobs.Linux file Structure: Linux files; file structure; listing, displaying and printing files; managingdirectories; file and directory operations.

(10 Hrs)

UNIT – III

vi editor : vi editing commands; advanced vi editing commands; line editingcommands; options in viSystem Administration: Management, managing users; installing and managing devices.

(10 Hrs)

UNIT – IV

Introduction to Windows Network Operating System: Windows network server, its features and capabilities, comparison with other servers, Hardware requirements, Installing Server.

(10 Hrs)

Title	Author	Publisher
Linux: The Complete Reference	Richard Patersen	Mc-Graw Hill Education
System Administration	Pankaj Sharma	S.K. Kataria & Sons

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CS 3205BASIC MATHEMATICS FOR COMPUTER SCIENCE

L T P
3 1 0

Maximum Sessional Marks: 25
Maximum End Term Examination Marks: 75

UNIT – I

Functions: Functions, Composition of Functions, one-one, onto and Inverse of a function, Ordinary Differential Equations: first order, second order and their applications, Partial Differential Equations, Integration by substitution, Integration by parts.Matrices: Determinant, Inverse of a matrix, Eigen value

(~~14~~ 10 Hrs)

UNIT – II

Number Theory: Theory of integers, Divisibility, Modular Arithmetic: congruence and remainders, Multiplicative Inverse, Fermat's theorem, GCD and its properties, Fundamental theorem of Arithmetic, Principle of Mathematical Induction: Different forms of the principle of mathematical induction, Set Theory: Ordered Sets, inductive definition of sets and proof by induction. Relations, Properties of relations, Equivalence Relations andPartitions, Total and Partial order relations,

(~~14~~ 10 Hrs)

UNIT – III

Boolean algebra: Introduction to Boolean algebra and Boolean functions. Different representations of Boolean functions. Application of Boolean functions. Graphs: Definition, path, cycle, sub-graphs, graph isomorphism. Trees, Rooted trees, Adjacency matrices

(~~14~~ 10 Hrs)

UNIT – IV

Discrete Probability: Random experiment, event, sample space, axioms of probability, conditional probability, theorem of total probability, Bayes' theorem, Introduction to Vectors

Solution of a system of linear equations by L-U decomposition, Gauss-Jordan and Gauss-Seidel Methods. Newton's interpolation formulae, Solution of a polynomial and a transcendental equation by Newton-Raphson method, numerical integration by trapezoidal rule, Simpson's rule and Gaussian quadrature, numerical solutions of first order differential equation by Euler's method and 4th order Runge-Kutta method.

12

(~~14~~ 10 Hrs)

Title	Author	Publisher
Higher Engineering Mathematics	B.S. Grewal	Khanna Publishers
Boolean algebra	Prabhat Kr. Choudhary	Anmol Publications Pvt. Ltd.
Discrete Mathematics for Computer Scientists & Mathematician	J L Mott, Abraham Kandel, Theodore P Bekar	PHI Learning
Computer Oriented Numerical Methods	V Rajaraman	PHI Learning

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CS 4102OBJECT ORIENTED PROGRAMMING

L T P
3 1 0

Maximum Sessional Marks: 25
Maximum End Term Examination Marks: 75

UNIT – I

Introduction: Need for object-oriented programming; characteristics of object-orientedlanguages.

C++ Programming Basics: Basic program construction, Pre-processor directives,variables, Operators, Library functions, manipulators.

Decision-making: Relational operators: loops; decisions; logical operators; other controlStatements

(~~14~~ 10 Hrs)

UNIT – II

Structures and Functions: Structure enumerated data types; functions; passingarguments to functions and returning values from functions.
Objects and Classes: C++ objects as physical objects and data types; constructor's data;strings.
Arrays: Arrays fundamentals; arrays of objects; arrays as class member data, Strings.

(~~14~~ 10 Hrs)

UNIT – III

Inheritance and Polymorphism: Derived class and base class; derived class constructors,overriding member functions; class hierarchies; public and private inheritance; levels ofinheritance; multiple inheritance.

Pointers: Addresses and pointers; pointers and arrays; pointers and functions; pointers andstrings; memory management, pointers to objects

(~~14~~ 10 Hrs)

UNIT – IV

Introduction to Streams: Streams, Error Handling.
Virtual Functions: Virtual Function, friend function, Static function, Assignment and copy initialization, this pointer, dynamic type information.

