

# **FOOD PROCESSING & PRESERVATION**

**PROPOSED COURSE STRUCTURE FOR  
FOOD PROCESSING & PRESERVATION**

**First Semester (July/August –December)**

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional Theory	Th. Exam	Practical	Total
1	AC 1101	Applied Chemistry	2	1	3	25	50	75	150
2	AM 1101	Applied Maths-I	3	2	0	25	100	-	125
3	AP 1101	Applied Physics-I	2	1	3	25	50	75	150
4	AE 1101	Fundamentals of Engineering	2	1	4	25	50	100	175
5	FT 1101	Introduction of Food Science & Technology	2	0	3	25	25	75	125
6	CS 1101	Computer Fundamentals Lab.	0	0	3	-	-	75	75
<b>TOTAL</b>			<b>11</b>	<b>6</b>	<b>15</b>	<b>125</b>	<b>300</b>	<b>375</b>	<b>800</b>

**Second Semester (January to May)**

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional Theory	Th. Exam	Practical	Total
1	AC 1201	Chemistry & Environmental Science	3	0	3	25	50	75	150
2	AM 1201	Applied Maths-II	3	2	0	25	100	-	125
3	AP 1201	Applied Physics-II	2	1	3	25	50	75	150
4	FT 1201	Post-Harvest Technology	2	0	3	25	25	75	125
5	HU 1201	Communication Skills	1	2	0	25	50	-	75
6	ME 1201	Engineering Drawing	0	0	3	-	-	75	75
7	ME 1202	Workshop Practice	0	0	4	-	-	100	100
<b>TOTAL</b>			<b>11</b>	<b>5</b>	<b>16</b>	<b>125</b>	<b>275</b>	<b>400</b>	<b>800</b>

**Third Semester -- A : Industrial Training ( June -- August )**

**Third Semester – B: (August –December)**

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional Theory	Th. Exam	Practical	Total
1	FT 2101	Principle of Food Processing &	2	0	4	25	25	100	150
2	FT 2102	Technology of Fruits & Vegetables	2	0	4	25	25	100	150
3	FT 2103	Technology of Milk & Milk Product	2	0	4	25	25	100	150
4	FT 2104	Elementary Food Analysis	2	0	4	25	25	100	150
5	HU 2101	Entrepreneurship Development	2	0	0	25	25	-	50
6	FT 2105	Computer Application in Food Technology Lab	0	0	4	-	-	100	100
<b>TOTAL</b>			<b>12</b>	<b>4</b>	<b>14</b>	<b>100</b>	<b>300</b>	<b>350</b>	<b>750</b>

**Fourth Semester (January to May)**

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional Theory	Th. Exam	Practical	Total
1	EE 2201	Electrical Measurements And Instrumentation-II	3	0	2	25	50	50	125
2	EE 2202	Non-conventional energy Sources	3	0	2	25	50	50	125
3	EE 2203	Electrical Machines-2	3	0	2	25	50	50	125
4	HU 2201	Entrepreneurship Development Programme	2	0	0	25	25	-	50
5	EE 2204	Trouble shooting of Electrical Equipments	0	0	6	-	-	150	150
6	EE 2205	Electrical safety & Hazards	3	0	2	25	50	50	125
7	CS 2205	Computer Application Lab	0	0	4	-	-	100	100
<b>TOTAL</b>			<b>14</b>	<b>0</b>	<b>18</b>	<b>125</b>	<b>225</b>	<b>450</b>	<b>800</b>

## EM -1101 FUNDAMENTALS OF ENGINEERING

**L T P**  
**2 1 4**

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

### UNIT - I

Definition of Voltage, Current, Power, Energy etc. with these units. Differences between AC and DC Various application of electricity, Advantage of Electrical energy over other type of energy. Distinction between single phase and three phase, Name the different instruments used to measure voltage, Current and energy, Pictorial diagram of a three phase transmission and distribution system. Brief function of following accessories transformer, supports, conductors and insulators. (13 Hrs.)

### UNIT - II

Various accessories and parts of installation and identification of different wiring systems. Different types of circuit like circuit to control one lamp with one switch, circuit to control one lamp with two way switch, circuit to control one lamp, fan and 3 pin outlet socket by single way switch, circuit to control the three phase motor. Purpose of Earthing, Different method of earthing. Other safety precautions while working on electrical equipment. Principle construction and working of AC and DC motors, Introduction to different types of motors i.e. single phase, three phase, various application of single and three phase motors, Distinctions between single and three phase motors. (12 Hrs.)

### UNIT - III

Transmission of power through belt, rope drives and pulleys and their applications, chain drive and its comparison with belt drives, Gear drives type of Gears, Simple gear trains and velocity ratio.

Classification and application of IC engines, working principles of two stroke, four stroke petrol and diesel engines, cooling system and lubrication of IC engines, General maintenance of engines. (15 Hrs.)

### UNIT - IV

Basic principles of refrigeration and air conditioning. Working of centralized air conditioning, concept of split air conditioning and its application.

General Idea of raw material used for construction, introduction to different construction techniques. Properties and uses of Brick, lime cement and timber.

Brief idea about the different types of foundation, concrete proportions, mixing water ratio, RCC and its uses (Elementary idea only)

#### **Instruction strategy:**

While imparting instructions, teachers are expected to lay more emphasis on the concepts and principles. It will be better if the classes for the general engineering.

**FT - 1101 INTRODUCTION TO FOOD SCIENCE AND TECHNOLOGY**

**L T P**  
**2 0 3**

**Sessional Marks : 25**  
**End Term Examination Marks : 25**

**UNIT - I**

Introduction : Definition of food science and food technology ; present status of food industry in India ; importance of food in diet ; sources of plant and animal food in India - their production and extent of post-harvest losses. (8 Hrs.)

**UNIT - II**

Classification of food : Classification of food on the basis of origin -- plant, animal, marine, functions physiological, psychological, social ; nutrients - energy giving, body building, regulatory ; pH- low acid, medium acid and high acid foods ; and storage -- highly perishable, semi-perishable and nonperishable. (8 Hrs.)

**UNIT - III**

Food composition and uses: Cereals, Fruits and Vegetables, Milk and Milk products, Egg, Meat and Fish; Macro and micro constituents of food; nutritional status of various foods. (6 Hrs.)

**UNIT - IV**

Physico - chemical properties of food: Colloids, Osmosis, Emulsions, Foams, Hydrogen ion concentration (pH), Acidity, Water activity. (05 Hrs.)

Preservation : Causes of food spoilage ; principals and methods of food preservations ( an overview) (05 Hrs.)

**Recommended books :**

<b>Authors</b>	<b>Title</b>	<b>Publishers</b>
Desrosier	Introduction to food science	CBS
Potter	Food science	CBS
W.C. Frazier	Food microbiology	TMH
Fennema, Kerrel	Principles of food preservation	Marcel Dekkar

**FT - 1201 POST HARVEST TECHNOLOGY**

**L T P**  
**2 0 3**

**Sessional Marks : 25**  
**End Term Examination Marks : 25**

**UNIT - I**

**Introduction :** Physical properties of food material like size, shape, density, specific gravity, thousand kernel weight, bulk & true density and their importance. (04 Hrs.)

**Material Handling:** Material handling equipment like belt conveyer, screw conveyor, pneumatic conveyor, bucket elevator. (06 Hrs. )

**UNIT - II**

**Cleaning , Sorting and Grading :** Types of contaminants; Methods of cleaning : Dry and wet cleaning; Sorting and grading of various food materials ; an overview of different types of sorters and graders based on weight, size, shape and density. (04 Hrs.)

**UNIT - III**

**Drying :** Basic concepts of drying; types of water in food materials, purpose and overview of different methods of drying; various types of dryers-tray drier, fluidized bed drier, drum drier, spray drier, freeze drier. (06 Hrs.)

**UNIT - IV**

**Size Reduction :** Purpose and general principals of size reduction, size reduction equipments: compress rolls, hammer mills, Disc mill, ball mills and homogenizers. (04 Hrs.)

**Storage :** Importance of storage; Basic factors affecting the storage of perishable and non-perishable food materials; storage structures for fruits and vegetables like cold store and storage structures for grains like steel bin, aluminum bin, cement masonry bin and godown (an overview)

**RECOMMENDED BOOKS :**

<b>Authors</b>	<b>Title</b>	<b>Publishers</b>
Chakraborty, A.	Post harvest technology of cereal, pulses & oilseeds	Oxford & IBH
Singh and Sahay	Unit operations in Agril processing	Vikas Pub
P. Fellow	Food Processing	Wood head Pub

### THIRD SEMESTER

#### FT - 2101 PRINCIPLES OF FOOD PROCESSING AND PRESERVATION

L T P

2 0 4

Sessional Marks : 25

End Term Examination Marks : 25

#### UNIT - I

**Scope and Trends in Food Industry :** Definition of food, food science, food technology and food preservation; Importance of food processing and preservation; Classification of foods on the basis of shelf life, pH, origin; Different types of food spoilage viz. microbiological, enzymatic, chemical and physical and their effects on food quality. (08 Hrs.)

#### UNIT - II

**Low Temperature Preservation :** Low temperature required for different foods Refrigeration, slow and fast freezing, freezing process; Types of freezer and their advantages and disadvantages; Storage and thawing of frozen food. (08 Hrs.)

#### UNIT - III

**High Temperature Preservation :** Canning: Definition advantages and disadvantages; can formation; Unit operations in canning: selection of raw material, peeling / coring, blanching, filling, brining / syruping, exhausting, sealing, processing, cooling, labeling and storage. (08 Hrs.)

#### UNIT - IV

**Moisture Removal :** Drying and dehydration methods-solar, cabinet, Tray and drum. (04 Hrs.)  
Chemical preservatives in food preservation. (02 Hrs.)  
Radiation preservation of foods . (02 Hrs.)

#### RECOMMENDED BOOKS :

Authors	Title	Publishers
Desrosier	Technology of food preservation	CBS
Fennema. Karrel	Principles of Food Science Vol - I	AVI

L T P  
2 0 4

Sessional Marks : 25  
End Term Examination Marks : 25

**UNIT - I**

**Introduction :** Difference between fruits and vegetables; Classification of fruits and vegetables; Food standards and Laws; Specifications for various raw and processed food products.  
(07 Hrs.)

**UNIT - II**

**Extraction of Fruit Juice / Pulp :** Selection of raw material, crushing, grating / pulping, pressing, filtration, clarification and preservation of fruit juice / pulp, packaging material requirements for fruits and vegetable processed food.  
(08 Hrs.)

**Fruit Products :** Definition, Flow Sheet and brief description of each step in the preparation of RTS, Squash, cordial, Crush, jam, Jelly, Marmalades, Preserves, Candies, Fruit bar.  
(07 Hrs.)

**Vegetable Products :** Flow sheets and brief description of tomato products ( soup, sauce, ketchup, puree, pasta ), pickles and chutney, canned, dried and chemically preserved vegetable products.  
(10 Hrs.)

**RECOMMENDED BOOKS :**

<b>Authors</b>	<b>Title</b>	<b>Publishers</b>
Girdhari Lal		
Sidappa and Tandon	Fruits and Vegetables preservation	ICAR, New Delhi
Srivastava	Technology of Fruits and Vegetables	



L T P  
2 0 4

Sessional Marks : 25  
End Term Examination Marks : 25

**UNIT - I**

**Introduction :** Scope and status of dairy industry in India; definition of milk, market milk and composition; Physico- chemical properties of milk; milk procurement and pricing pattern in Indian dairy plants. (08 Hrs.)

**UNIT - II**

**Milk reception operations :** Unloading, grading, weighing, testing, platform tests. (03 Hrs.)

**Liquid milk processing :** Receiving, clarification, standardization, homogenization, pasteurization, filling, storage and distribution. (05 Hrs.)

**UNIT - III**

**Special milks :** Flow sheet of sterilized, flavoured, toned, double toned, skimmed, condensed and evaporated milks. (06 Hrs.)

**UNIT - IV**

**Milk products :** Flow sheet for the manufacturing of butter, milk powder and ice cream. (07 Hrs.)

**Traditional milk products :** Khoa, Paneer, Sri-khand, Lassi, Desi ghee, Dahi, Chhana Misti Dahi & Kulfi. (05 Hrs.)

**RECOMMENDED BOOKS :**

<b>Authors</b>	<b>Title</b>	<b>Publishers</b>
Su Kumar De	Outlines of Dairy Technology	Oxford
Lampart	Dairy products	Tata McGraw Hill

**FT - 2104      ELEMENTARY FOOD ANALYSIS**

**L T P  
2 0 4**

**Sessional Marks : 25  
End Term Examination Marks : 25**

**UNIT - I**

**Introduction** : Definition of Food Analysis, Food quality, Types of food analysis and basic criteria; Food adulteration : Definition, types, purpose of food adulteration, a basic concept. (04 Hrs.)

**Adulteration Detection in Fats And Oils** : Types of adulterants in fats and oils; organoleptic evaluation of fats and oils; tests for the detection of argemone oils, castor oil, oil soluble coal tar dyes, presence of sesame oil, tests for mineral oil, mustard oil in other oils. (06 Hrs.)

**UNIT - II**

**Adulteration Detection in Milk and Milk Products** : Detection of water, neutralizers, preservatives, stabilizers, skim milks addition, metallic; metallic yellow in ice-cream and milk based sweets ; rancid stuff, synthetic colouring in ghee. (08 Hrs.)

**UNIT - III**

**Adulteration Detection in Cereal Pulses and Oils Seed and Their Products** : Extraneous sand and silica in atta, sugi, maida; Metanil yellow in pulses; rancidity in biscuits; kesari dhal in pulses / Besan ; lead chromate in pulses; excessive sand and chalk powder in wheat flour.(09 Hrs.)

**UNIT - IV**

Adulteration Detection in Spice , condiments and plantation products : (05 Hrs.)

**RECOMMENDED BOOKS :**

<b>Authors</b>	<b>Title</b>	<b>Publishers</b>
M. Swarninathan	Food Science Chemistry and Experimental Food PFA Rule Book Quality Control lab manual	Bappco AIFOA New Delhi

**FT - 2101      ENTREPRENEURSHIP DEVELOPMENT PROGRAMME**

**L T P**  
**2 0 0**

**Sessional Marks : 25**  
**End Term Examination Marks : 25**

**UNIT - I**

Introduction to entrepreneurship, Meaning, Concept, Scope of entrepreneurship, qualities of an entrepreneur, problems faced by Indian entrepreneurs, Role of banks & financial institutions in the development of small scale industries. (07 Hrs.)

**UNIT - II**

Communication, Communication process, Barriers to effective communication and communication channels, Effective communication, Motivation, Meaning, Motivating and demotivating factors, Abraham Maslow's need hierarchy model, Theory X & Theory Y of motivation. (06 Hrs.)

**UNIT - III**

Marketing management & Marketing Mix, Leadership and qualities of a successful leader. (08 Hrs.)

**UNIT - IV**

Responsibilities of Professional Manager, Basic functions of Management viz planning, organizing directing & controlling (08 Hrs.)

**RECOMMENDED BOOKS :**

<b>Title</b>	<b>Author / Publishers</b>
Management	Stephen P. Robbins, Mary (Pearson education Asia )
Entrepreneurship New venture creation	David H.Holt, PHI
Entrepreneurship & small Business management	Nicholas, Siropholis, Houghton Mifflin Company, Boston-Newyork
Entrepreneurship development of India	C.B. Gupta / Sultan chanda & sons

**FT - 2201      FUNDAMENTALS OF FOOD MICROBIOLOGY**

**L T P**  
**2 0 3**

**Sessional Marks : 25**  
**End Term Examination Marks : 25**

**UNIT - I**

**Introduction : Classification of living system :** Whittaker's five Kingdom concept, Definition of Microbiology ; Historical developments in Microbiology. (05 Hrs.)

**Classification of microorganisms :** Unicellular; Multicellular; Prokaryotes; Eukaryotes, Cell and cell organelles : ribosome, mitochondria, endoplasmic reticulum, vacuoles etc. (05 Hrs.)

**UNIT - II**

**Bacteria :** Cell - structure, size & shapes ; Types depending upon different requirements, Gram positive and negative bacteria; Mode of reproduction. (07 Hrs.)

**UNIT - III**

**Fungi :** Cell structure of yeasts and moulds; distinguishing characteristics of fungi, importance of fungi (06 Hrs. )

**UNIT - IV**

**Food microbiology :** An overview; food poisoning and food borne infections : an introduction ; Permissible limits of counts of different microorganisms in natural and processed foods and importance (09 Hrs.)

**RECOMMENDED BOOKS :**

<b>Authors</b>	<b>Title</b>	<b>Publishers</b>
Michal. J Pleczer	Basic Food Microbiology	Champen and Hall
W.C. Frazier	Food Microbiology by	Tata McGrae Hill
James M. Jay	Modern Food Microbiology	CBS

**FT - 2202 FOOD GRAIN PROCESSING TECHNOLOGY**

**L T P**  
**2 0 3**

**Sessional Marks : 25**  
**End Term Examination Marks : 25**

**UNIT - I**

**Introduction :** Importance of cereals, pulses and oilseeds in human nutrition; structure and composition of selected cereals, pulse and oilseeds. (06 Hrs.)

**Wheat :** Types of wheat ; traditional and modern methods of wheat milling ( an overview ); wheat milling products - whole wheat flour ( Atta ), wheat flour ( Maida ), semolina, wheat germ. bran. (06 Hrs.)

**UNIT - II**

**Rice :** Types of rice; Paddy parboiling ( concept, advantages , disadvantages ) milling of paddy ; milling products - head broken and brewers rice, rice husk, rice bran. (06 Hrs.)

**Maize :** Types of maize; milling of corn ( an overview ); milling products and uses (05 Hrs.)

**UNIT - III**

**Milling of Pulses :** Traditional milling methods ( dry and wet milling ); Modern milling methods (CFTRI and Pantnagar ); Advantages and disadvantages of these methods. (11 Hrs.)

**UNIT - IV**

**Oilseed Processing :** Pre-treatments of raw material; Mechanical oil extraction methods- Ghani and Oil Expeller; Flow sheets for extraction of cottonseed rapeseed / mustard, groundnut , sunflower and soybean oil ; Brief description of various oil refining steps; Introduction to hydrogenation (12 Hrs.)

**RECOMMENDED BOOKS :**

<b>Authors</b>	<b>Title</b>	<b>Publishers</b>
RL Kent	Cereal Technology	AVI
A Chakraverty	Post harvest Technology of Cereals Pulses and Oil Seeds	Oxford and IBH EIRE Board
	Hand Book of Oils , Fat & Derivatives with Refining and Packaging Technology	EIRI

**FT - 2203      BAKERY AND CONFECTIONERY TECHNOLOGY**

**L T P**

**Sessional Marks : 25**

**2 0 3**

**End Term Examination Marks : 25**

**UNIT - I**

**Introduction :** Definition of bakery products ; Raw materials for bakery products and their functions in bread, biscuits, cake, pastry, buns and traditional products (10 Hrs.)

**UNIT - II**

**Bakery Products :** Flow sheet with brief description of bakery products (i) Bread (ii) Buns (iii) Bread rolls (iv) Biscuits (v) Cakes (vi) Rusks (vii) Pastries (viii) Traditional bakery products (10 Hrs.)

**UNIT - III**

**Confectionery products :** Flow diagram and brief description of hard boiled candies and fruit peel candies (08 Hrs.)

**Packaging materials :** Packaging types, requirements and materials. (06 Hrs.)

**Hygiene Practices :** Importance of hygiene in bakery plants, various cleaning agents and disinfectants (04 Hrs.)

**UNIT - IV**

**Machinery and Equipments :** Bakery equipments ( Sieves , mixers, dough divider, moulder sheeter, proofing chamber, oven , cooling chamber . (10 Hrs.)

**RECOMMENDED BOOKS :**

<b>Authors</b>	<b>Title</b>	<b>Publishers</b>
SB Arora	Hand Book of Bakery Products	SIRI
Matz	Bakery Technology and Engineering	AVI

**FT - 2204 TECHNOLOGY OF MEAT, FISH AND POULTRY**

**L T P**

**2 0 3**

**Sessional Marks : 25**

**End Term Examination Marks : 25**

**UNIT - I**

**Introduction** : Definition status and scope of meat, fish and poultry processing industry in India  
(04 Hrs.)

**Egg** : Structure and composition; egg quality; preservation and storage (05 Hrs. )

**UNIT - II**

**Meat** : Sources of meat ; structure , types and composition of muscle, connective tissues, conversion of muscle into meat, postmortem changes (09 Hrs.)

**UNIT - III**

**Properties** : of fresh meat & its preservation : Color characteristics, curing, smoking, freezing, canning and pickling. (09 Hrs.)

**UNIT - IV**

**Poultry** : Kind of poultry, different types of slaughtering methods; singeing; evisceration; washing; cooling and storage ( 05 Hrs. )

**Fish** : Classification of fishes; composition, processing, preservation and spoilage of fresh fish (04 Hrs. )

**RECOMMENDED BOOKS :**

<b>Authors</b>	<b>Title</b>	<b>Publishers</b>
Lawries	Meat Science	CBS
Stadelman	Egg Science and Technology	
Borgstron	Fish as Food Vol. I to IV	AP

## FT - 2205 TEA PROCESSING TECHNOLOGY

L T P  
2 0 3

Sessional Marks : 25  
End Term Examination Marks : 25

### UNIT - I

**Introduction:** Botanical description, classification of tea, scope and status of tea industry in India; Production figure in India and the world. (04 Hrs.)

**Tea cultivation:** Planning, site selection, suitability of land, design layout and stacking and planting techniques. Climatic condition requirement and its effect on cultivation tea leaf. (06 Hrs.)

### UNIT - II

**Processing of Black Tea:** Quality analysis of green leaf, Ballmeter method, principle stages of processing (06 Hrs.)

**Withering:** introduction and objectives (03 Hrs.)

**Orthodox Manufacture, Unorthodox Manufacture:** Leaf conditioning, CTC Process (03 Hrs.)

### UNIT - III

**Fermentation:** introduction and objective of fermentation, Biochemical changes during the fermentation, method of fermentation (03 Hrs.)

#### **Drying:**

Objective of drying, theory of drying, factors consideration during drying, sorting and grading, storage and packaging. (07 Hrs.)

### RECOMMENDED BOOKS:

Authors	Title	Publishers
Manoy and Swamy	Foods : Facts & Principle	New Age Intl.
Potter and Hotchkiss	Food Science	CBS
M. Swaminathan	Experimental Food	Bappco



**FT - 2206 FOOD BEVERAGES TECHNOLOGY**

**L T P  
2 0 3**

**Sessional Marks : 25  
End Term Examination Marks : 25**

**UNIT - I**

**Water for beverages:** Potable water quality parameters; treatment of water for beverages industry; Microbiological status; Water standards for beverages; Mineral water -- Specification, processing and packaging. (08 Hrs.)

**UNIT - II**

**Carbonated non-alcoholic beverages:** General methods of preparation and inspection; Chemical composition and nutritive value; Functions of ingredients used in these beverages; Bottling and packaging of soft drinks (07 Hrs.)

**UNIT - III**

**Coffee and Tea Processing :** History, area in India under production coffee and tea types, Production practices, Flow diagram for the processing of tea and coffee (07 Hrs.)

**Introduction to alcoholic beverages:** Different types of alcoholic beverages and flow diagram for their manufacturing (10 Hrs.)

**RECOMMENDED BOOKS:**

<b>Authors</b>	<b>Title</b>	<b>Publishers</b>
Potter and Hotchkish	Foods Science	New Age Intl.
M. Swarninathan	Food Science chemistry and Experimental Food	Bappco
Ashurst	Chemistry and Technology of Sheffield Soft Drinks and Fruit Juices	Academic Press

# **SERVICING AND MAINTENANCE OF ELECTRICAL APPLIANCES**

**PROPOSED COURSE STRUCTURE FOR  
SERVICING AND MAINTENANCE OF ELECTRICAL APPLIANCES**

**First Semester (July/August –December)**

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional Theory	Th. Exam	Practical	Total
1	AC 1101	Applied Chemistry	2	1	3	25	50	75	150
2	AM 1101	Applied Maths-I	3	2	0	25	100	-	125
3	AP 1101	Applied Physics-I	2	1	3	25	50	75	150
4	AE 1101	Fundamentals of Engineering	2	1	4	25	50	100	175
5	EE 1101	Electrical circuit theory	2	1	2	25	50	50	125
6	CS 1101	Computer Fundamentals Lab.	0	0	3	-	-	75	75
<b>TOTAL</b>			<b>11</b>	<b>6</b>	<b>15</b>	<b>125</b>	<b>300</b>	<b>375</b>	<b>800</b>

**Second Semester (January to May)**

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional Theory	Th. Exam	Practical	Total
1	AC 1201	Chemistry & Environmental Science	3	0	3	25	50	75	150
2	AM 1201	Applied Maths-II	3	2	0	25	100	-	125
3	AP 1201	Applied Physics-II	2	1	3	25	50	75	150
4	EE 1201	Electrical Measurements And Instrumentation-I	2	0	3	25	25	75	125
5	HU 1201	Communication Skills	1	2	0	25	50	-	75
6	ME 1201	Engineering Drawing	0	0	3	-	-	75	75
7	ME 1202	Workshop Practice	0	0	4	-	-	100	100
<b>TOTAL</b>			<b>11</b>	<b>5</b>	<b>16</b>	<b>125</b>	<b>275</b>	<b>400</b>	<b>800</b>

**Third Semester (July/August –December) –A: Industrial Training (June –August)****Third Semester – B: (August –December)**

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional Theory	Th. Exam	Practical	Total
1	EE 2101	Electrical Machines-1	3	1	2	25	75	50	150
2	EE 2102	Electrical power System	3	1	2	25	75	50	150
3	EE 2103	Analog & Digital Electronics	3	1	2	25	75	50	150
4	EE 2104	Electrical Estimation & Costing	3	1	0	25	75	-	100
5	EE 2105	Electrical Drawing	0	0	2	-	-	50	50
6	EE 2106	Electrical Workshop Practice	0	0	6	-	-	150	150
<b>TOTAL</b>			<b>12</b>	<b>4</b>	<b>14</b>	<b>100</b>	<b>300</b>	<b>350</b>	<b>750</b>

**Fourth Semester (January to May)**

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional Theory	Th. Exam	Practical	Total
1	EE 2201	Electrical Measurements And Instrumentation-II	3	0	2	25	50	50	125
2	EE 2202	Non-conventional energy Sources	3	0	2	25	50	50	125
3	EE 2203	Electrical Machines-2	3	0	2	25	50	50	125
4	HU 2201	Entrepreneurship Development Programme	2	0	0	25	25	-	50
5	EE 2204	Trouble shooting of Electrical Equipments	0	0	6	-	-	150	150
6	EE 2205	Electrical safety &	3	0	2	25	50	50	125
7	CS 2205	Computer Application Lab	0	0	4	-	-	100	100
<b>TOTAL</b>			<b>14</b>	<b>0</b>	<b>18</b>	<b>125</b>	<b>225</b>	<b>450</b>	<b>800</b>

## FIRST SEMESTER

AC-1101      APPLIED CHEMISTRY

L T P

2 1 3

Sessional Marks: 25

End Term Exam Marks: 50

### UNIT - I

**Structure of an Atom :** Recapitulation of fundamental particles of atom (e,p,n), e = electron; p=proton, ; n=neutron, Atomic number, Mass number, Bohr's model of atom, Line spectrum of hydrogen, Modern concept of atom, quantum numbers, shells, sub-shells, orbitals (shapes of s and p orbitals), Pauli's exclusion principle, Aufbau Energy ranking rule, Hund's rule. (6 Hrs.)

**Periodic Table :** Modern periodic table, periodic properties (ionization potential, electron affinity, atomic and ionic radii)

(4 Hrs.)

### UNIT - II

**Chemical Arithmetic :** Mole concept, Empirical formula, Molecular formula

(2 Hrs.)

**Oxidation and Reduction:** Electronic concept of oxidation and reduction, Redox reactions (direct and indirect), Balancing of simple redox reactions (oxidation number method and ion electron method)

(3 Hrs.)

**Chemical Bonding :** Types of chemical bond (ionic, covalent, co-ordinate), Lewis structure, VSEPR theory, orbital concept of co-valency, formation of s-s, s-p, and p-p bonding with examples, Hybridization - sp, sp<sup>2</sup>, sp<sup>3</sup> (BeF<sub>2</sub>, BF<sub>3</sub>, CH<sub>4</sub>, H<sub>2</sub>O, NH<sub>3</sub>), Intermolecular forces (Vander waal forces, Hydrogen bond), Metallic bond.

(6 Hrs.)

### UNIT - III

#### Electrochemistry - I

Conductance (specific, molar & equivalent conductance), Electrolysis, Faraday's laws and their applications.

(4 Hrs.)

#### Electrochemistry – II

Electrochemical cell, type of electrodes, electrode potential and EMF, electrochemical series and its applications, effect of concentration on cell potential (Nernst equation), relationship of the cell potential and the equilibrium constant.

(6 Hrs.)

### UNIT – IV

**Chemical Equilibrium:** Law of Chemical equilibrium, Le chatelier principle, Ionization, factors affecting ionization of water, Ionic product, pH concept, Common Ion effect and solubility product, Concept of acids and bases (Arrhenius, Bronsted-Lowery, Lewis), Acid Base equilibrium, Buffer solutions. (6 Hrs.)

**Chemical Energetics:** Energy changes in chemical reactions, enthalpy changes, Heats of reactions and thermochemistry, Hess's law of constant heat summation, elementary idea about entropy and free energy.

(5 Hrs.)

#### Recommended Books:

Chemistry for class XI and XII, published by NCERT

## AM-1101 APPLIED MATHEMATICS-I

**L T P**  
**3 2 0**

**Sessional Marks: 25**  
**End Term Exam Marks:100**

### UNIT-I

Introduction to trigonometric formulas. Trigonometric ratios of multiple and sub-multiple angles (2A, 3A, A/2). Product formulae, conversion from sum or difference to product and vice-versa (without proof). Solutions of simple trigonometric equations. Inverse trigonometric functions and their properties. Permutation and combinations, elementary problems. Principle of mathematical Induction. (14 Hrs.)

### UNIT-II

Binomial theorem for positive integral index (without proof) and for any index (without proof), general and particular terms, first and second binomial approximation, simple problems. Complex number in the form of  $a+ib$ , Argand diagram, polar form, algebra of complex numbers, modulus and argument of a complex number, square root of a complex number, cube root of unity, triangle inequality, De-Moivre's theorem (without proof) and simple problems. (16 Hrs.)

### UNIT-III

Review of distance formula and section formula, equation of straight line in various standard forms, intersection of two straight lines, angle between two lines, condition of parallelism and perpendicularity, perpendicular distance formula. General equation of a circle, diameter form, centre and radius of a circle, circle through three non-collinear points, tangent and normal to a circle at a given point on it, condition of tangency. (13 Hrs.)

### UNIT-IV

Introduction to conic section, standard equation of parabola, ellipse and hyperbola (without proof), writing equations when directrix, focus and eccentricity are given; finding focus, directrix, latus-rectum, axes, eccentricity and vertex when equation is given. Arithmetic progression, geometric progression, arithmetico-geometric series. Special series:  $\sum n$ ,  $\sum n^2$ ,  $\sum n^3$ . (13 Hrs.)

### RECOMMENDED BOOKS

#### Text Book

Text books on Mathematics for XI, NCERT, New Delhi

#### Reference Books

Shanti Narayan, Coordinate Geometry, S. Chand and Co.  
Thomas & Finney, Calculus, Pearson Education

**UNIT-I**

**UNITS AND MEASUREMENTS:** Need for measurements, system of units, S.I. units, fundamental and derived units. Dimensional formula, dimensional equations and their applications. Error in Physical measurements-causes & types. Combination of errors (qualitative ideas). Numerical Problems (4 Hrs.)

**VECTOR ANALYSIS:** Scalars and vectors, vectors in two and three dimensions, unit vector, laws of vector addition, Resolution of a vector in a plane, rectangular components, scalar and vector products. Numerical Problems (6 Hrs.)

**UNIT-II**

**DESCRIPTION OF MOTION:** Motion in a straight line, uniform motion, speed and velocity, equations of motion, instantaneous velocity and acceleration. Motion in two dimensions, projectile motion, uniform circular motion, qualitative concepts of torque, angular momentum, conservation of angular momentum, centripetal and centrifugal forces. Numerical Problems (6 Hrs.)

**LAWS OF MOTION:**

Force and inertia, first law of motion, momentum, second law of motion, impulse, third law of motion, conservation of linear momentum, qualitative concepts of rocket propulsion. Friction and its cause, Static and kinetic friction, self-adjusting nature of friction, laws of limiting friction, rolling friction, angle of friction and angle of repose, methods to reduce friction. Numerical Problems (6 Hrs.)

**UNIT-III**

**WORK, POWER AND ENERGY:** Work and its scalar representation, Work done by a constant force, kinetic and potential energy, conservation of energy (free fall motion of a body), Power. Numerical Problems (6Hrs.)

**GRAVITATION:** Universal law of gravitation, Inertial and gravitational mass, relation between 'g' and 'G', variation of acceleration due to gravity (with altitude and depth), orbital velocity, escape velocity, elementary ideas of geo-stationary satellite. Numerical Problems (4 Hrs.)

**UNIT-IV**

**SIMPLE HARMONIC MOTION:** Periodic motion, simple harmonic motion (S.H.M.) K.E. and P.E. in S.H.M., simple pendulum and oscillations of mass attached to vertical spring. Concepts of seconds pendulum, Wave motion, its kinds & properties, speed, frequency, amplitude, time period and displacement of wave, principle of superposition. Numerical Problems (4 Hrs.)

**Properties of Matter:**

Interatomic and intermolecular forces, elastic properties, Hooke's law, Three moduli of elasticity, Poisson's ratio, surface tension and surface energy, angle of contact, examples of drops and bubbles, capillary rise, Viscosity, Stoke's law (treatment by dimensional analysis), Streamline and turbulent flow, Bernoulli's theorem. Numerical Problems (6 Hrs.)

**Recommended Books:**

1. Fundamental Physics Class (XI) by K L Gomber & K L Gogia Pardeep Publications
2. Fundamental of Physics by Haliday & Resnick and Walker John Wiley & Sons

## FUNDAMENTALS OF ENGINEERING

**L T P**  
**2 1 4**

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

### UNIT –I

Definition of Voltage, Current, Power, Energy etc. with their units. Differences between AC and DC. Various applications of electricity, Advantage of Electrical energy over other type of energy, Distinction between single phase and three phase, Name the different instruments used to measure voltage, Current and energy, Pictorial diagram of a three phase transmission and distribution system. Brief function of following accessories transformer, supports, conductors and insulators. (13 Hrs.)

### UNIT –II

Various accessories and parts of installation and identification of different wiring systems. Different types of circuit like circuit to control one lamp with one switch, circuit to control one lamp with two way switch, circuit to control one lamp, fan and 3 pin outlet socket by single way switch, circuit to control the three phase motor. Purpose of Earthing, Different method of earthing, other safety precautions while working on electrical equipment. Principle construction and working of AC and DC motors, Introduction to different types of motors i.e. single phase, three phase, various applications of single and three phase motors, Distinctions between single and three phase motors. (12 Hrs.)

### UNIT –III

Transmission of Power through belt, rope drives and pulleys and their applications, chain drive and its comparison with belt drives, Gear drives, type of Gears, Simple gear trains and velocity ratio. Classification and application of IC engines, working principles of two stroke, four stroke petrol and diesel engines, cooling system and lubrication of IC engines, General maintenance of engine. (15 Hrs.)

### UNIT –IV

Basic principles of refrigeration and air conditioning. Working of centralized air conditioning, concept of split air conditioning and its application. General Idea of raw material used for construction, introduction to different construction techniques. Properties and uses of Brick, lime, cement and timber. Brief idea about the different types of foundation, concrete proportions, mixing water ratio, RCC and its uses (Elementary idea only) (15 Hrs.)

#### **Instruction strategy:**

While imparting instructions, teachers are expected to lay more emphasis on the concepts and principles. It will be better if the classes for the general engineering.



## ELECTRICAL CIRCUIT THEORY

L T P  
2 1 3

Sessional Marks: 25  
End Term Examination Marks: 50

### UNIT – I

**DC Circuits:** Concepts of electricity, Definition and units of following terms, Potential and potential difference; Current; Resistance, Electrical Power; Electrical Energy, Ohm's law and its practical applications, Effect of temperature on resistance, Connection of resistance in series and parallel, Kirchoff's laws and their applications to simple circuits. (12 Hrs.)

### UNIT – II

**AC Fundamentals:** Difference between ac and dc, Terms related with ac waves, RMS and average values of sinusoidal waves, phase and phase difference, Representation of sinusoidal quantities by means of phasors, Alternating voltage applied to pure resistance, Alternating voltage applied to pure inductance, Alternating voltage applied to pure capacitance, R-L series circuit, R-C series circuit, Impedance triangle, Power and power factor in ac circuits (12 Hrs.)

### UNIT – III

**Magnetic Circuits:** Concept of magnetic field, Concept of magnetic flux, reluctance, mmf, permeability, Faraday's law and Lenz's law, Fleming's Left Hand and Right Hand Rule, Self and mutual induction, Construction and working principle of single phase transformer, Principle of Motor and Generator. (12 Hrs.)

### UNIT – IV

**Resonance :** Series RLC resonant circuits. Application of Resonance. Introduction to parallel resonance.

**Network Theorems:** Superposition, Thevenin's Norton, Maximum power transfer theorem, Star-Delta Conversion. (12 Hrs.)

### RECOMMENDED BOOKS

Title	Author	Publisher
<b>Text Book</b>		
Elements of Electrical and Electronics	Tarlok Singh	S.K Kataria & sons
<b>Reference Books</b>		
Basic Electrical Engineering	P S Dhogal	TMH
A text book of electrical technology, vol- I and II	B L Thereja	S Chand & Co.
Basic electricity	B R Sharma	SatyaPrakashan
Basic Electrical Engineering	J B Gupta	S K Kataria & Sons
Experiments in basic electrical engineering	SK Bhattacharya	New International Publishers
Experiments in Basic Electrical Engineering	KM Rastogi	Publishers
	G P Chhalotra	Khanna Publishers

## SECOND SEMESTER

### AC-1201 CHEMISTRY & ENVIRONMENT

L T P  
3 0 3

Sessional Marks: 25  
End Term Exam Marks: 50

#### UNIT – I

**ORGANIC CHEMISTRY – I:** Classification, nomenclature of organic compounds, Electronic displacement in a covalent bond; inductive effect, electromeric effect, resonance and hyper conjugation. Fission of a covalent bond; free radicals, electrophiles, nucleophiles, carbocations and carbanions. (7 Hrs.)