Template: Function templates, Class templates Exceptions

(~~14~~ 12 Hrs)

Title	Author	Publisher
Mastering C++	Venugopal	McGraw Hill Education (India) Private Limited
Object Oriented Programming with C++	E Balagurusamy	McGraw Hill Education (India) Private Limited
C++: The Complete Reference	H. Schildt	McGraw Hill Education (India) Private Limited

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CS 4103VISUAL PROGRAMMING

L T P
3 1 0

Maximum Sessional Marks: 25
Maximum End Term Examination Marks: 75

UNIT – I

Overview of Microsoft .NET Framework, The .NET Framework components, The Common Language Runtime (CLR) Environment, Getting Started with Visual Basic .net IDE : Set up of work environment, start page, the menu system, toolbars, the new project dialog box, graphical designers, code designers, intelligence, the object explorer, the toolbox, the solution explorer, the class view window, the properties window, the dynamic help window, the server explorer, the output window, the command window.

Visual basic language concept: variables, Constants, Data Types, Operators, Control Statementsand loops.

(14 Hrs)

UNIT – II

Arrays: single and multidimensional array, dynamic array; Handling Strings,

Windows Forms: Working with Form: Properties: appearance, behaviour, layout, windows style etc., Common Tool Box Controls: Label & button and their properties, Textbox and its properties, Check Box and its properties, Radio Button and its properties, Group Box and its properties, control and methods and events

(14 Hrs) 10

UNIT – III

Advanced Features: Ritch Text Box, List Box, Combo Box, Picture Box, Progress bar, scroll bar, timer etc., Creating and managing Menus, Dialog Boxes,

Sub Procedures and Functions, Exception Handling

(14 Hrs) 08

UNIT – IV

Inbuilt functions and string manipulation

Introduction to ADO,DAO, Database connectivity with MS Access and Printing. Introductionto Windows API Programming.

(14 Hrs) 08

Title	Author	Publisher
VB.Net Programming	Y. Kanetkar	Kanetkar School Of Embedded Tech. Pvt. Ltd.
Visual Basic 2010 in Simple Steps	Kogent Learning Solutions Inc.	Dreamtech Press
Visual Basic .Net: The Complete Reference	Jeremy Shapiro	McGraw Hill Education (India) Private Limited

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CS 4201BASICS OF DATA COMMUNICATION AND NETWORKING

L T P
4 0 0

Maximum Sessional Marks: 25
Maximum End Term Examination Marks: 75

UNIT – I

Data Communication Principles: Transmission of binary data, simples, halfduplex and full duplex modes, two and four line systems, Bit level data transfer, rate of datatransfer, Byte level data communication, Synchronous communication data transferefficiency , Synchronous communication, start-stop bits, data transfer efficiency, relativeadvantages and disadvantages with synchronous communication, Frame level communication, data packets, address encoding and decoding of data packets, dataencryption and decryption, Serial and parallel data communications, comparison in terms ofspeed of data transfer

Modulation: Need for a modulation in communication systems, Concepts of AM, FM, PM,PAM, FSK, PSK, and PAM, Concepts of bandwidth, noise andchannel capacity of different communication system such as radio, microwave, differenttypes of electrical communication lines, optical fibre systems and issues like linecharacteristics and impedance matching

(~~14~~ 12 Hrs)

UNIT – II

Error Detection: Sources of errors in data communication. Effect of errors, data error rateand its dependency on data transfer rates. Error detection through parity bit, block parity todetect double errors and correct single errors, General principles of error detection andcorrection.

Communication Methods and Standards: One-to-one connection, multidrop lines.Methods of implementation, channel capacities, Multiplexed lines, time division, multiplexingand de-multiplexing Concept of synchronization, synchronization methods.

(~~14~~ 08 Hrs)

UNIT – III

Analog vs Digital Communication, transmission media,transmission errors, error detection and correction, parity check, CRC, hamming code.

Synchronous and Asynchronous systems:serial and parallel communication,
Interface Standards: Introduction to RS-232, RS-232 voltages, data bits, RS-232 signals,RS-232 interconnection, IEEE 488, IEEE b/g/n, UART and USART chips and their working.
Multiplexing and Modulation techniques: Frequency Division Multiplexing, time division, multiplexing, and wavelength division multiplexing, Digital modulation techniques: ASK,FSK, PSK, and QPSK

(~~14~~ 08 Hrs)

UNIT – IV

Networks: OSI model, networks topology, basic network protocols and access, media andphysical interconnection. Local Area networks (LAN), IEEE 802 standards. Packetswitching, message switching and circuit switching. Design issues in data link layers, slidingwindow protocols.
Inter-networking: Introduction to hubs, routers, bridges, gateways.