#### UNIT – II

**ORGANIC CHEMISTRY – II:** Preparation and properties of alkanes, alkenes, alkyne and benzene, Common types of organic reactions: Addition, Substitution ( $S_N^1$ ,  $S_N^2$ ), Elimination ( $E_1$ ,  $E_2$ ) and rearrangement reactions. (8 Hrs.)

#### UNIT – III

**ORGANIC CHEMISTRY – III:** Stereoisomerism: Optical and geometrical isomerism, chirality, DL and RS notation. Conformation in butane and cyclohexane (chair and boat form). (7 Hrs.)

#### UNIT – IV

**CHEMICAL KINETICS:** Molecularity, rate and order of reaction, factors influencing rates of reaction, activation energy, rate equation for first and second order reaction, pseudo-unimolecular reactions. (4 Hrs.)

**ENVIRONMENTAL CHEMISTRY :** Environmental pollutants; soil, water and air pollution; chemical reactions in atmosphere, kind of smog, major atmospheric pollutants; acid rain, ozone and its reactions, effects of the depletion of ozone layer, green house effect and global warming, green chemistry as an alternative tool for reducing pollution. (4 Hrs.)

#### **Books Recommended:**

Chemistry for class XI and XII, published by NCERT  
Organic Chemistry, Morrison & Boyd.  
Physical Chemistry, G. W. Castellan  
Environmental Chemistry, A. K. De

**UNIT-I**

Function, types of functions, domain and range. Concept of limit. Standard limits. Continuity of a function (with simple examples). Physical & geometrical meaning of  $\frac{dy}{dx}$ , differentiation of  $x^n$ ,  $\sin x$ ,  $\cos x$ ,  $\tan x$ ,  $e^x$ ,  $a^x$  and  $\log x$  from the first principle. Differentiation of sum, difference, product and quotient. (14 Hrs.)

**UNIT-II**

Differentiation of function of a function. Chain rule of differentiation, differentiation of inverse trigonometric functions, logarithmic and parametric differentiation. Differentiation of implicit function. Maxima and minima of a function. Equations of tangent and normal (for explicit function only). (14 Hrs.)

**UNIT-III**

Integration as an anti-derivative, fundamental integrals involving algebraic, trigonometric, exponential and logarithmic functions. Integration by substitution, by parts and by partial fractions. Integration of rational and irrational functions. (14 Hrs.)

**UNIT-IV**

Evaluation of definite integral by substitution, properties of definite integral (without proof). Application of definite integral in finding area under a curve and area between two Curves involving line, circle, parabola and ellipse only. (14 Hrs.)

**RECOMMENDED BOOKS:****Text Book**

Text books on Mathematics for XII, NCERT, New Delhi

**Reference Books**

Shanti Narayan, Differential Calculus, S.Chand& Co.

Shanti Narayan, Integral Calculus, S.Chand& Co.

**UNIT- I**

**ELECTROSTATICS:** Coulomb's law (scalar & vector forms), electric field, electric field due to a point charge, electric dipole and its moment, electric fields along the axial and equatorial lines, concept of dielectric and dielectric constant, Gauss's theorem and its application to find electric field due to an infinite wire and plane sheet of charge. Conductors and insulators, force and torque experienced by a dipole (in uniform electric field), capacitance, parallel plate capacitor with air/dielectric medium between the plates, series and parallel combinations of capacitors, energy of a capacitor. Numerical Problems (6 Hrs.)

**CURRENT ELECTRICITY** Electric current, Ohm's law, resistance, resistivity, combination of resistances in series and parallel, internal resistance of a cell and its E.M.F, Kirchoff's laws, principle of potentiometer and its application for comparing e.m.f. of two cells and determination of internal resistance of a cell. Numerical Problems (4 Hrs.)

**UNIT- II**

**MAGNETISM:** Magnetism and its origin, Magnetic lines of force and magnetic dipole, current loop as a magnetic dipole, earth's magnetic field and its source (elementary ideas), concepts and properties of Para, Dia and Ferro-magnetic substances with examples. Numerical Problems (4 Hrs.)

**THERMAL AND MAGNETIC EFFECTS OF CURRENT:** Electric energy and power, Joule's law of heating, thermoelectricity (Seebeck effect), Biot-Savart's law, magnetic field due to a straight wire and a circular loop. Force on a moving charge in a uniform magnetic field, force between two parallel current carrying conductors, definition of Ampere, elementary idea of moving coil galvanometer and its conversion into ammeter and voltmeter. Numerical Problems (6 Hrs.)

**UNIT- III**

**ELECTROMAGNETIC INDUCTION AND ALTERNATING CURRENT:** Electromagnetic induction, Faraday's law, Induced e.m.f., Lenz's law, Lorentz magnetic force, self and mutual inductance, alternating current & e.m.f., mean and r.m.s. value of AC, elementary idea of working of transformer. Numerical Problems. (6 Hrs.)

**HEAT AND THERMODYNAMICS:** First law of thermodynamics, specific heat at constant volume and constant pressure of ideal gas, relation between  $C_p$  and  $C_v$ . Thermodynamic processes (reversible, irreversible, isothermal and adiabatic), second law of thermodynamics. Thermal conductivity, black body radiation, Wien's law, Stefan's law, Newton's law of cooling. Numerical Problems (6 Hrs.)

**UNIT- IV**

**RAY OPTICS AND OPTICAL INSTRUMENTS:** Laws of reflection and refraction, refractive index, lens and curved mirrors, lens and curved mirror formula, linear magnification, dispersion of light by prism and dispersive power (qualitative ideas), total internal reflection and its application in optical communication (elementary ideas), Prism Spectrometer, Optical instruments- simple microscope, Galilean telescope and magnifying power. Numerical Problems (6 Hrs.)

**WAVE OPTICS :** Wave front and Huygen's principle, interference of light, Young's double slit experiment, coherent sources of light, diffraction of light, diffraction due to a single slit, polarization of light (general idea). Numerical Problems (4 Hrs.)

**RECOMMENDED BOOKS:**

1. Fundamental Physics Class (XII) by K L Gomber & K L Gogia Pardeep Publicatio
2. Fundamental of Physics by Haliday & Resnick and Walker John Wiley & Sons

**EE-1201 ELECTRICAL MEASUREMENT AND INSTRUMENTATION-I**

**L T P**  
**2 0 3**

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

**UNIT - I**

**Introduction:** Elements of generalized measurement system, characteristics of instruments, accuracy, precision, sensitivity, range span. (08 Hrs.)

**UNIT - II**

**Basic Indicating Instruments:** Classification of analog Instruments, 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. (08 Hrs.)

**Cathode Ray Oscilloscope (CRO):** Construction and working of CRT, Block diagram of CRO, measurement of voltage and frequency with CRO. (08 Hrs.)

**Bridges:** Wheatstone Bridge, for Resistance Measurement, Macwells Inductance Bridge for Induction Measurement, De Sauty Bridge for capacitive measurement, Weins bridge for frequency measurement, LCR meter, Insulation tester. (08 Hrs.)

**RECOMMENDED BOOKS:**

<b>Title</b>	<b>Author</b>	<b>Publisher</b>
<b>Text Book</b>		
Electrical and Electronics Measurement and Instrumentation	AK Sawhney	Dhanpat Rai
<b>Reference Books</b>		
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

**HU-1201**

**COMMUNICATION SKILLS**

**L T P**  
**1 2 0**

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

**UNIT – I**

**TEXTUAL EXERCISES:** Exercises in Comprehension, Vocabulary and Composition (10 Hrs.)

**UNIT-II**

**GRAMMAR:** Textual Review of usage of Tenses, Articles and Narration (8 Hrs.)

**UNIT-III**

**CORRESPONDENCE:** Official, Business and Personal Letters (8 Hrs.)

**UNIT-IV**

**WRITING SKILLS:** Précis writing exercises, Drafting Invitations, Advertisements, Reporting events (8 Hrs.)

**TUTORIALS:** Using the Library, Declamations & Debates, Conversation Practice (8 Hrs.)

**RECOMMENDED BOOKS:**

<b>Title</b>	<b>Author</b>	<b>Publisher</b>
Brush Up Your English	J.D. Murthy	Book Palace
English Grammar & Composition	Wren & Martin	ELBS
A Course in Written English	Narayanswami	Orient Longman

**SEMESTER-III**  
**EE-2101 ELECTRICAL MACHINES-I**

**L T P**  
**3 1 2**

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

**UNIT – I**

**DC Generator** : Working principle, conversion of AC to DC by commutator, parts of DC generator, types of winding on the armature, emf equation of generator, types of dc generator, characteristics of series shunt and compound generators.

(12 Hrs.)

**UNIT – II**

**DC Motor** : Working principle, terms used-back emf torque, speed, characteristics of dc shunt, series and compound motors and their applications, use of starters, three point starters, four point starters.

(12 Hrs.)

**UNIT – III**

**Transformers (Part-1)** : 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, emf equation, turn ratio, transformer on no-load, losses.

(12 Hrs.)

**UNIT – IV**

**Transformers (Part-II)** : Methods of determining losses-short circuit and open circuit tests, efficiency, rating, auto transformers and instrument transformers, idea of 3-phase transformers, difference between power and distribution transformers.

(12 Hrs.)

**RECOMMENDED BOOKS :**

<b>Title</b>	<b>Author</b>	<b>Publisher</b>
<b>Text Book</b> Principle of electrical & electronics Engg	J.S. Dhillon	Kalyani
<b>Reference Books</b> Electrical machines	S K Sahdev	Unique Pub
Electrical machines	SK Bhattacharya	TMH
Basic electrical engineering vol-I and II	P S Dhogal	TMH

## EE-2102 ELECTRICAL POWER SYSTEMS

L T P  
3 1 2

Sessional Marks : 25  
End Term Examination Marks: 75

### UNIT – I

**Overview of power system:** Generation: Hydro, thermal, nuclear and gas based stations, diesel generating stations, Transmission: Importance of high voltage transmission, introduction to transmission losses, EHV, AC and HV DC transmission, and layout of a transmission substation, Distribution: Ring and radial distribution system, layout of a distribution substation, common distribution voltage in India, list of equipment and accessories used in distribution system.

(12 Hrs.)

### UNIT – II

**Bushing:** Introduction and classification of bushing, transformer, bus duct, neutral, motor terminals and DC applications of bushings.

(04 Hrs.)

**Earthing:** Significance of earthing, need of earthing, types of earthing, earth electrodes, earth continuity conductor, method of improving earthing, earthing of transmission lines, distribution line, power equipment and domestic gadgets and service mains.

(08 Hrs.)

### UNIT – III

**Relays and Circuit Breakers:** Types and relays, their working principle of operation, difference between fuse, isolator and circuit breaker, types of isolators and circuit breakers, operation of air, oil and vacuum circuit breakers.

(12 Hrs.)

### UNIT – IV

**Insulators:** Types of insulators- pin type, suspension type, shackle type, strain type insulators, and voltage rating of insulators.

(12 Hrs.)

### RECOMMENDED BOOKS

Title	Author	Publisher
<b>Text Book</b>		
Basic electrical engineering	J B Gupta	TMH
<b>Reference Books</b>		
Basic electrical engineering	M L Anwani	Dhanpat Rai & Sons
Basic electrical engineering	B R Sharma	Satya Prakashan
Principles of electrical power system	V K Mehta	S Chand & Co



L T P  
3 1 2

Sessional Marks : 25  
End Term Examination Marks: 75

**UNIT – I**

**Introduction :** Concepts of amplifier, positive and negative feedback and oscillator.

(12 Hrs.)

**UNIT – II**

**Operational amplifiers :** Characteristics of an ideal operational amplifier, inverting and non-inverting configurations, use of operational amplifiers as inverting and non-inverting amplifiers, adders, subtractors, differentiators, integrator and comparator.

(12 Hrs.)

**UNIT – III**

**Voltage regulator ICs:** Concept of voltage regulation, specifications and applications of 3-terminal voltage regulator ICs (78xx and 79xx series).

(12 Hrs.)

**UNIT – IV**

**Digital Electronics:** Difference between analog and digital signals, binary and hexadecimal number systems, conversion between decimal to binary, decimal to hexadecimal and binary to hexadecimal number, Definitions, symbols and truth table for NOT, OR, AND, NAND, NOR, XOR, gates and RS, JK, T- type, D-type, flip-flops, Logic familiarization and familiarization with commercial digital ICs.

(12 Hrs.)

**RECOMMENDED BOOKS:**

<b>Title</b>	<b>Author</b>	<b>Publisher</b>
<b>Text Book</b>		
Principle of electrical & electronics Engg	J.S. Dhillon	Kalyani
<b>Reference Books</b>		
Principles of electronics	V K Mehta	S Chand and Co
Digital fundamentals	Malvino and Leach	TMH
Integrated electronics	Botkar	Khanna Publishers

**EE-2104 ELECTRICAL ESTIMATION AND COSTING**

**L T P**  
**3 1 0**

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

**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; Miniature circuit breaker; Fuses and their types; Light and fan circuits.

(08 Hrs.)

**Illumination Schemes in Buildings and Calculations:** Basic definitions; Electric lamps and their types; Design of indoor lighting schemes; Method of lighting calculations.

(04 Hrs.)

**UNIT – II**

**Conductor Size Calculations:** Specifications of Cables, Conductor size calculations for underground cables and house wiring.

(12 Hrs.)

**UNIT – III**

**Internal wiring Estimates in Domestic Installations :** Definition and 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**

**Internal wiring Estimates in Industrial 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.

(12 Hrs.)

**RECOMMENDED BOOKS:**

<b>Title</b>	<b>Author</b>	<b>Publisher</b>
<b>Text Book</b> Electrical estimating and costing	Surjit Singh	Dhanpat Rai & Co
<b>Reference Book</b> Electrical Engineering Drawing	Surjit Singh	Kataria publications

## SEMESTER-IV

### EE-2201 ELECTRICAL MEASUREMENTS AND INSTRUMENTATION-II

L T P  
3 0 2

Sessional Marks : 25  
End Term Examination Marks: 50

#### UNIT – I

**Introduction:** Introduction to various electrical parameters (viz. voltage, current, power, power factor and energy) and their units. Familiarization with analog and digital measuring instruments for above mentioned electrical parameters.

(12Hrs.)

#### UNIT – II

**Measurement of power and energy:** Measurement of power, power factor, energy etc and various instruments to measure these electrical quantities, different types of watt meters and energy meters, their basic working principle.

(12 Hrs.)

#### UNIT – III

**Special Measuring Instruments:** Study of construction and working of a frequency meter, power factor meter, ohmmeter, synchroscope.

(12 Hrs.)

#### UNIT – IV

**Measurement of non-electrical quantities:** Preliminary idea about measurement of temperature, pressure, humidity, speed etc

(12 Hrs.)

#### RECOMMENDED BOOKS

Title	Author	Publisher
<b>Text Book</b> Electrical and electronics measurement and instrumentation	A K Sawhney	Dhanpat Rai & Co
<b>Reference Book</b> Basic electrical engineering	P.S.Dhokal	TMH
Electronic measurements & instrumentation	Rajendra Prasad	Khanna Publishers
Electrical measurement	J B Gupta	S K Kataria and Sons

**UNIT – I**

**Introduction:** Different energy sources, energy scenario in India.

(12Hrs.)

**UNIT – II**

**Types of energy sources:** Conventional and non-conventional (solar, wind, geothermal and biogas)

(12 Hrs.)

**UNIT – III**

**Energy Management:** Energy conservation, Use of energy efficient devices (CFL etc), structures Effect of power factor and its improvement, Introduction to tariffs and different tariff.

(12 Hrs.)

**UNIT – IV**

**Fuel Cell:** Introduction, Types of fuel cell, DFC (Direct Fuel Cell)

(12 Hrs.)

**RECOMMENDED BOOKS:**

<b>Title</b>	<b>Author</b>	<b>Publisher</b>
<b>Text Book</b>		
Non-conventional energy resources	D.S Chauhan	New Age
<b>Reference Book</b>		
Environmental impact assessment	Martinus	Nijhoff Publications
Energy and Ecological Modeling	WJ Initsch	Elsevier Scientific Publishing Co
Energy Future, Human Values and Lifestyle	Richard C Carlson	International West View Press,
Non-conventional energy sources	G.D Rai	Khanna

L T P  
3 0 2

EE –2203

ELECTRICAL MACHINES-II

Sessional Marks : 25  
End Term Examination Marks: 50

**UNIT – I**

**Three-phase induction motors:** Working principle, construction (slip ring and squirrel cage), concept of slip, torque-slip, characteristics, starting of 3-phase induction motors, DOL and star delta starters.

(12 Hrs.)

**UNIT – II**

**Single phase induction motors:** Basic principle of split phase induction motors, capacitor start, capacitor run, capacitor start and run type, shaded pole, universal, reluctance, hysteresis and ac series motors and their applications.

(12 Hrs.)

**UNIT – III**

**Alternators:** Working principle, Parts, Types of slots, Rotor, Frequency and speed, emf equation of alternators, construction and types of alternators, parallel operation of two or more alternators.

(12 Hrs.)

**UNIT – IV**

**Synchronous motor:** Working principle, Starting method, behaviour of synchronous motors, pull in torque and pull out torque, V-curves, applications.

(12 Hrs.)

**RECOMMENDED BOOKS:**

<b>Title</b>	<b>Author</b>	<b>Publisher</b>
<b>Text Book</b>		
Electrical machines	SK Bhattacharya	TMH
<b>Reference Books</b>		
Electrical machines	B R Sharma	SatyaPrakashan
Electrical engineering	S K Sahdev	Unique Indian Publishers
Electrical technology vol-II	B L Theraja	S Chand and Co
Electrical Machines	Tarlok Singh	S.K Kataria& sons

**HU 2101      ENTREPRENEURSHIP DEVELOPMENT PROGRAMME**

**L T P  
2 0 0**

**Sessional Marks: 25  
End Term Examination Marks: 25**

**UNIT-I**

Introduction to entrepreneurship, Meaning, Concept, Scope of entrepreneurship, qualities of an entrepreneur, problems faced by Indian entrepreneurs, Role of banks & financial institutions in the development of small scale industries.

(07 Hrs.)

**UNIT-II**

Communication, Communication process, Barriers to effective communication and communication channels, Effective communication, Motivation, Meaning, Motivating and demotivating factors, Abraham Maslow's need hierarchy model, Theory X & Theory Y of motivation.

(06 Hrs.)

**UNIT-III**

Marketing management & Marketing Mix, Leadership and qualities of a successful leader

(08 Hrs.)

**UNIT-IV**

Responsibilities of Professional Manager, Basic functions of Management viz. planning, organizing, directing & controlling

(08 Hrs.)

**Recommended Books:**

**Title**

Management

Entrepreneurship New venture creation

Entrepreneurship & small Business Management

Mifflin

Entrepreneurship development of India

**Author/Publisher**

Stephen P. Robbins, Mary  
(Pearson education Asia)

David H. Holt, PHI

Nicholas, Siropholis, Houghton

Company, Boston-Newyork

C.B. Gupta/Sultan chand & sons

**EE-2205      ELECTRICAL SAFETY AND HAZARDS**

**L T P**  
**3 0 2**

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

**UNIT-I**

Precautions while working on electricity, Electric shock, Effect on electrical shock and precautions against shock, treatment of electrical shock. Fuses, types, need, rating & selection of fuse.

(12Hrs.)

**UNIT-II**

Introduction to electrical safety equipments, Rubber insulating equipment. Hot sticks, insulating tools, Barriers and Signs, Safety Tags, Locks and locking devices. Ground fault equipments.

(12 Hrs.)

**UNIT -III**

**Grounding** :Need of grounding, types of grounding, Grounding of Electrical systems, system grounding & equipment grounding.

(12 Hrs.)

**UNIT-IV**

Accident prevention, First Aid, Rescue techniques including artificial respiration. Health effects of electrical accidents, safety procedures & standards.

Hrs.)

(12

1.      Electrical Safety Hand Book  
         John Caduck
2.      Basic Electrical Engineering  
         J. B. Gupta  
         S.K. Kataria & Co.

# **FARM AND AUTOMOBILES REPAIRING AND MAINTENANCE**



**PROPOSED COURSE STRUCTURE FOR  
FARM AND AUTOMOBILES REPAIRING AND MAINTENANCE**

**First Semester (July/August – December)**

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional Theory	Th. Exam	Practical	Total
1	AC 1101	Applied Chemistry	2	1	3	25	50	75	150
2	AM 1101	Applied Maths – I	3	2	0	25	100	-	125
3	AP 1101	Applied Physics - I	2	1	3	25	50	75	150
4	EM 1101	Fundamentals of Engineering	2	1	3	25	50	75	150
5	ME 1151	Workshop Technology - I	2	0	4	25	25	100	150
6	CS 1101	Computer Fundamentals Lab	0	0	3	0	0	75	75
<b>Total</b>			<b>11</b>	<b>5</b>	<b>16</b>	<b>125</b>	<b>275</b>	<b>400</b>	<b>800</b>

**Second Semester (January - May)**

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional Theory	Th. Exam	Practical	Total
1	AC 1201	Chemistry & Environmental Science	3	0	3	25	50	75	150
2	AM 1201	Applied Maths – II	3	2	0	25	100	-	125
3	AP 1201	Applied Physics – II	2	1	3	25	50	75	150
4	HU 1201	Communication Skills	1	2	0	25	50	-	75
5	CE 1201	Basic Thermodynamics	2	1	0	25	50	-	75
6	CE 1251	Workshop Technology - II	2	0	4	25	25	100	150
7	ME 1202	Engineering Drawing	0	0	3	-	-	75	75
<b>Total</b>			<b>13</b>	<b>6</b>	<b>13</b>	<b>150</b>	<b>325</b>	<b>325</b>	<b>800</b>

**Third Semester (July/August – December) – A. Industrial Training (June – August)****Third Semester – B. (August – December)**

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional Theory	Th. Exam	Practical	Total
1	ME 2101	Engineering Materials	2	0	0	25	25	-	50
2	ME 2101	Auto Engineering - I	3	0	6	25	50	150	225
3	ME 2102	Farm Machinery - I	3	0	6	25	50	150	225
4	ME2103	Maintenance of Auto & Farm Equipment	2	0	6	25	25	150	200
5	HU 2101	Entrepreneurship Development Programme	2	0	0	25	25	-	75
<b>Total</b>			<b>12</b>	<b>0</b>	<b>18</b>	<b>125</b>	<b>175</b>	<b>450</b>	<b>750</b>

**Fourth Semester (January – May)**

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional Theory	Th. Exam	Practical	Total
1	ME 2201	Auto Engineering - II	3	0	6	25	50	150	225
2	ME 2202	Farm Machinery - II	3	0	6	25	50	150	225
3	ME 2203	Basic Refrigeration & Air Conditioning	3	0	4	25	50	100	175
4	ME 2204	Estimating & Costing	2	1	0	25	50	-	75
5	ME 2205	Trouble Shooting in Automobiles	0	0	2	-	-	50	50
6	ME 2206	Trouble Shooting in Farm Machinery	0	0	2	-	-	50	50
<b>Total</b>			<b>11</b>	<b>1</b>	<b>20</b>	<b>100</b>	<b>200</b>	<b>500</b>	<b>800</b>

**FIRST SEMESTER**  
**AC - 1101 APPLIED CHEMISTRY**

**L T P**  
**2 1 3**

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

**UNIT - I**

**Structure of an Atom :** Recapitulation of fundamental particles of atom (e,p,n), e = electron; p=proton, ; n = neutron , Atomic number , Bohr's model of atom, Line spectrum of hydrogen , Modern concept of atom, quantum numbers, shells, sub-shells, orbitals ( shapes of s and p orbitals ), Pauli's exclusion principle, Aufbau Energy ranking rule, Hund's rule. (6 Hrs.)

**Periodic Table :** Modern periodic table, periodic properties ( ionization potential, electron affinity, atomic and ionic radii) ( 4 Hrs. )

**UNIT - II**

**Chemical Arithmetic :** Mole concept , Empirical formula, Molecular formula ( 2 Hrs. )

**Oxidation and Reduction :** Electronic concept of oxidation and reduction, Redox reactions (direct and indirect ) Balancing of simple redox reactions (oxidation number method and ion electron method )

**Chemical Bonding :** Types of chemical bond ( ionic, covalent, co-ordinate ), Lewis structure, VSEPR theory, orbital concept of co-valency, formation of s-s, s-p and p-p bonding with examples, Hybridization - sp, sp<sup>2</sup> , sp<sup>3</sup> ( BeF<sub>2</sub> , BF<sub>3</sub>, CH<sub>4</sub>, H<sub>2</sub>O, NH<sub>3</sub> ) Intermolecular forces (Vander Waal forces , Hydrogen bond) Metallic bond. ( 6 Hrs. )

**UNIT - III**

**Electrochemistry – I :** Conductance ( specific, molar & equivalent conductance ) Electrolysis, Faraday's laws their applications. ( 4 Hrs. )

**Electrochemistry – II :** Electrochemical cell, type of electrodes, electrode potential and EMF, electrochemical series and its applications, effect of concentration on cell potential and the equilibrium constant. ( 6 Hrs. )

**UNIT - IV**

**Chemical Equilibrium :** Law of Chemical equilibrium, Le chatelier principle ionization, factors affecting ionization of water, ionic product, pH concept, Common Ion effect and solubility product, Concept of acids and bases ( Arrhenius, Bronsted Lowery, Lewis ), Acid Base equilibria, Buffer solutions. (6 Hrs.)

**Chemical Energetics :** Energy changes in chemical reactions, enthalpy changes, Heats of reactions and thermochemistry, Hess's law of constant heat summation, elementary idea about entropy and free energy. ( 6 Hrs. )

**Recommended Books :**

**Chemistry for XI and XII, published by NCERT**

**AM - 1101 APPLIED MATHEMATICS - I**

**L T P**  
**3 2 0**

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

**UNIT - I**

Introduction to trigonometric formulas. Trigonometric ratios of multiple and sub-multiple angles (2A, 3A, A/2 ) Product formulae, conversion from sum or difference to product and vice-versa (without proof ), Solutions of simple trigonometric equations. Inverse trigonometric functions and their properties. Permutation and combinations, elementary problems. Principle of mathematical Induction. (14 Hrs. )

**UNIT - II**

Binomial theorem for positive integral index ( without proof ) and for any index ( without proof ), general and particular terms, first and second binomial approximation, simple problems. Complex number in the form of  $a+ib$ , Argand diagram, polar form , algebra of complex numbers, modulus and argument of a complex number, square root of a complex number, square root of unity, triangle inequality, De-Moivre's theorem (without proof) and simple problems. (16 Hrs. )

**UNIT - III**

Review of distance formula and section formula, equation of straight line in various standard forms, intersection of two straight lines, angle between two lines, condition of parallelism and perpendicularity, perpendicular distance formula. General equation of a circle, diameter form, centre and radius of a circle, circle through three non-collinear points, tangent and normal to a circle at a given point on it, condition of tangency. (13 Hrs.)

**UNIT - IV**

Introduction to conic section, standard equation of parabola, ellipse and hyperbola ( without proof ), writing equations when directrix, focus and eccentricity are given; finding focus, directrix, latus-rectum, axes, eccentricity and vertex when equation is given.

Arithmetic progression, geometric progression, arithmetico-geometric series.

Special series : ( 13 Hrs. )

**RECOMMENDED BOOKS:**

**Text Book**

Text books on Mathematics for XI, NCERT, New Delhi

**Reference Books**

Shanti Narayan, Coordinate Geometry, S. Chanda and Co.

Thomas & Finney, Calculus, Pearson Education

L T P  
2 1 3

Sessional Marks : 25  
End Term Examination Marks : 50

### UNIT - I

**UNITS AND MEASUREMENTS** : Need for measurements, system of units, S.I. units, fundamental and derived units. Dimensional formula, dimensional equations and their applications. Error in Physical measurements-causes & types. Combination of errors (qualitative ideas) . Numerical Problems. ( 4 Hrs. )

**VECTOR ANAL -YSIS** : Scalars and vectors, vectors in two and three dimensions, unit vector, laws of vector addition, Resolution of a vector in a plane, rectangular components, scalar and vector products. Numerical Problems ( 6 Hrs. )

### UNIT - II

**DESCRIPTION OF MOTION** : Motion in a straight line, unifro motion, speed and velocity, equations of motion, instantaneous velocity and acceleration, Motion in two dimensions, projectile motion, uniform circular motion, qualitative concepts of torque, angular momentum, conservation of angular momentum, centripetal and centrifugal forces, Numerical Problems. (6 Hrs.)

**LAWS OF MOTION** : Force and inertia, first law of motion, momentum, second law of motion, impulse, third law of motion, conservation of linear momentum, qualitative concepts of rocket propulsion. Friction and its cause, Static and kinetic friction, self-adjusting nature of friction, laws of limiting friction, rolling friction, angle of friction and angle of repose, methods to reduce friction. Numerical Problems. ( 6 Hrs. )

### UNIT - III

**WORK, POWER AND ENERGY** : Work and its scalar representation. Work done by a constant force, kinetic and potential energy, conservation of energy ( free fall motion of a body ), Power. Numerical Problems. ( 6 Hrs. )

**GRAVITATION** : Universal law of gravitation, Inertial and gravitational mass, relation between 'g' and 'G' variation of acceleration due to gravity ( with altitude and depth), orbital velocity, escape velocity, elementary ideas of geo-stationary satellite. Numerical Problems. ( 4 Hrs. )

### UNIT --- IV

**SIMPLE HARMONIC MOTION** : Periodic motion, simple harmonic motion ( S.H.M.) K.H. and P.E. in S.H.M. simple pendulum and oscillations of mass attached to vertical spring. Concepts of seconds pendulum, Wave motion, its kinds & properties, speed, frequency, amplitude, time period and displacement of wave, principle of super position. Numerical Problems. ( 4 Hrs. )

**Properties Of Matter** : Interatomic and intermolecular forces, elastic properties, Hooke's law moduli of elasticity, Poisson's ratio, surface tension and surface energy, angle of contact, examples of drops and bubbles, capillary rise, Viscosity, Stoke's law ( treatment by dimensional analysis), Streamline and turbulent flow, Bernoulli's theorem. Numerical Problems. ( 6 Hrs. )

### RECOMMENDED BOOKS :

1. Fundamental Physics Class ( XI ) by K L Gomber & K L Gogia Pardeep Publications
2. Fundamental of Physics by Haliday & Resnick and Walker John Wiley & Sons

**L T P**  
**2 1 4**

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

**UNIT - I**

Definition of Voltage, Current, Power, Energy ect. with there units. Differences between AC and DC. Various application of electricity, Advantage of Electrical energy over other type of energy, Distinction between single phase and three phase, Name the different instruments used to measure voltage, Current and energy, Pictorial diagram of a three phase transmission and distribution system. Brief function of following accessories transformer, supports, conductors and insulators. ( 13 Hrs. )

**UNIT - II**

Various accessories and parts of installation and identification of different wiring systems. Different typs of circuit like circuit to control one lamp with one switch, circuit to control one lamp with two way switch, circuit to control one lamp, fan and 3pin outlet socket by single way switch, circuit to control one lamp, fan and 3 pin outlet socket by single way switch, circuit to control the three phase motor.

Purpose of Earthling, Different method of earthling, other safety precautions while working on electrical equipment.

Principle construction and workshop of AC and DC motors, Introduction to different types of motors i.e. single phase, three phase, various application of single and three phase motors, Distinctions between single and three phase motors. ( 12 Hrs. )

**UNIT - III**

Transmission of Power through belt, rope drives and pulleys and their applications, chain drive and its comparison with belt drives, Gear drives, type of Gears, Simple fear trains and velocity ratio.

Classification and application of IC engines, working principles of two stroke, four stroke petrol and diesel engines, cooling system and lubrication of IC engines, General maintenance of engines ( 15 Hrs. )

**UNIT - IV**

Basic principles of refrigeration and air conditioning. Working of centralized air conditioning concept of split air conditioning. Working of centralized air conditioning concept of split air conditioning and its application.

General Idea of raw material used for construction, introduction to different construction techniques. Properties and used of Brick, lime cement and timber.

Brief idea about the different types of foundation, concreet proportions, mixing water ratio, RCC and its uses ( Elementary idea only )

**Instruction strategy :**

While impating instructions, teaches are

## ME - 1101 WORKSHOP TECHNOLOGY -- I

L T P  
2 0 4

Sessional Marks : 25

End Term Examination Marks : 25

### UNIT - I

**Carpentry** : Introduction, Soft and hard wood, Selection of timber, Seasoning of timber, Classification of carpentry tools and their operations, Wooden joints. (08 Hrs.)

### UNIT - II

**Welding** : Introduction, Classification of Welding processes, Principles of Arc & Gas welding, Advantages, limitations and application. Equipments used in Arc & Gas welding, Types of welded joints, Soldering & Brazing & their applications (08 Hrs.)

### UNIT - III

**Foundry** : Moulding and casting, Advantages of casting & its limitations, types & properties of moulding sand, ingredient of moulding sands, Foundry hand tools, Moulding procedure, Types of pattern, cores & core making, common casting defects.

**Sheet Metal** : Tools & Equipment used, Types of sheet metal, Shearing & bending machines, Types of sheet metal Joints & their applications. (10 Hrs.)

### UNIT - IV

**Fitting** : Equipment used in fitting shop-vices, surface place, try square, bevel squares, Combination set, different files & their purposes, hacksaw, hammers, callipers & dividers, taps, drills, fillets & radius gauges. Application of vernier caliper & micrometer. (06 Hrs.)

### RECOMMENDED BOOKS :

Title	Author	Publishers
Production technology	PC Sharma	S Chand Publication
	<b>Text</b>	
Worshop Technology ( Vol - 1)	T L Chaudhary	Khanna Publishers.
Worshop Technology ( Vol - 1)	Raghuwanshi	Dhanpat Rai
Worshop Technology	R B Gupta	Satya Prakashan
	<b>Reference</b>	

**SECOND SEMESTER**  
**AC - 1201 CHEMISTRY & ENVIRONMENT**

**L T P**  
**2 0 4**

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

**UNIT - I**

**ORGANIC CHEMISTRY -- I** : Classification, nomenclature of organic compounds, Electronic displacement in a covalent bond; inductive effect, electronic effect, resonance and hyperconjugation. Fission of a covalent bond; free radicals, electrophiles, nucleophiles, carbocations and carbon ions. ( 7 Hrs. )

**UNIT - II**

**ORGANIC CHEMISTRY -- II** : Preparation and properties of alkanes, alkenes, alkyne and benzene, Common types of organic reactions: Addition, Substitution (  $S_N^1$  ,  $S_N^2$  ), Elimination (  $E_1$ ,  $E_2$  ) and rearrangement reactions. ( 8 Hrs. )

**UNIT --- III**

**ORGANIC CHEMISTRY -- III** : Stereoisomerism: Optical and geometrical isomerism, chirality, DL and RS notation. Conformation in butane and cyclohexane ( chair and boat form ). ( 7 Hrs. )

**UNIT --- IV**

**CHEMICAL KINETICS** : Molecularity, rate and order of reaction, factors influencing rates of reaction, activation energy, rate equation for first and second order reaction, pseudo-unimolecular reactions. ( 4 Hrs. )

**ENVIRONMENTAL CHEMISTRY** : Environmental pollutants; soil , water and air pollution; chemical reactions in atmosphere, kind of smog, major atmospheric pollutants; acid rain, ozone and its reactions. effects of the depletion of ozone layer, green house effect and global warming, green chemistry as an alternative tool for reducing pollution. ( 4 Hrs. )

**Books Recommended :**

Chemistry for class XI and XII, Published by NCERT

Organic Chemistry, Morrison & Boyd.

Physical Chemistry, G.W. Castellan

Environmental Chemistry, A.K.De



L T P  
3 2 0

Sessional Marks : 25  
End Term Examination Marks : 100

### UNIT - I

Function, types of functions, domain and range. Concept of limit. Standard limits Continuity of a function ( with simple examples). Physical & geometrical meaning of differentiation of  $x^n$ ,  $\sin x$ ,  $\cos x$ ,  $\tan x$ ,  $e^x$ ,  $a^x$  and  $\log x$  from the first principle. Differentiation of sum, difference, product and quotient. (14 Hrs.)

### UNIT - II

Differentiation of function of a function. Chain rule of differentiation, differentiation of inverse trigonometric functions, logarithmic and parametric differentiation. Differentiation of implicit function. Maxima and minima of a function. Equations of tangent and normal (for explicit function only ) (14 Hrs.)

### UNIT - III

Integration as anti-derivative, fundamental integrals involving algebraic, trigonometric, exponential and logarithmic functions. Integration by substitution, by parts and by partial fractions. Intergration of rational and irrational functions. (14 Hrs.)

### UNIT - IV

Evaluation of definite integral by substitution, properties of definite integral (without proof). Application of definite integral in finding area under a curve and area between two curves involving line, circle, parabola and ellipse only. (14 Hrs.)

### RECOMMENDED BOOKS.

#### Text Book

Text books on Mathematics for XII, NCERT, New Delhi

#### Reference Books

Shanti Narayan, Differential Calculus, S.Chand & Co.

Shanti Narayan, Integral Calculus, S. Chanda & Co.

**UNIT - I**

**ELECTROSTATICS** : Coulomb's law ( scalar & vector forms), electric field, electric field due to a point charge, electric dipole and its moment, electric fields along the axial and equatorial lines, concept of dielectric and dielectric constant, Gauss's theorem and its application to find electric field due to an infinitive wire and plane sheet of charge. Conductors and insulators, force and torque experienced by a dipole ( in uniform electric field), capacitance, parallel plate capacitor with air / dielectric medium between the plates, series and parallel combinations of capacitors, energy of a capacitor. Numerical problems ( 6 Hrs.)

**CURRENT ELECTRICITY** : Electric current, Ohm's law, resistance , resistivity, combination of resistances in series and parallel, internal resistance of a cell and its E.M.F. Kirchhoff's laws, principle of potentiometer and its application for comparing e.m.f. of two cells and determination of internal resistance of a cell. Numerical problems ( 4 Hrs.)

**UNIT - II**

**MAGNETISM** : Magnetism and its origin, Magnetic lines of force and magnetic dipole, current loop as a magnetic dipole, earth's magnetic field and its source ( elementary ideas ), concepts and properties of Para, Dia and Ferro- magnetic substances with examples. Numerical Problems. ( 4 Hrs.)