(14 Hrs)

Title	Author	Publisher
Data Communications & Networking	B.A. Forouzan	McGraw Hill Education (India) Private Limited
Computer Networks	Tenenbaum	Pearson

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CS 4201NETWORK SECURITY

L T P
3 0 0

Maximum Sessional Marks: 25
Maximum End Term Examination Marks: 50

UNIT – I

Why secure network, Attackers Vs Hackers, Attack from internal and external network. Howmuch Security, Performing Risk analysis, Developing security policy, Accessibility, Definingsecurity units. Justify the policy, Level of privacy, Virus, Trojans, Worms, malware, spyware etc., What is virus,replication, concealment, bomb, social engineering viruses, Worms, Trojan horses,Preventive measures, access central, checksum verification, process monitoring, virusscanner.

(12 Hrs)

UNIT – II

Firewalls: Defining and access central policy, Definition of firewalls and types, Firewalls. (Unix/ NT). Address translation, Firewall logging, Firewall Development, Intrusion detectionsystem. IDS introduction, IDS limitations, Teardrops attack, Host based IDS setup.

(12 Hrs)

UNIT – III

Authentication and Encryption: a) Authentication: Clear text transmission, Session hijackingb) Encryption: Methods, Weaknesses, Government intervention, c) Solutions: Dataencryption standards. Digital certificate servers, IP Security, Secure Socket Layer (SSL)

(10 Hrs)

UNIT – IV

Introduction to VPN (Virtual Private Network), Disaster, Prevention and Recovery, Disastercategories. Network disasters.

(08 Hrs)

Title	Author	Publisher
Network Security First Step	D Stoddard, Tom Thomas	Perason India
Network Security A Beginners' Guide	Maiwald	Mc-Graw Hill

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CS 4202PC ORGANIZATION

L T P
3 0 0

Maximum Sessional Marks: 25
Maximum End Term Examination Marks: 50

UNIT – I

Introduction: Salient features and block diagram of 486, Pentium MMX and Pentium-II, Pentium-III, Pentium-IV and Intel core series CPU

Hardware Organization of PC: The motherboard of PC; Pentium CPU, memoryorganization, keyboard interfacing, interfacing of audio speakers, serial and parallel ports

(12 Hrs)

UNIT – II

Bus Standards and architectures: ISA,EISA, VESA, and PCI , USB, FireWire,
Interface Standards: RS232,RS-422, RS-423,IDE,EIDE,SCSI-II, fast and wide SCSI, IEEE 488

(10 Hrs)

UNIT – III

The Basic Input Output System: BIOS? Function of BIOS, software interrupts, testing andinitialization, configuring the system

Introduction to RISC Processors: What is RISC technology? Different RISC processors available

(10 Hrs)

UNIT – IV

Introduction: Bus Architectures and Mini computers, VME and Multi bus, Architectures ofmultiprocessor system

(10 Hrs)

Title	Author	Publisher
Hardware & Software of Personal Computers	Bose, Sanjay K	New Age International
Computer Fundamentals: Architecture & Organization	B Ram	New Age International
Computer Peripherals & Interfacing	Priti Srivastava	Ishan Publisher

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T-De 23/02/16

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CS 4203SYSTEM SOFTWARE

L T P
3 1 0

Maximum Sessional Marks: 25
Maximum End Term Examination Marks: 75

UNIT – I

Introduction: System software and programming. Basic concepts of machine structure andlanguage. assembly language, single pass and two pass assembler, general designprocedure of an assembler (14 Hrs)

UNIT – II

Macro-processor and macro language: Features of macro facility, Editor, various types ofeditors and their features (10 Hrs)

UNIT – III

Overview: Compilers, various phases of a Compiler and their functions (10 Hrs)

UNIT – IV

Introduction : Linker, Loader. (08 Hrs)

Title	Author	Publisher
System programming	JJ Donovan	Mc-Graw Hill
Software Engineering	R Pressman	Mc-Graw Hill

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