**THERMAL AND MAGNETIC EFFECTS OF CURRENT** : Electric energy and power, Joule's law of heating, thermoelectricity ( Seeback effect ), Biot-Savart's law, magnetic field due to a straight wire and a circular loop. Force on a moving charge in a uniform magnetic field. force between two parallel current carrying conductors, definition of Ampere, elementary idea of moving coil galvanometer and its conversion into ammeter and voltmeter. Numerical Problems ( 6 Hrs.)

**UNIT - III**

**ELECTROMAGNETIC INDUCTION AND ALTERNATING CURRENT** : Electromagnetic induction, Faraday's law, Induced e.m.f., Lenz's law Lorentz magnetic force, self and mutual inductance, alternating current & e.m.f., mean and rms value of AC , elementary idea of working of transformer, Numerical Problems. ( 6 Hrs.)

**HEAT AND THERMODYNAMICS** : First law of thermodynamics, specific heat at constant volume and constant pressure of ideal gas, relation between  $C_p$  and  $C_v$ . Thermodynamic processes ( reversible, irreversible, isothermal and adiabatic), second law of thermodynamics. Thermal conductivity, black body radiation, Wien's law, Stefan's law, Newton's law of cooling. Numerical Problems. ( 6 Hrs.)

**UNIT - IV**

**RAY OPTICS AND OPTICAL INSTRUMENTS** : Law of reflection and refraction, refractive index lens and curved mirrors, lens and curved mirror formula, linear magnification, dispersion of light by prism and dispersive power ( qualitative ideas ), total internal reflection and its application in optical communication ( elementary ideas), Prism Spectrometer, Optical instruments- simple microscope, Galilean telescope and magnifying power. Numerical Problems. ( 6 Hrs.)

**WAVE OPTICS** : Wave front and Huygen's principle, interference of light, Young's double slit experiment, coherent sources of light, diffraction of light, diffraction due to a single slit, polarization of light ( general idea) Numerical Problems. ( 4 Hrs.)

**RECOMMENDED BOOKS :**

1. Fundamental Physics Class ( XII ) by K L Gombe & K L Gogia Pardeep Publication
2. Fundamental of Physics by Haliday & Resnick and Walker John Wiley & So.

**HU - 1201 COMMUNICATION SKILLS**

**L T P**  
**1 2 0**

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

**UNIT - I**

**TEXTUAL EXERCISES** : Exercises in Comprehension, Vocabulary and Composition  
(10 Hrs.)

**UNIT - II**

**GRAMMER** : Textual Review of usage of Tenses, Articles and Narration  
(10 Hrs.)

**UNIT - III**

**CORRESPONDENCE** : Official, Business and Personal Letters  
( 8 Hrs.)

**UNIT - IV**

**WRITING SKILLS** : Precis writing exercises, Drafting Invitations, Advertisements, Reporting events.  
( 8 Hrs.)

**TUTORIALS** : Using the Library, Declamations & Debates, Concersation Practice.  
( 8 Hrs.)

**RECOMMENDED BOOKS.**

<b>Title</b>	<b>Author</b>	<b>Publisher</b>
Brush Up Your English	J.D. Murthy	Book Place
English grammar & Composition	Wren & Martin	ELBS
A Course in Written English	Narayanswami	Orient Longman

## ME - 1201 BASIC THERMODYNAMICS

L T P  
2 1 0

Sessional Marks : 25  
End Term Examination Marks : 50

### UNIT - I

**Introduction :** Definition of Thermodynamics, Boyle's Law, Charle's Law, characteristics gas equation, universal gas constant Properties; intrinsic and extrinsic, system; open, closed and isolated, surrounding, Thermodynamic equilibrium ( 12 Hrs.)

### UNIT - II

**Laws of thermodynamics :** Zeroth law of thermodynamics, first law of thermodynamics, concepts of enthalpy, internal energy, specific heat, work and heat, concept of entropy, clauses and Kelvin plank statement of second law of thermodynamics, Throttling and free expansion, no flow work done under isothermal, polytropic, adiabatic, isobaric, isochoric processes ( 12 Hrs.)

### UNIT - III

#### Formation of Steam and Steam Boilers

Steam formation, wet steam, dry steam and saturated steam, dryness fraction, superheated steam; degree of superheat, latent heat of vaporization, Enthalpy of steam, Study of various types of Boilers and their applications.

( 12 Hrs.)

### UNIT - IV

**I.C Engine and Cycles :** Classification of IC Engines, SI and CI engines, Study of various types of cycles such as Otto cycle, Diesel cycle, Dual cycle ect. ( 12 Hrs.)

#### Recommended Books :

Title	Author	Publisher
Thermal Engg	Text R.K. Rajput	Laxmi publication
Heat and Thermodynamics	PL Ballany;	Khanna Publication
Thermal Science	Domkundwar	S.Chand Publication

**ME - 1202 WORKSHOP TECHNOLOGY -- II**

**L T P**  
**2 0 4**

**Sessional Marks : 25**  
**End Term Examination Marks : 25**

**UNIT - I**

**Turning** : Principle of Operation, Description and main parts of Lathe, Specifications of Lathe, Lathe accessories, Lathe operations-turning, facing, threading, parting off, grooving, taper turning, drilling, knurling ect. , Cutting parameters, Geometry of a single point cutting tool. Concept of Capstan and Turret lathe & their construction ( 12 Hrs.)

**UNIT- II**

**Drilling** : Principle of operation, Types of drilling machine, parts of Drilling machine, Specifications of Drilling machine, Types of drills and holding devices, Operations drilling, reaming, counter-boring, counter-sinking, spot facing, tapping, Cutting parameters.

**Boring** : Principal of operation, Boring machines and specifications, Boring tools, Boring bars. ( 12 Hrs.)

**UNIT - III**

**Milling** : Principle of operation, Classification of milling machines, Up milling and down milling, milling operations-slab milling, face milling, end milling, form milling, gear milling, Simple Indexing, Types of milling cutters ( 12 Hrs.)

**UNIT - IV**

**Shaping, Planning and Slotting** : Principle of operation, Brief description and construction of shaper, planner and slotter, Specifications and different operations, Types of tools. ( 12 Hrs.)

**Recommended Books :**

<b>Title</b>	<b>Author</b>	<b>Publisher</b>
Workshop Technology	H.S.Bawa	TMH

**Reference**

Production Technology	PC Sharm	S. Chand Publishers
Workshop Technology ( Vol-II)	Hazara and Chaudhary	Khanna Publishers.
Workshop Technology	P.M. Raghuvanshi	Katatia Publishers

**THIRD SEMISTER**  
**ME - 1201 ENGINEERING MATERIALS**

**L T P**  
**2 0 0**

**Maximum Sessional Marks : 25**

**Maximum End Term Examination Marks : 25**

**UNIT - I**

**Introduction** : Classification of Engineering materials, metals and non-metals. Mechanical, Thermal and Electrical properties of metals. Elastic deformation of metals (Introductory). Plastic deformation of metals (Introductory). (08Hrs.)

**UNIT - II**

**Ferrous Metals** : Pig Iron. Cast Iron, Wrought Iron. Carbon Steels. Constituent elements, Properties and applications of ferrous metals. (08Hrs.)

**UNIT - III**

**Non-Ferrous Metals** : Introduction to Aluminium and its alloys. Introduction to Copper and its alloys. Introduction to Lead and its alloys. Introduction to Tin and its alloys. Copper-Tin alloys. Composition, properties and applications of non-ferrous metals. (08Hrs.)

**UNIT - IV**

**Non-Metals and Composites** : Introduction to plastics. Ceramics, Glass, Abrasives, Insulating Materials and Composites. Properties and applications. (08Hrs.)

**Recommended Books :**

<b>Title</b>	<b>Author</b>	<b>Publisher</b>
<b>Text</b> Workshop Technology ( Vol -I)	Hazra- Chaudhary	Media Publishers
<b>References</b> Production Technology	P.C. Sharma	S. Chand
Material Science	O.P. Khanna	S. Chand

## ME - 2102 AUTO ENGINEERING - I

L T P  
2 0 4

Maximum Sessional Marks : 25

Maximum End Term Examination Marks : 25

### UNIT - I

**Introduction** : General layout of vehicle; Scooter, car and tractor. Bodies and chassis of vehicles. Location and brief function of major assemblies like. Cooling system. Power auto injection system (For Four wheelers )

Definition of following technical terms :- bore, stroke, clearance volume, swept volume, compression ratio, TDC, BDC, IHP, BHP, FHP (12 Hrs.)

### UNIT - II

**Engines : Type of Engines** : petrol engine, Diesel engine, CNG, Two strokes and four strokes engine, Single cylinder and multi cylinder engine, air cooled and water cooled engines.

**Engine Components** : cylinder block, cylinder head, piston, piston ring, gudgeon pin, connecting rod, crankshaft, bearing ( main and big end ) camshaft, tappets, push rod, rocker arm, valves, flywheels, oil pump, strainer, Working of 2-stroke and 4 stroke cycle engines-petrol and diesel. Concept of Euro / Bharat Norms.

### UNIT - III

**Fuel Injection System** : Types of Fuel injection system, Various components and brief description of Fuel injection system like, Fuel tank, Fuel filter, Feed pump, Primary and secondary filter, Fuel injection pump, Fuel line, Pipe, Fuel injector, AC fuel feed pump, Carburetor, Multipoint fuel injection.

**Lubrication System** : Importance, type and main parts of lubrication system. Lubricant types and their grades.

### UNIT - IV

**Electrical System** : Lighting system ( brief description and function of each part ) fuse, electric horn circuit; meter set, temperature gauge, fuel gauge, speedometer / Odometer, cable colour coding, wiper motor, indicators, starter, solenoid switch, ignition switch, horn relay, Battery, dynamo and alternator, hydrometer. Water level sensor, oil pressure switch.

#### Recommended books :

Title	Author	Publisher
Text		
Automotive Mechanics	S. Srinivasan	TMH
Diesel Engine Mechanics	Mangal	TMH
Automobile Engineering Vol.1&2	Kirpal Singh	Standard
Automobile Mechanics	Coruse & Anglin	Mc Graw Hill
Automobile Mechanics	Joseph Heitner	CBS Publishers

## ME - 2103 FARM MECHINERY - I

**L T P**  
**3 0 6**  
**: 50**

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

### UNIT - I

**Introduction :** Status of farm power in India, sources of farm power, Fram mechanization and its importance in the advancement of agriculture engineering / technology, Categorization of farm mechnery and equipmet.

**Shaping and Leveling equipments :** Introduction, types, working , principle, construction, mode of operation, specifications of Scraper, riddger, leveller, bund former, soil scoop  
(12Hrs.)

### UNIT - II

**Ploughing :** Primary Tillage; intriduction, types, working, principle, construction, mode of operation, specifications of cultivator, disc harrow, puddler, rotovator, brief introduction of hand hoe, wheel hoe.  
(12 Hrs.)

### UNIT - III

**Seeding equipments :** Introduction, types, working principle, construction, mode of operation, specifications of; furrow opener, calibration of seed cum fertilizer drill, specification of different types of metering devices.  
(12 Hrs.)

### UNIT - IV

**Plant protection equipments :** Introduction, types, working principle, mode of operation, specifications of sprayer and duster, foot operated hand operated, power operated, hydraulic tractor drawn.  
(12 Hrs.)

#### Recommended books :

<b>Title</b>	<b>Author</b>	<b>Publisher</b>
Principles of Farm Machinery	<b>Taxt</b> Kepner	C. B. S
Principles of Agriculture Engineering, Vol. I	<b>Reference</b> Ohjha	jain publishers
Hydraulic Machinery	Abdullah	Dhanpat Rai
Farm Mechanization, Farm machinery & Power	Singal	Saroj Prakashan Allahabad



**ME - 2104 MAINTENANCE OF AUTO & FARM EQUIPMENTS**

**L T P**  
**2 0 6**

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

**UNIT - I**

**Introduction** : Need for maintenance, Types of maintenance -- preventive maintenance, Diagnostics maintenance, breakdown maintenance routine maintenance, corrective maintenance etc. ( 12Hrs.)

**UNIT - II**

**Maintenance** : Condition based maintenance and zero defects, Industrial applications and objectives of preventive maintenance diagnostics maintenance, preventive maintenance techniques applicable to farm machinery. ( 08Hrs.)

**UNIT - III**

**Farm Equipment Maintenance** : Possibilities of breakdowns in farm equipment ( Cultivator, Disc harrow, seed Cum fertilizer Drill, Rotovator ) root cause analysis of these breakdowns and remedies for the breakdowns, Prepare the maintenance chart. ( 08Hrs.)

**UNIT - IV**

**AUTOMOBILE MAINTENANCE** : Possibilities of breakdowns in Automobiles ( Scooter, Motorcycle, Diesel car, Petrol car ; Euro I Euro II ) root cause analysis of these breakdowns and remedies for the breakdowns, Prepare the Maintenance chart for automobiles. ( 08Hrs.)

**Recommended books :**

<b>Author</b>	<b>Title</b>	<b>Publisher</b>
	<b>Text</b>	
Diagnostic Maintenance and condition monitoring	Kelly	EWP
	<b>Reference</b>	
Automobile Engineering Vol, 1&2	Kirpal Singh	Standard
Principles of agriculture engineering Vol. I	Ohjha	Jain publishers

## HU - 2101 ENTREPRENEURSHIP DEVELOPMENT PROGRAMME

**L T P**  
**2 0 0**

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

### UNIT - I

Introduction to entrepreneurship, Meaning, Concept, Scope of entrepreneurship, qualities of an entrepreneur, problems faced by India entrepreneurs, Role of banks & financial institutions in the development of small scale industries. ( 07 Hrs.)

### UNIT - II

Communication, Communication process, Barriers to effective communication and communication channels, Effective communication, Motivation Meaning, Motivating and demotivating factors, Abraham Maslow's need hierarchy model, Theory X & Theory Y of motivation. ( 06 Hrs.)

### UNIT - III

Marketing management & Marketing Mix, Leadership and qualities of a successful leader. ( 08 Hrs.)

### UNIT --- IV

Responsibilities of Professional Manager, Basic functions of Management viz. planning, organizing, directing & controlling ( 08 Hrs.)

### Recommended Books :

#### Title

Management

Entrepreneurship New venture creation

Entrepreneurship & small Business management

Haughton Mifflin

Entrepreneurship development of India

#### Author / Publisher

Stephen P. Robbins, Mary  
( Pearson education Asia )

David H. Holt, PHI

Nicholas, Siropholis

Company, Boston-Newyork  
C.B. Gupta / Sultan chanda & sons

**UNIT - I**

**Transmission Systems** : Function and brief description of Clutch- Types : Single plate. Multi plate; Components: Clutch plate, Gear Box- Types ; sliding mesh, constant mesh, transfer; Introduction to Epicycle gear box, Universal Joint and Slipjoint and Propeller shaft, Differential .  
(12 Hrs. )

**UNIT - II**

**Steering System** : Functions and brief description of : Steering wheel, Steering shaft, Steer (gear box types ; worm and nut mechanism, worm and worm wheel , worm and earn, knuckle arm. Tie rod, Drop arm, Track rod, King pin, Stub axle, Camber plate), Steering geometry: Toe-in Toe-out, King pin inclination, Dip stick, camber, castor, Front axle, Wheel alignment & balancing.  
(12 Hrs. )

**UNIT - III**

**Brake system** : Functions and brief description of : brakes; Mechanical, Hydraulic, Pneumatic Vacuum assisted Hydraulic brake, power brake, Main components; Tandem Master cylinder master vacuum, Brake lining, Wheel cylinder, Retracting spring, Air compressor, Packing brake , Brake oil

**Ignition system** : types -battery coil, magnetic system Description and function of each part : battery, ignition coil, cam capacitor brake, point distributor rotor, spark plug, and magneto.  
(12 Hrs. )

**UNIT - IV**

**Cooling system** : Necessity, types ( air and water cooling ), brie description and function of main art like: radiator, water pump, thermostat, water houses, water radiation from coolants and additives

**Overhauling and fault Diagnosis** : trouble shooting, defects, troubles, causes and remedies of the engine, clutch, gear box, universal joint, differential, rear axle, brake, steering, suspension, ignition, system, cooling system, lubricating system, lighting system.  
(12 Hrs. )

**Recommended Books :**

<b>Title</b>	<b>Author</b>	<b>Publisher</b>
	<b>Text</b>	
Automotive mechanic	S. Srinivasan	TMH
	<b>Reference</b>	
Diesel Engine Mechanic	Mangal	Mc Graw Hill
Automobile Engineering Vol, 1&2	Kirpal Singh	Standard
Automobile Mechanics	Crouse & Anglin	Mc Graw Hill
I.C. Engines	Mathur and Sharma	Dhanpat Rai
Automotive Mechanics-	Joesph Heitner	CBS Publishers

## ME - 2202 FARM MACHINERY - II

L T P  
3 0 6

Maximum Sessional Marks : 25

Maximum End Term Examination Marks : 50

### UNIT - I

**Planting Equipment** : Introduction, types, working, construction, adjustment, operation, maintenance, specifications of : Potato planters ( semi auto and automatic ) & Sugarcane planter, Multi-crop planter ( cotton, Maize, sunflower, ground nut etc. ) paddy transplante, safety precautions in handling planting equipments. (12 Hrs. )

### UNIT - II

**Harvesting equipment** : Introduction, types, working construction, material adjustment, operation, maintenance, repair specifications of : Sickle, Mower, Reaper, Ground nut Digger, Potato digger elevator, Tractor operated combine, Self propelled- Combine,

**Threshing Equipment** : Introduction, types working, construction, material adjustment, operation, and specifications of : wheat thresher, groundnut decorticator, maize sheller. (12 Hrs. )

### UNIT - III

**Processing equipment** : Introduction, type working, construction, material adjustment, operation, specification of : chaff cutter, hammer mill, sugarcane crusher, and rice huller.

**Pumps** : Introduction, types , working construction, operation, installatioin ( location, foundation, grouting ) power requirement, priming & specifications : Reciprocating ( single and double acting ) Centrifugal ( and mono-block, submersible pump) Profeller pump. Introduction to Sprinkler and Drip irrigation. (12 Hrs. )

### UNIT - IV

**Tractor** : Devlopment of the tractors and functions of farm tractor, introduction to special feature of tractors such as: cooling system, steering system, transmission, final drive, clutch, PTO, hydraulic system, brake, hitching system, repair & maintenance, common defects, few causes and their remedial measures. (12 Hrs. )

#### Recommended books :

Title	Author	Publisher
<b>Text</b>		
Farm Machines & Equipment	C.P. Nagra	Dhanpat Rai
<b>Reference</b>		
Principles of Farm Machinery	Kepner	C.B.S
Farm tractors : Maint & Repair	Jain	T.M.H
Hydraulic Machinery	Abdulla	Dhanpat Rai
Farm Mechanisation, farm machinery & Power	Singal	Saroj Prakashan, Allahabad
Tractors & Automobiles ( Russia )	Rodichev and Rodicheva	Mir Publishers

**ME - 2203 BASIC REFRIGERATION AND AIR CONDITIONING**

**L T P**  
**25**

**Maximum Sessional Marks :**

**3 0 4**  
**50**

**Maximum End Term Examination Marks :**

**UNIT - I**

**Introduction :** Concept of refrigeration. Units of refrigeration, Refrigerator and heat pump, Refrigerants and their types. (10 Hrs.)

**UNIT - II**

**Refrigeration system:** Simple Vapour Compression cycle, Vapour compression refrigeration cycle, advantages and disadvantages of Vapour compression refrigeration system over air compression refrigeration system. COP of vapour compression refrigeration system. (12 Hrs.)

**UNIT - III**

**Refrigeration and Air- Xonditioning Equipments:** Compressors and their types, Condensers, evaporators, and their classifications, Breakdowns, their causes and remedies of Refrigerators and Air conditioners. (14 Hrs. )

**UNIT - IV**

**Air-conditioning :** Constructional features & working of window type air conditioning & split type air conditioning, Concept of cooling loads, Automobile air-conditioning system and its working. ( 12 Hrs. )

**Recommended Books :**

<b>Title</b>	<b>Author</b>	<b>Publisher</b>
Refrigeration and Air conditioning	Domkundwar	Dhanpat Rai
	<b>Text</b>	
	<b>Referance</b>	
Air-conditioning Designs Hand book	Carrier Corporation	Mc graw hill
Refrigeration and air conditioning	Arora	Tata Mc- graw
Automobile Mechanics	Crouse & Anglin	Mc Graw Hill

**ME - 2204 ESTIMATION & COSTING**

**L T P**  
**2 1 0**

**Maximum Sessional Marks : 25**

**Maximum End Term Examination Marks : 50**

**UNIT - I**

**Introduction:** Definition of estimation, cost accounting, purpose of estimating and costing, advantages of costing methods of costing, functions of cost estimating, estimating procedures. (08 Hrs.)

**UNIT - II**

**Elements of Costing:** Cost structure, Components of cost , overheads, types of overheads, methods of computing overheads, descriptiin, methods of computing depreciation.(08 Hrs.)

**UNIT - III**

**Estimation of Material Cost:** Basic formula for coputation of area and volume, Estimation of volume,weight and cost of materials for various products. (08 Hrs.)

**UNIT - IV**

**Estimation of Auto and Farm Equipments:** Estimation and costing of different products produced in Auto industries and Agricultural industries. Break Even analysis and equipment replacment analysis (08 Hrs.)

**Recommended Books :**

<b>Title</b>	<b>Author (s)</b>	<b>Publisher</b>
	<b>Text</b>	
Mechanical Estimating and Costing	B P Sinha	TMH
	<b>Referance</b>	
Mechanical Estimating and Costing	TTTI, Madras	TMT
Production Engineering, Estimating and Costing	M Adithan and BS Pabla	Konark Publishers

# **CONSTRUCTION TECHNOLOGY**

**PROPOSED COURSE STRUCTURE FOR  
CONSTRUCTION TECHNOLOGY**

**First Semester (July/August – December)**

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional Theory	Th. Exam	Practical	Total
1	AC 1101	Applied Chemistry	2	1	3	25	50	75	150
2	AM 1101	Applied Maths – I	3	2	0	25	100	-	125
3	AP 1101	Applied Physics - I	2	1	3	25	50	75	150
4	AE 1101	Fundamentals of Engineering	2	1	4	25	50	100	175
5	CE 1151	Engineering Drawing	0	0	6	0	0	150	150
6	CS 1101	Computer Fundamentals Lab	0	0	2	0	0	50	50
<b>Total</b>			<b>9</b>	<b>5</b>	<b>18</b>	<b>100</b>	<b>250</b>	<b>450</b>	<b>800</b>

**Second Semester (January - May)**

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional Theory	Th. Exam	Practical	Total
1	AC 1201	Chemistry & Environmental Science	3	0	3	25	50	75	150
2	AM 1201	Applied Maths – II	3	2	0	25	100	-	125
3	AP 1201	Applied Physics – II	2	1	3	25	50	75	150
4	CE 1201	Construction Materials	3	0	0	25	50	0	75
5	HU 1201	Communication Skills	1	2	0	25	50	-	75
6	CE 1251	Civil Engineering Drawing - I	0	0	5	-	-	125	125
7	ME 1202	Workshop Practice	0	0	4	-	-	100	100
<b>Total</b>			<b>12</b>	<b>5</b>	<b>15</b>	<b>125</b>	<b>300</b>	<b>375</b>	<b>800</b>



**Third Semester (July/August – December) – A. Industrial Training (June – August)**

**Third Semester – B. (August – December)**

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional Theory	Th. Exam	Practical	Total
1	EE 2101	Basic Electrical & Electronics Engineering	3	1	0	25	75	0	100
2	CE 2101	Construction Technology	3	1	0	25	75	-	100
3	CE 2102	Building Construction and Maintenance	3	0	2	25	50	50	125
4	CE2103	Surveying – I	3	0	3	25	50	75	150
5	CE 2104	Water Supply and Sanitary Services	2	0	2	25	25	50	100
6	HU 2101	Entrepreneurship Development Programme	2	0	0	25	50	0	75
7	CE 2106	Civil Engineering Drawing – II	0	0	6	0	0	150	150
<b>Total</b>			<b>16</b>	<b>2</b>	<b>13</b>	<b>150</b>	<b>325</b>	<b>325</b>	<b>800</b>

**Fourth Semester (January – May)**

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional Theory	Th. Exam	Practical	Total
1	CE 2201	Estimating and Quantity Surveying	3	1	0	25	75	0	100
2	CE 2202	Technical Mechanics	3	1	0	25	75	0	100
3	CE 2203	Civil Engineering Workshop	0	0	4	0	0	100	100
4	CE 2204	Survey Trade Theory	4	0	0	25	75	0	100
5	CE 2205	Building Planning and Architecture	2	0	4	25	25	100	150
6	CE 2206	Survey Practice	0	0	6	0	0	150	150
7	CE 2207	Civil Engineering Drafting – I	0	0	4	25	0	100	100
<b>Total</b>			<b>12</b>	<b>2</b>	<b>18</b>	<b>125</b>	<b>225</b>	<b>450</b>	<b>800</b>

## CE 1201 CONSTRUCTION MATERIALS

**L T P**  
**3 0 0**

**Sessional Marks – 25**  
**End Term Examination Marks – 100**

### UNIT - I

**Rock:** Classification, quarrying and dressing.

**Bricks:** Manufacturing processes, classification and tests. Flooring and roofing tiles. (12 Hrs.)

### UNIT - II

Production, properties and uses of lime; cement and sand-mortar Concrete: Plain and reinforced. (12 Hrs.)

### UNIT - III

**Timber:** types and methods of preservation, plywood. Iron and structural steel. (12 Hrs.)

### UNIT - IV

Types and uses of paints; varnishes and distemper. Sound and heat insulating materials; Glasses; plastics and asphaltic materials. (12 Hrs.)

### Reference & Text Books :

<b>Title</b>	<b>Author</b>	<b>Publisher</b>
Civil Engineering Materials Engineering Materials	TTTI, Chandigarh Sushil Kumar	Tata Mc-Graw Hill Metropolitan Publishers
Engineering Materials	Rangwala,	S.C Charotar Publishing House
Engineering Materials	KP Roy Chowdhury	Oxford & IBH

**CE 2101 CONSTRUCTION TECHNOLOGY**

**L T P  
3 1 0**

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

**UNIT - I**

Roads classification, Geometrical features of roads, Construction of WBM, Black top and concrete pavements including grade and base courses. Equipments used for road construction, features of hilly roads. (12 Hrs.)

**UNIT - II**

Railways- Components of railway tracks, Construction and Maintenance of tracks. (12 Hrs.)

**UNIT - III**

Bridge and Culverts – Types of Bridges/culverts, criteria for selection of sites, Construction and maintenance of bridges/culverts. (12 Hrs.)

**UNIT - IV**

Hydraulic Structures- Construction details of dam construction details of canals/other hydraulic structures. (12 Hrs.)

**Reference & Text Books :**

<b>Title</b>	<b>Author</b>	<b>Publisher</b>
Highway Engineering	S K khanna and C E G Justo	Nem Chand and Brothers
A Text Book of Railway Engineering	Arora&saxena	DhanpatRai and Sons
Elements of Bridge Engineering	J Victor	Oxford and IBH
Irrigation Engineering &S.k. Garg, Publishers		Khanna

**L T P**  
**3 0 2**

**Sessional marks : 25**  
**End Term Examination Marks : 50**

**UNIT – I**

**Foundation** :Classification and Construction, Brick Masonry, Scaffolding (12 Hrs.)

**UNIT – II**

Doors and windows, Brick and RCC arches and lintels (12 Hrs.)

**UNIT – III**

**Roofs** :Classification and Coverings, Floors, Ground and upper floors, Cement, Concrete and mosaic floors, Damp proof courses (12 Hrs.)

**UNIT – IV**

Stairs, Protective and Decorative finishes, Maintenance and repairs of floors, walls, wooden parts, foundations and roofs.

(12 Hrs.)

**Reference & Text Books :**

<b>Title</b>	<b>Author</b>	<b>Publisher</b>
1. Building Construction	B.C. Punmia	Laxmi Publishers
2. Building Construction	Shushil Kumar	Standard Publishers
3. Maintenance of Building	A.C. Panchdhari	New Age International
4. Building Construction Vol. I to IV	W.B. Mackey	Orient Longman

**CE 2103 SURVEYING – I**

**L T P  
3 0 3**

**Sessional marks : 25  
End Term Examination Marks : 50**

**UNIT – I**

Introduction, Classification of survey, Chain surveying principle, Instruments used, Procedure, Problems and errors in chain survey (12 Hrs.)

**UNIT - II**

Compass surveying, Types, Description and uses, measurement of bearings and in WCB and QB systems, Local attraction and related problems. (12 Hrs.)

**UNIT - III**

Plane table surveying, methods of plane tabling, Two-point and three-point problems and their solutions, errors in plane tabling (12 Hrs.)

**UNIT - IV**

Leveling, Differential leveling, Booking and reduction of levels, related problems and practices (12 Hrs.)

**Reference & Text Books :**

<b>Title</b>	<b>Author</b>	<b>Publisher</b>
1. Surveying Vol. I	B.C. Punamia	Laxmi Publishers
2. Surveying & Leveling Vol. I	T.P. Kanetkar & S.V. Kulkarni	Pune Vidyarthi Griha Prakashan
3. Surveying Vol. I	S.K. Duggol	Tata Mc-Graw Hill
4. Surveying and Leveling	N.N. Basak	Tata Mc-Graw Hill
5. Plane Surveying	Alok De	S. Chand & Co.

**UNIT – I**

Sources of water, Wells, Tube wells, Construction, Types of pumps with fittings (12 Hrs.)

**UNIT – II**

Collection of surface water and its conveyance through pipes, pipe laying, Lake and corrosion in pipes and their remedial measures (12 Hrs.)

**UNIT – III**

Appurtenances in distribution system, Sanitary systems – Conservancy and water carriage systems, Construction and maintenance of privates, Septic tanks, Imhoff tanks. (12 Hrs.)

**UNIT – IV**

Construction and maintenance of sewers, Sewer appurtenances, Plumbing equipments and operations, Water supply and sanitary fittings, House drainage, Concepts of rural water supply and sanitation. (12 Hrs.)

**Reference & Text Books :**

<b>Title</b>	<b>Author</b>	<b>Publisher</b>
1. Environmental Engineering Vol. I Water supply Engineering	S.K. Garg	Khanna Publishers
2. Environmental Engineering Vol. II Sewage Disposal & Air pollution Engineering	S.K. Garg	Khanna Publishers
3. Wastewater Engineering: Treatment Disposal & Reuse	Metcalf & Eddy	Tata Mc-Graw Hill
4. Elements of Public Health Engineering	K.N. Duggol	S.Chand & Co.
5. Water Supply & Sanitary Engineering	S.C. Rangawala	Charotar Publishing House
6. Water Supply & Sanitary Installation	A.C. Panchdhari	New Age International

## CE 2201 ESTIMATING AND QUANTITY SURVEYING

**L T P**  
**2 1 0**

**Sessional marks : 25**  
**End Term Examination Marks : 50**

### UNIT – I

Unit of measurement and payments, Methods of estimates and examples (8 Hrs.)

### UNIT – II

Preparation of detailed estimates of earthwork, masonry, concreting, flooring (8 Hrs.)

### UNIT – III

Estimates of plastering, White washing and painting, Wood and steel work, RCC work and sanitary fittings, Estimate preparation for building, roads, culverts (8 Hrs.)

### UNIT – IV

Estimate preparation for water tank, septic tank and retaining wall etc., Rate analysis for construction, materials various items of work (8 Hrs.)

### Reference & Text Books :

Title	Author	Publisher
1. Estimating & Costing in Civil Engineering	B.N. Dutta	USB Publishers Distribution Ltd.
2. Estimating & Costing Professional Practice	S.C. Rangwala	Charotar Publishing House
3. Quantity Surveying: Estimating And Costing	P L BhasinS.	Chand& Co.
4. Estimating, Costing, Specifications & Valuation.	M Chakraborty	Author

**CE 2202 TECHNICAL MECHANICS**

**L T P  
3 1 0**

**Sessional marks : 25  
End Term Examination Marks : 75**

**UNIT – I**

Forces in a plane ; addition and resolution of forces ‘ parallelogram law , graphical and analytical representation of force in space- representation of force in space ,position vector and unit vector in space ,Addition and resolution of forces in space; moment of a force: Varignon’s Theorem.  
(12 Hrs.)

**UNIT – II**

Equilibrium of particles : Free body diagram ,Inertial reference frame ,Concurrent force system ,Reaction ,Internal force , Cordlike elements , pulleys , and connection , Linear spring, Rollers and smooth supports ; Equilibrium in a plane :Equilibrium of particles in a plane ,Scalar method of solution.  
(12 Hrs.)

**UNIT – III**

Equilibrium of rigid bodies : Equivalent system of forces: Resolution of a given force into a force moment system at another point ,Reduction of a system of forces to a force-Moment , Equivalent system of forces.  
(12 Hrs.)

**UNIT – IV**

Friction: friction between Rigid bodies : State of sliding surfaces ,Friction force, Laws of Dry friction ,Angles of friction ,Types of friction problems. Kinematics of particle : Rectilinear motion: Position Displacement ,and velocity, Acceleration and jerk ,Determination of rectilinear Motion ,Relative Rectilinear motion ,Dependent rectilinear motions, Curvilinear motion: Position vector ,velocity and Acceleration ,Free flight of a projectile.  
(12 Hrs.)

**Reference & Text Books :**

<b>Title</b>	<b>Author</b>	<b>Publisher</b>
1. Vector Mechanics for Engineers, Statics and Dynamics	Beer and Johnston	Tata Mc-Graw Hill
2. Engineering Mechanics, Statics And Dynamics	Hibbeler	Pearson Education Asia Pvt. Ltd.
3. Engineering Mechanics, Statics And Dynamics	Irving Shames	Prentice Hall International
4. Engineering Mechanics, Statics And Dynamics	Meriam and Kraige	John Wiley & Sons



**UNIT – I**

Introduction to theodolite :Components and there functions, Temporary adjustment ; setting up the theodolite. (16 Hrs.)

**UNIT – II**

Measurement of horizontal and vertical angles direct and deflection angles , field notes , adjustment of errors , setting out straight lines through obstacles like ponds , buildings , hills etc. (16 Hrs.)

**UNIT – III**

Permanent adjustment of Theodolite, Theodolite traversing, Height and Distance problems . (16 Hrs.)

**UNIT – IV**

Omitted measurements and calculation, methods of computation of areas and volumes. (16 Hrs.)

**Reference & Text Books :**

<b>Title</b>	<b>Author</b>	<b>Publisher</b>
1. Surveying Vol. I	B.C Punamia	Laxmi Publications
2. Surveying & Leveling Vol. I	T.P. Kanetkar & S.V. Kulkarni	Pune Vidyarthi Griha Publication
3. Surveying Vol. I	S.K. Duggol	Tata Mc-Graw Hill
4. Surveying and Leveling	N.N. Basak	Tata Mc-Graw Hill
5. Plane Surveying	Alok De	S.Chand & Co.

**CE 2205 BUILDING PLANNING AND ARCHITECTURE**

**L T P  
2 0 4**

**Sessional marks : 25  
End Term Examination Marks : 25**

**UNIT – I**

Types of building , NBC classification , site selection, Building bye – laws and regulation for urban buildings.

(8 Hrs.)

**UNIT – II**

Orientation and functional requirements of buildings.

(8 Hrs.)

**UNIT – III**

Elements of aesthetics in architecture, unity, mass, contrast, proportion, scale balance, symmetry etc.

(8 Hrs.)

**UNIT – IV**

Feature of roman/Gothic , Indian ,Muslim and modern architecture .

(8 Hrs.)

**Reference & Text Books :**

<b>Title</b>	<b>Author</b>	<b>Publisher</b>
1. The Great Ages of World Architecture	G.K. Hiraskar	DhanpatRai& Sons
2. History of Architecture	Fletcher	C.B.S Publication
3. Planning & Designing Building	Y.S. Sane	Engineering Book Publishing Co.
4. National building Code	B.I.S	Latest Publication

**UNIT – I**

Residential Buildings, Industrial Buildings, Public Building (4 Hrs.)

**UNIT – II**

Bar bending schedule, Structural drawings of RCC elements, Foundations for heavy structures (Grillage/Isolated column footing, Pile and well foundation) (4 Hrs.)

**UNIT – III**

Beam column and eccentric connections in steel structures, plate girder (4 Hrs.)

**UNIT – IV**

Pipe joints, Septic tanks and sook pits, man holes

Simple drawing of above topics in computer graphics (4 Hrs.)

**Reference & Text Books :**

<b>Title</b>	<b>Author</b>	<b>Publisher</b>
1. Civil Engineering Drawing	Malik & Meo	New Asian Publications
2. Civil Engineering Drawing	M. Chakroborty	
3. Civil Engineering Drawing Manual	Thanikachalam & Natarajan	S. Chand & Co.
4. Design of Steel Structures	Kazmi & Zindal	Prentice Hall & India
5. Building Drawings	Shah M.G, Kale C.M & Patki S.Y.	Tata Mc-Graw Hill
6. Related Software		

# **COMPUTER APPLICATIONS**

**PROPOSED COURSE STRUCTURE FOR  
COMPUTER APPLICATIONS**

**First Semester (July/August – December)**

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional Theory	Th. Exam	Practical	Total
1	AC 1101	Applied Chemistry	2	1	3	25	50	75	150
2	AM 1101	Applied Maths – I	3	2	0	25	100	-	125
3	AP 1101	Applied Physics - I	2	1	3	25	50	75	150
4	AE 1101	Fundamentals of Engineering	2	1	4	25	50	100	175
5	CS 1102	Computer Fundamentals & IT	3	2	0	25	100	-	125
6	CS 1101	Computer Fundamentals Lab	0	0	3	-	-	75	75
<b>Total</b>			<b>12</b>	<b>7</b>	<b>13</b>	<b>125</b>	<b>350</b>	<b>325</b>	<b>800</b>

**Second Semester (January - May)**

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional Theory	Th. Exam	Practical	Total
1	AC 1201	Chemistry & Environmental Science	3	0	3	25	50	75	150
2	AM 1201	Applied Maths – II	3	2	0	25	100	-	125
3	AP 1201	Applied Physics – II	2	1	3	25	50	75	150
4	CS 1201	Introduction to Operating Systems	3	0	2	25	50	50	125
5	HU 1201	Communication Skills	1	2	0	25	50	-	75
6	ME 1201	Engineering Drawing	0	0	3	-	-	75	75
7	ME 1202	Workshop Practice	0	0	4	-	-	100	100
<b>Total</b>			<b>12</b>	<b>5</b>	<b>15</b>	<b>125</b>	<b>300</b>	<b>375</b>	<b>800</b>

**Third Semester– A. Industrial Training (June – August)****Third Semester – B. (August – December)**

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional Theory	Th. Exam	Practical	Total
1	CS 2101	Desktop Publishing (DTP)	2	0	0	25	25	-	50
2	CS 2102	Principles of Digital Electronics	3	0	0	25	50	-	75
3	CS 2103	Basics of Databases	3	0	0	25	50	-	75
4	CS 2104	System Installation	2	0	0	25	25	-	50
5	CS 2105	Troubleshooting & Maintenance of Computers	2	0	0	25	25	-	50
6	CS 2106	Database & Spreadsheets Lab	0	0	4	-	-	100	100
7	CS 2107	Principles of Digital Electronics Lab	0	0	4	-	-	100	100
8	CS 2108	System Installation Lab	0	0	4	-	-	100	100
9	CS 2109	Troubleshooting & Maintenance of Computers Lab	0	0	4	-	-	100	100
10	CS 2110	Desktop Publishing Lab	0	0	4	-	-	100	100
<b>Total</b>			<b>12</b>	<b>0</b>	<b>20</b>	<b>125</b>	<b>175</b>	<b>500</b>	<b>800</b>

**Fourth Semester (January – May)**

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional Theory	Th. Exam	Practical	Total
1	CS 2201	Computer Peripherals	3	0	0	25	50	-	75
2	CS 2202	Programming in C	3	2	0	25	100	-	125
3	CS 2203	Web Page Design	3	1	0	25	75	-	100
4	CS 2204	Internet Applications	3	1	0	25	75	-	100
5	HU2201	Entrepreneurship Development Programme	2	0	0	25	25	-	50
6	CS 2206	Computer Peripherals Lab	0	0	2	0	-	50	50
7	CS 2207	Programming in C Lab	0	0	4	0	-	100	100
8	CS 2208	Web Page Design Lab	0	0	4	0	-	100	100
9	CS 2209	Internet Applications Lab	0	0	4	0	-	100	100
<b>Total</b>			<b>14</b>	<b>4</b>	<b>14</b>	<b>125</b>	<b>325</b>	<b>350</b>	<b>800</b>

**CS 1102      COMPUTER FUNDAMENTALS & INFORMATION TECHNOLOGY**

**L T P**  
**3 2 0**

**Sessional Marks – 25**  
**End Term Examination Marks – 100**

**UNIT – I**

Block diagram of computer, CPU, memory, microprocessor, type of computer-PC, PC-XT, PC-AT, 286,386,486, PENTIUM-I, II, III, IV, minicomputer, Main-frame computer concept of hardware and software, flowchart and algorithm, introduction to high level and low level languages, translators-assembler, compiler & interpreter. (12Hrs.)

**UNIT – II**

Input and output devices: Keyboard, mouse VDU, printer  
Memory: Type of memory, primary: RAM ROM and its types. (12Hrs.)

**UNIT – III**

Secondary storage devices, Introduction to data, Bits, Bytes, Bus system, binary and decimal number system and their inter-conversion.  
Concept of networking, Need, types (LAN, WAN,MAN)- it is basics; introduction to topologies(MESH, RING, TREE, BUS,STAR). (12Hrs.)

**UNIT – IV**

Internet Basics : Introduction, history , dialup configuration and ISP, web browser world wide web (WWW), hypertext transfer protocol (HTTP) and file transfer protocol (FTP), URL, e-mail, chatting. (12Hrs.)

**Reference & Text Books:**

<b>Title</b>	<b>Author</b>	<b>Publisher</b>
1. Fundamental of Computer	Gurvinder Singh,	KalyaniPublishers
2. Computer Fundamental	Anita Goel	Pearson Education
3. Computer Fundamentals	PradeepSinha	BPB Publication

## CS 1201 INTRODUCTION TO OPERATING SYSTEMS

L T P  
3 0 2

Sessional Marks: 25  
End Term Examination Marks: 50

### UNIT – I

**INTRODUCTION** :A brief history of operating system, Definition of operating system. Operating system classification: single user, multi-user, batch processing, time- sharing, real time operating system, multi-processing Operating system functions

**OPERATING SYSTEM CONCEPTS: Definitions:** process, program, interrupts, virtual management, swapping, thrashing, File, file structure: - stream of bytes, records, file access methods. (12Hrs.)

### UNIT – II

**INTRODUCTION TO MS DOS** :MS-DOS structure, booting sequence, OS files, command processor files, definition of a file, file names, booting from floppy and HDD, warm and cold reboot. Introduction to DOS programming & various control structures, DOS utility commands: DELTREE, SCANDISK, SETVER, UNDELETE, UNFORMAT (12Hrs.)

### UNIT – III

**DISK MANAGEMENT COMMAND:** FORMAT, CHKDSK, DISKCOPY, ABEL, VOL DISKCOMP, COMP, RECOVER, EDLINE editor commands

**BATCH FILE COMMANDS:** - ECHO, PAUSE, REM

**GENERAL COMMAND:** TYPE, DATE, TIME, PROMPT (12Hrs.)

### UNIT – IV

**INTRODUCTION TO WINDOWS OPERATING SYSTEM: Definition:** windows operating system, desktop, file, folder creating files and folders, saving files, deleting files, using task bar, creating icons for different applications, creating shortcuts, opening different applications/programs. (12Hrs.)

### Reference & Text Books:

Title	Author	Publisher
1.Fundamental of Computer	Gurvinder Singh,	Kalyani Publishers
2. Programming & Information Technology	Rashpal Singh	Khanna Publishers
3. Learning MS DOS	Ramesh Bangia	Khanna Publishers



**UNIT – I**

**Introduction :**Overview of desktop publishing (DTP)

**Page Maker :**Documents needs, creating a document, editing and formatting a document, saving and printing a document, inserting text and graphics, inserting columns, fonts & styles, integrating images and graphics from a drawing package in the document, making transparencies.  
(09 Hrs.)

**UNIT – II**

**Corel draw :**Introduction, exploring a corel draw screen, using dialog boxes, using roll up, create open files, save file, import/export files, and print files. Use of ribbon bar, use of tool box, select object, shaping objects using zoom tool, filling object use of flying tool. Setting up new drawing, setting multi-page document, undo/redo mistakes, repeat. Cut, copy, paste, delete, duplicate, and clone. Insert object, paste special, copy attribute from select all, drawing objects, selecting objects. Page setup, insert/delete page, use of layers, roll up, grid & skill set up, guide line set up.  
(08 Hrs.)

**UNIT – III**

**Formatting objects:** Arranging objects; align, order group, and ungroup.

**Arranging objects:** Combine, break apart, weld, and intersection, trim, separate.

**Mode edits:** To line to curve, stretch, rotate, align, and convert, to curves.

**Creating special effects:** Transform roll up, clear transformation & perspective, envelope rolls up.

**Creating special effects:** Blend roll up, extrude roll up, counter roll up, power line, power-clip clear effects.

**Working with text:** Character, paragraph text, frame setting of tabs, indents, bullets, spacing in paragraph text.  
(08 Hrs.)

**UNIT – IV**

**Tools :** Filling text to a path, align to base line, straighten text, edit text Using spell checker, type assist, thesaurus, find and replace text, adding symbols, create pattern, preferences  
(07 Hrs.)

**Reference & Text Books:**

<b>Title</b>	<b>Author</b>	<b>Publisher</b>
1. Top publishing from a to z	Bill Grout and Osborne	McGraw hill
2. DTP for pc user	Houghton	Galgotia publishing
3. Learning Corell Draw9	Ramesh Bangia	Khanna publisher

**UNIT - I**

**Introduction:** Basic differences between analog and digital signals, Application and advantages of digital signals.

**Logic Gates:** Concept of negative and positive logic, Definition, symbols and truth table of NOT, AND, OR, NOR, NAND and EXOR gates, NAND and NOR gates as universal gates.

(11 Hrs.)

**UNIT - II**

**Number System:** Binary, Decimal, Octal and hexadecimal number System, Conversion from decimal Octal and hexadecimal to binary and vice-versa, BCD representation. (12 Hrs.)

**UNIT – III**

Binary addition, subtraction and 2's complement method of addition/subtraction.

Concept of SOP and POS. Boolean algebra, simplification using k-map (2 and 3 variables only)

(12 Hrs.)

**UNIT - IV**

**Latches and flip flops:** Concepts and types of latches with their working and applications. Operation using waveforms and truth tables of RS, T, D, JK. Difference between a latch and a flip flop. (13 Hrs.)

**Reference & Text Books:**

<b>Title</b>	<b>Author</b>	<b>Publisher</b>
1. Digital Electronics	RP Jain	Tata Mc-Graw Hill
2. Digital Electronics	Subrata Ghosal	CL India

**UNIT - I**

**Definition:** Data, Information, Database, Knowledge, Need for information storage and retrieval. Fields, records, models of databases, hierarchical, networks & relational model Relationships, attribute, entity, entity set, primary and foreign keys. (12Hrs.)

**UNIT – II**

Various data types available in a database and tables, Creating a database (in access) Creating Tables – Using Wizard, In design view , Create table by entering data, Defining primary keys in tables. Create relationship, Adding modifying and deleting records in a data sheet. Formatting and printing a data sheet (12Hrs.)

**UNIT – III**

Retrieving the records from a data sheet, Create Query: Using design view and by using Wizard, types of queries: SQL query, crosstab query, etc. (12Hrs.)

**UNIT - IV**

**Creating forms and reports:** - In design view,- By using wizard, Use of different tool boxes: text box, label, option group, check box, toggle button, option button, list box, combo box etc. (12Hrs.)

**Reference & Text Books:**

<b>Title</b>	<b>Author</b>	<b>Publisher</b>
1. DBMS with MS Access	S.S Bhatia, Vikram Gupta	Kalyani Publishers

**CS 2104      SYSTEM INSTALLATION**

**L T P  
2 0 0**

**Sessional Marks : 25  
End Term Examination Marks: 25**

**UNIT - I**

Introduction & functioning of various hardware components i.e. CPU, RAM, ROM, Mother Board, serial port, parallel port, CD-ROM drive, sound card LAN card, graphics acceleration card.

The necessary steps for loading of following operating systems to a new computer a) DOS b) Windows c) Window NT-Workstation, Server d) Windows 2000 professional

(04 Hrs.)

**UNIT - II**

Installation procedure for various drives required for the functioning of various devices, i.e. CD-ROM, MOUSE and VGA. Installation of MS-office 97/2000/MS visual studio in the system

(04 Hrs.)

**UNIT – III**

Installing USB ports on a system so that devices such as a digital camera/web Camera can connect to the system. Installing various printers and activating them to print text pages.

(04 Hrs.)

**UNIT - IV**

Installing an internal and external modem to a system including configuring the port to which the modem is connected.

(04 Hrs.)

**Reference & Text Books**

<b>Title</b>	<b>Author</b>	<b>Publisher</b>
1. Hardware Bible	W. L. Rosch	Que
2. Upgrading and Repairing Pcs	Muller &Zacker	PHI
3. Fundamentals of Computer HardwarePublishing	Mandeep Bhatia Singh	Khanna Book

**CS 2105**  
**L T P**  
**2 0 0**

**TROUBLESHOOTING AND MAINTENANCE OF COMPUTERS**

**Sessional Marks : 25**  
**End Term Examination Marks: 25**

**UNIT - I**

**Repair, servicing and maintenance concepts:** Introduction to servicing and maintenance concepts, meantime between failure (NTBF), meantime the repair maintenance policy, potential problems preventive maintenance and corrective maintenance. Concept of shielding, grounding and power supply requirements and considerations of computers and its peripherals.

(09 Hrs.)

**UNIT- II**

**Fundamental troubleshooting procedures:** fault location, fault finding aids, Service manuals, Test and measuring instruments, Special tools.

(07 Hrs.)

**UNIT- III**

**Hardware and Software faults:** Trouble shooting techniques and methods, Functional area approach, split half method, Divergent, convergent and feedback path circuits, analysis measured techniques.

(08 Hrs.)

**UNIT- IV**

Troubleshooting of computers, component and peripherals: mother board, HDD, FDD, CD ROM/DVD, Printers, Modems, Monitors.

(08 Hrs.)

**Reference & Text Books**

<b>Title</b>	<b>Author</b>	<b>Publisher</b>
1. Upgrading and Repairing PC's	Muller & Zacker	PHI
2. Trouble Shooting Computer System	Robert C Benner	Mc-Graw Hills

**CS 2201      COMPUTER PERIPHERALS**

**L T P**  
**3 0 0**

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

**UNIT - I**

**Peripheral devices:** Introduction, need and history, various types of ports: serial port, parallel port, USB port, COM port and LPT port. Introduction to buses.

(10 Hrs.)

**UNIT - II**

**Input devices:** Keyboard, Mouse, Joystick – brief construction & functions/ Floppy disks, hard disk, optical disk, floppy drives & cartridges-construction & types. Information recording and retrieval, Optical disk (CD & DVD).

(12 Hrs.)

**UNIT - III**

**Output devices:** CRT–overview of raster scan, CRT tube, elementary principles of scanning & Picture formation, and video signal TV.

**Scanner:** working and functioning

(12 Hrs.)

**UNIT - IV**

**Printers:** Types of printer –dot matrix, ink jet, line laser printing –their construction, working, principles and command faults.

**Plotters:** Introduction and working principle of plotters

(14 Hrs.)

**Reference & Text Books**

<b>Title</b>	<b>Author</b>	<b>Publisher</b>
1. Computer Hardware	Chauhan	Khanna publishers
2. Computer Peripherals and Interfacing	Priti Srivastava	Ishan publisher

## CS 2202 PROGRAMMING IN 'C'

L T P  
3 2 0

Sessional Marks : 25  
End Term Examination Marks: 100

### UNIT - I

**Algorithm and Program development:**-Steps in developing a program, Flow chart, algorithm development, Program debugging.

**Fundamentals of C programming:** Basic structure of C programming, execution a program, constants, variables and data type, operators & their precedence, formatted output, assignment statement.

(12 Hrs.)

### UNIT – II

**Control statements and their syntax with example:**

**IF-else:**-Simple if statement, simple if else statement, nested if else statement,

**Go to:** - Backward go to and forward go to

**For, while, do-while** and its programs

**Break, continue,** their comparison, **switch** statement,(programs of break, continue & switch statements)

(12 Hrs.)

### UNIT - III

Functions declaration, parameter passing, call by value, local and variables Array declaration, one dimensional array & its programs like: find the greatest no.& smallest no. from a given array, sort an array in ascending and descending order, find the average and sum of all the elements of an array etc.

(12 Hrs.)

### UNIT – IV

Two dimensional array and its programs like: matrix multiplication, addition and subtraction of two matrices, to find the transpose of matrix. Basic introduction to Structures & Unions.

(12 Hrs.)

### Reference & Text Books

Title	Author	Publisher
1. Programming with "C" language	C Balaguruswami	Tata Mc-Graw Hill
2. Let Us C	Yashwant Kanetkar	BPB

**CS 2203    WEB PAGE DESIGN**

**L T P**  
**31 0**

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

**UNIT - I**

**Definition:** World-Wide-Web (WWW).

**Planning a web site:** Content collection, reorganization and content structuring.

**Business on the web:** Picking URL; launching the web sites, selling product and services online.

**Promoting the web site:** Register with popular search engines, search tools; define metatag and keywords; advertise through media.

(08 Hrs.)

**UNIT - II**

**HTML Fundamentals:** working with text, arranging text, working with images, links and lists.

(08 Hrs.)

**UNIT – III**

**Advanced topics:** Working with tables, working with frames, style sheets, linking pages and images.

(09 Hrs.)

**UNIT – IV**

**Web authoring tools:** Front page: Various menus, making tables, images, marquees, frames, hyperlinks

(07 Hrs.)

**Reference & Text Books**

<b>Title</b>	<b>Author</b>	<b>Publisher</b>
1. HTML the Complete Reference	Thomas A Powell	Mc-Graw Hill
2. Learning HTML 4.0	Ramesh Bangia	Khanna Publisher
3. Web Technology & Design	C. Xavier	New Age International



**CS-2204 INTERNET APPLICATIONS**

**L T P  
3 1 0**

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

**UNIT I**

Introduction to World-WideWeb, searching internet using search engines like yahoo, AltaVista, Different methods of internet connectivity. (12 Hrs.)

**UNIT-II**

**Using servicing of internet:** File transfer through FTP, Remote login through telnet, security issues, E-mail, IRC. (11 Hrs.)

**UNIT-III**

**E-commerce:** Electronic data interchange; Electronic file transfer; on-line shopping, selling products and services, Security : encryption, digital signatures etc. (12 Hrs.)

**UNIT-IV**

**Audio and Video conferencing:** what is sound and its representation on computer :sampling rate , quantization, Introduction to MIDI standard, capturing graphic and images, image formats, storing graphics, Components of an audio & video conferencing system, Multimedia system. (13 Hrs.)

**Reference & Text Books**

<b>Title</b>	<b>Author</b>	<b>Publisher</b>
1. Practical Guide to Internet	A.B. Tiwana	Galgotia Publications
2. Internet Fundamental	Curt Robbins	DDC
3. Learning Internet & E-mail Khanna Publisher	Ramesh Bangia	

# **CHEMICAL TECHNOLOGY**

**PROPOSED COURSE STRUCTURE FOR  
CHEMICAL TECHNOLOGY**

**First Semester (July/August –December)**

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional Theory	Th. Exam	Practical	Total
1	AC 1101	Applied Chemistry	2	1	3	25	50	75	150
2	AM 1101	Applied Maths-I	3	2	0	25	100	-	125
3	AP 1101	Applied Physics-I	2	1	3	25	50	75	150
4	ME 1101	Fundamentals of Engineering	2	1	4	25	50	100	175
5	CT 1101	Chemical Process Industries –I	2	1	2	25	50	50	125
6	CS 1101	Computer Fundamentals Lab.	0	0	3	-	-	75	75
<b>TOTAL</b>			<b>11</b>	<b>6</b>	<b>15</b>	<b>125</b>	<b>300</b>	<b>375</b>	<b>800</b>

**Second Semester (January to May)**

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional Theory	Th. Exam	Practical	Total
1	AC 1201	Chemistry & Environmental Science	3	0	3	25	50	75	150
2	AM 1201	Applied Maths-II	3	2	0	25	100	-	125
3	AP 1201	Applied Physics-II	2	1	3	25	50	75	150
4	CT 1201	Chemical Process Industries –II	2	0	3	25	25	75	125
5	HU 1201	Communication Skills	1	2	0	25	50	-	75
6	ME 1201	Engineering Drawing	0	0	3	-	-	75	75
7	ME 1202	Workshop Practice	0	0	4	-	-	100	100
<b>TOTAL</b>			<b>11</b>	<b>5</b>	<b>16</b>	<b>125</b>	<b>275</b>	<b>400</b>	<b>800</b>

### Third Semester-A (June –August)

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional Theory	Th. Exam	Practical	Total
1	IT 2170	Industrial Training and Viva-voce	0	0	2	0	0	50	50

### Third Semester – B: (August –December)

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional Theory	Th. Exam	Practical	Total
1	CT 2101	Engineering Materials-I	3	1	2	25	75	50	150
2	CT 2102	Fuel Technology	3	1	2	25	75	50	150
3	CT 2103	Chemical Process Industries - III	3	1	2	25	75	50	150
4	CT 2104	Industrial Process Calculation	3	1	0	25	75	-	100
5	ME 2101	Chemical Engineering Drawing	0	0	2	-	-	50	50
6	ME 2102	Chemical Workshop Practice	0	0	6	-	-	150	150
<b>TOTAL</b>			<b>12</b>	<b>4</b>	<b>14</b>	<b>100</b>	<b>300</b>	<b>350</b>	<b>750</b>

### Fourth Semester (January to May)

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional Theory	Th. Exam	Practical	Total
1	EE 2201	Measurements and process Instrumentation	3	0	2	25	50	50	125
2	CT 2201	Engineering Materials-II	3	0	2	25	50	50	125
3	CT 2202	Basic of Engineering Thermodynamics	3	0	2	25	50	50	125
4	CT 2203	Alternate Energy Sources	3	0	3	25	50	75	150
5	HU 2201	Entrepreneurship Development Programme	2	0	0	25	25	-	50
6	CT 2204	Pollution Control and Industrial Safety	3	0	2	25	50	50	125
7	CS 2201	Computer Application in Chemical Industry	0	0	4	-	-	100	100
<b>TOTAL</b>			<b>17</b>	<b>0</b>	<b>15</b>	<b>150</b>	<b>275</b>	<b>375</b>	<b>800</b>

**FIRST SEMESTER**  
**AC-1101 APPLIED CHEMISTRY**

**L T P**  
**2 1 3**

**Sessional Marks: 25**  
**End Term Exam Marks: 50**

**UNIT – I**

**Structure of an Atom :** Recapitulation of fundamental particles of atom (e,p,n), e = electron; p=proton; n=neutron, Atomic number, Mass number, Bohr's model of atom, Line spectrum of hydrogen, Modern concept of atom, quantum numbers, shells, sub-shells, orbitals (shapes of s and p orbitals), Pauli's exclusion principle, Aufbau Energy ranking rule, Hund's rule. (6 Hrs.)

**Periodic Table: Modern** periodic table, periodic properties (ionization potential, electron affinity, atomic and ionic radii) (4 Hrs.)

**UNIT – II**

**Chemical Arithmetic:** Mole concept, Empirical formula, Molecular formula (2 Hrs.)

**Oxidation and Reduction:** Electronic concept of oxidation and reduction, Redox reactions (direct and indirect), Balancing of simple redox reactions (oxidation number method and ion electron method) (3 Hrs.)

**Chemical Bonding :** Types of chemical bond (ionic, covalent, co-ordinate), Lewis structure, VSEPR theory, orbital concept of co-valency, formation of s-s, s-p, and p-p bonding with examples, Hybridization - sp, sp<sup>2</sup>, sp<sup>3</sup> (BeF<sub>2</sub>, BF<sub>3</sub>, CH<sub>4</sub>, H<sub>2</sub>O, NH<sub>3</sub>), Intermolecular forces (Vander Waal forces, Hydrogen bond), Metallic bond. (6 Hrs.)

**UNIT – III**

**Electrochemistry - I:** Conductance (specific, molar & equivalent conductance), Electrolysis, Faraday's laws and their applications. (4 Hrs.)

**Electrochemistry – II:** Electrochemical cell, type of electrodes, electrode potential and EMF, electrochemical series and its applications, effect of concentration on cell potential (Nernst equation), relationship of the cell potential and the equilibrium constant. (5 Hrs.)

**UNIT – IV**

**Chemical Equilibrium:** Law of Chemical equilibrium, Le chatelier principle, Ionization, factors affecting ionization of water, Ionic product, pH concept, Common Ion effect and solubility product, Concept of acids and bases (Arrhenius, Bronsted-Lowery, Lewis), Acid Base equilibrium, Buffer solutions. (5 Hrs.)

**Chemical Energetics:** Energy changes in chemical reactions, enthalpy changes, Heats of reactions and thermo chemistry, Hess's law of constant heat summation, elementary idea about entropy and free energy. (5 Hrs.)

**Recommended Books:**

Chemistry for class XI and XII, published by NCERT

## AM-1101 APPLIED MATHEMATICS-I

L T P  
3 2 0

Sessional Marks: 25

End Term Exam Marks: 100

### UNIT-I

Introduction to trigonometric formulas. Trigonometric ratios of multiple and sub-multiple angles (2A, 3A, A/2). Product formulae, conversion from sum or difference to product and vice-versa (without proof). Solutions of simple trigonometric equations. Inverse trigonometric functions and their properties. Permutation and combinations, elementary problems. Principle of mathematical Induction. (12 Hrs.)

### UNIT-II

Binomial theorem for positive integral index (without proof) and for any index (without proof), general and particular terms, first and second binomial approximation, simple problems. Complex number in the form of  $a+ib$ , Argand diagram, polar form, algebra of complex numbers, modulus and argument of a complex number, square root of a complex number, cube root of unity, triangle inequality, De-Moivre's theorem (without proof) and simple problems. (13 Hrs.)

### UNIT-III

Review of distance formula and section formula, equation of straight line in various standard forms, intersection of two straight lines, angle between two lines, condition of parallelism and perpendicularity, perpendicular distance formula. General equation of a circle, diameter form, centre and radius of a circle, circle through three non-collinear points, tangent and normal to a circle at a given point on it, condition of tangency. (13 Hrs.)

### UNIT-IV

Introduction to conic section, standard equation of parabola, ellipse and hyperbola (without proof), writing equations when directrix, focus and eccentricity are given; finding focus, directrix, latus-rectum, axes, eccentricity and vertex when equation is given. Arithmetic progression, geometric progression, arithmetico-geometric series. Special series:  $\sum n$ ,  $\sum n^2$ ,  $\sum n^3$ . (12 Hrs.)

### RECOMMENDED BOOKS

#### Text Book

Text books on Mathematics for XI, NCERT, New Delhi

#### Reference Books

Shanti Narayan, Coordinate Geometry, S. Chand and Co.  
Thomas & Finney, Calculus, Pearson Education

## AP-1101 APPLIED PHYSICS-I

L T P  
2 1 3

Sessional Marks: 25

End Term Exam Marks: 50

### UNIT-I

**UNITS AND MEASUREMENTS:** Need for measurements, system of units, S.I. units, fundamental and derived units. Dimensional formula, dimensional equations and their applications. Error in Physical measurements-causes & types. Combination of errors (qualitative ideas). Numerical Problems (4Hrs.)

**VECTOR ANALYSIS:** Scalars and vectors, vectors in two and three dimensions, unit vector, laws of vector addition, Resolution of a vector in a plane, rectangular components, scalar and vector products. Numerical Problems (6Hrs.)

### UNIT-II

**DESCRIPTION OF MOTION:** Motion in a straight line, uniform motion, speed and velocity, equations of motion, instantaneous velocity and acceleration. Motion in two dimensions, projectile motion, uniform circular motion, qualitative concepts of torque, angular momentum, conservation of angular momentum, centripetal and centrifugal forces. Numerical Problems (6Hrs.)

**LAWS OF MOTION:** Force and inertia, first law of motion, momentum, second law of motion, impulse, third law of motion, conservation of linear momentum, qualitative concepts of rocket propulsion. Friction and its cause, Static and kinetic friction, self-adjusting nature of friction, laws of limiting friction, rolling friction, angle of friction and angle of repose, methods to reduce friction. Numerical Problems. (6Hrs.)

### UNIT-III

**WORK, POWER AND ENERGY:** Work and its scalar representation, Work done by a constant force, kinetic and potential energy, conservation of energy (free fall motion of a body), Power. Numerical Problems. (5 Hrs.)

**GRAVITATION:** Universal law of gravitation, Inertial and gravitational mass, relation between 'g' and 'G', variation of acceleration due to gravity (with altitude and depth), orbital velocity, escape velocity, elementary ideas of geo-stationary satellite. Numerical Problems (4 Hrs.)

### UNIT-IV

**SIMPLE HARMONIC MOTION:** Periodic motion, simple harmonic motion (S.H.M.) K.E. and P.E. in S.H.M., simple pendulum and oscillations of mass attached to vertical spring. Concepts of seconds pendulum, Wave motion, its kinds & properties, speed, frequency, amplitude, time period and displacement of wave, principle of superposition. Numerical Problems. (4 Hrs.)

**PROPERTIES OF MATTER:** Interatomic and intermolecular forces, elastic properties, Hooke's law, Three moduli of elasticity, Poisson's ratio, surface tension and surface energy, angle of contact, examples of drops and bubbles, capillary rise, Viscosity, Stoke's law (treatment by dimensional analysis), Streamline and turbulent flow, Bernoulli's theorem. Numerical Problems. (5 Hrs.)

### RECOMMENDED BOOKS:

Fundamental Physics Class (XI) by K L Gomber & K L Gogia Pardeep Publications  
Fundamental of Physics by Haliday & Resnick and Walker John Wiley & Sons

## ME 1101 FUNDAMENTALS OF ENGINEERING

L T P  
2 1 4

Sessional Marks: 25  
End Term Examination Marks: 50

### UNIT –I

Definition of Voltage, Current, Power, Energy etc. with their units. Differences between AC and DC. Various applications of electricity, Advantage of Electrical energy over other type of energy, Distinction between single phase and three phase, Name the different instruments used to measure voltage, Current and energy, Pictorial diagram of a three phase transmission and distribution system. Brief function of following accessories transformer, supports, conductors and insulators. (12 Hrs.)

### UNIT –II

Various accessories and parts of installation and identification of different wiring systems. Different types of circuit like circuit to control one lamp with one switch, circuit to control one lamp with two way switch, circuit to control one lamp, fan and 3 pin outlet socket by single way switch, circuit to control the three phase motor. (06 Hrs.)

Purpose of Earthing, Different method of earthing, other safety precautions while working on electrical equipment, Principle construction and working of AC and DC motors, Introduction to different types of motors i.e. single phase, three phase, various applications of single and three phase motors, Distinctions between single and three phase motors. (06 Hrs.)

### UNIT –III

Transmission of Power through belt, rope drives and pulleys and their applications, chain drive and its comparison with belt drives, Gear drives, type of Gears, Simple gear trains and velocity ratio.

Classification and application of IC engines, working principles of two stroke, four stroke petrol and diesel engines, cooling system and lubrication of IC engines, General maintenance of engine. (08 Hrs.)

### UNIT –IV

Basic principles of refrigeration and air conditioning. Working of centralized air conditioning, concept of split air conditioning and its application. General Idea of raw material used for construction, introduction to different construction techniques. Properties and uses of Brick, lime, cement and timber. Brief idea about the different types of foundation, concrete proportions, mixing water ratio, RCC and its uses (Elementary idea only). (08 Hrs.)

#### **Instruction strategy:**

While imparting instructions, teachers are expected to lay more emphasis on the concepts and principles. It will be better if the classes for the general engineering.



## CT 1101 CHEMICAL PROCESS INDUSTRIES-I

**L T P**  
**2 1 2**

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

### UNIT – I

**FUEL GASES:** Classification of gaseous fuel, Manufacture of producer gas, water gas by continuous process, coke oven gas, natural gas & LPG. (10 Hrs.)

### UNIT – II

**FERTILIZER INDUSTRIES:** Ammonia, Nitric acid, Ammonium Sulphate, Urea, Ammonium Nitrate, Phosphorus, Phosphoric Acid, Calcium Phosphates- Super Phosphates, Triple Super. Phosphate, Nitro Phosphate, N-P-K fertilizer. (10 Hrs.)

### UNIT – III

**CHLOR-ALKALI INDUSTRIES:** Definition of electrochemistry , manufacture of soda ash by Solvay process, manufacture of chlorine & caustic soda by diaphragm cell, advantages & disadvantages of diaphragm & comparison with mercury cell. (10 Hrs.)

### UNIT –IV

**INORGANIC ACIDS & ALLIED INDUSTRY:** Detailed flow sheet, raw material requirement, industrial applications, and major engineering problems associated for the following processes: Sulfuric acid, hydrochloric acid & citric acid. (10 Hrs.)

### RECOMMENDED BOOKS:

1. Outlines of Chemical Technology by Dryden, East-West Press Publishing.
2. Chemical Process Industries by Shreve, Mc Graw Hill Publication.
3. Text book of Chemical Technology Vol.-I & Vol.-II, by G.N. Pandey, Vikas Publication.

## SECOND SEMESTER

### AC-1201 CHEMISTRY & ENVIRONMENTAL SCIENCE

L T P

3 0 3

Sessional Marks: 25

End Term Exam Marks: 50

#### UNIT – I

**ORGANIC CHEMISTRY – I:** Classification, nomenclature of organic compounds, Electronic displacement in a covalent bond; inductive effect, electrometric effect, resonance and hyper conjugation. Fission of a covalent bond; free radicals, electrophiles, nucleophiles, carbocation's and carbanions. (7 Hrs.)

#### UNIT – II

**ORGANIC CHEMISTRY – II:** Preparation and properties of alkanes, alkenes, alkyne and benzene, Common types of organic reactions: Addition, Substitution ( $S_N^1$ ,  $S_N^2$ ), Elimination ( $E_1$ ,  $E_2$ ) and rearrangement reactions. (8 Hrs.)

#### UNIT – III

**ORGANIC CHEMISTRY – III:** Stereoisomerism: Optical and geometrical isomerism, chirality, DL and RS notation. Conformation in butane and cyclohexane (chair and boat form). (7 Hrs.)

#### UNIT – IV

**CHEMICAL KINETICS:** Molecularity, rate and order of reaction, factors influencing rates of reaction, activation energy, rate equation for first and second order reaction, pseudo-unimolecular reactions. (4 Hrs.)

**ENVIRONMENTAL CHEMISTRY :** Environmental pollutants; soil, water and air pollution; chemical reactions in atmosphere, kind of smog, major atmospheric pollutants; acid rain, ozone and its reactions, effects of the depletion of ozone layer, green house effect and global warming, green chemistry as an alternative tool for reducing pollution. (14 Hrs.)

#### RECOMMENDED BOOKS:

Chemistry for class XI and XII, published by NCERT  
Organic Chemistry, Morrison & Boyd.  
Physical Chemistry, G. W. Castellan  
Environmental Chemistry, A. K. De

## AM-1201 APPLIED MATHEMATICS-II

**L T P**  
**3 2 0**

**Sessional Marks: 25**  
**End Term Exam Marks: 100**

### UNIT-I

Function, types of functions, domain and range. Concept of limit. Standard limits. Continuity of a function (with simple examples). Physical & geometrical meaning of  $\frac{dy}{dx}$ , differentiation of  $x^n$ ,  $\sin x$ ,  $\cos x$ ,  $\tan x$ ,  $e^x$ ,  $a^x$  and  $\log x$  from the first principle. Differentiation of sum, difference, product and quotient. (10 Hrs.)

### UNIT-II

Differentiation of function of a function. Chain rule of differentiation, differentiation of inverse trigonometric functions, logarithmic and parametric differentiation. Differentiation of implicit function. Maxima and minima of a function. Equations of tangent and normal (for explicit function only). (12 Hrs.)

### UNIT-III

Integration as an anti-derivative, fundamental integrals involving algebraic, trigonometric, exponential and logarithmic functions. Integration by substitution, by parts and by partial fractions. Integration of rational and irrational functions. (08 Hrs.)

### UNIT-IV

Evaluation of definite integral by substitution, properties of definite integral (without proof). Application of definite integral in finding area under a curve and area between two Curves involving line, circle, parabola and ellipse only. (12 Hrs.)

### RECOMMENDED BOOKS:

#### Text Book

Text books on Mathematics for XII, NCERT, New Delhi

#### Reference Books

Shanti Narayan, Differential Calculus, S.Chand& Co.

Shanti Narayan, Integral Calculus, S.Chand& Co.

## AP-1201 APPLIED PHYSICS-II

L T P  
2 1 3

Sessional Marks: 25  
End Term Examination Marks: 50

### UNIT- I

**ELECTROSTATICS:** Coulomb's law (scalar & vector forms), electric field, electric field due to a point charge, electric dipole and its moment, electric fields along the axial and equatorial lines, concept of dielectric and dielectric constant, Gauss's theorem and its application to find electric field due to an infinite wire and plane sheet of charge. Conductors and insulators, force and torque experienced by a dipole (in uniform electric field), capacitance, parallel plate capacitor with air/dielectric medium between the plates, series and parallel combinations of capacitors, energy of a capacitor. Numerical Problems.

(6 Hrs.)

**CURRENT ELECTRICITY:** Electric current, Ohm's law, resistance, resistivity, combination of resistances in series and parallel, internal resistance of a cell and its E.M.F, Kirchoff's laws, principle of potentiometer and its application for comparing e.m.f. of two cells and determination of internal resistance of a cell. Numerical Problems

(4 Hrs.)

### UNIT- II

**MAGNETISM:** Magnetism and its origin, Magnetic lines of force and magnetic dipole, current loop as a magnetic dipole, earth's magnetic field and its source (elementary ideas), concepts and properties of Para, Dia and Ferro-magnetic substances with examples. Numerical Problems

(4 Hrs.)

**THERMAL AND MAGNETIC EFFECTS OF CURRENT:** Electric energy and power, Joule's law of heating, thermoelectricity (Seebeck effect), Biot-Savart's law, magnetic field due to a straight wire and a circular loop. Force on a moving charge in a uniform magnetic field, force between two parallel current carrying conductors, definition of Ampere, elementary idea of moving coil galvanometer and its conversion into ammeter and voltmeter. Numerical Problems

(6 Hrs.)

### UNIT- III

**ELECTROMAGNETIC INDUCTION AND ALTERNATING CURRENT:** Electromagnetic induction, Faraday's law, Induced e.m.f., Lenz's law, Lorentz magnetic force, self and mutual inductance, alternating current & e.m.f., mean and r.m.s. value of AC, elementary idea of working of transformer. Numerical Problems.

(5 Hrs.)

**HEAT AND THERMODYNAMICS:** First law of thermodynamics, specific heat at constant volume and constant pressure of ideal gas, relation between  $C_p$  and  $C_v$ . Thermodynamic processes (reversible, irreversible, isothermal and adiabatic), second law of thermodynamics. Thermal conductivity, black body radiation, Wien's law, Stefan's law, Newton's law of cooling. Numerical Problems

(5 Hrs.)

### UNIT- IV

**RAY OPTICS AND OPTICAL INSTRUMENTS:** Laws of reflection and refraction, refractive index, lens and curved mirrors, lens and curved mirror formula, linear magnification, dispersion of light by prism and dispersive power (qualitative ideas), total internal reflection and its application in optical communication (elementary ideas), Prism Spectrometer, Optical

instruments- simple microscope, Galilean telescope and magnifying power. Numerical Problems  
(6 Hrs.)

**WAVE OPTICS :** Wave front and Huygen's principle, interference of light, Young's double slit experiment, coherent sources of light, diffraction of light, diffraction due to a single slit, polarization of light (general idea). Numerical Problems (4 Hrs.)

**RECOMMENDED BOOKS:**

Fundamental Physics Class (XII) by K L Gomber & K L Gogia Pardeep Publicatio  
Fundamental of Physics by Haliday & Resnick and Walker John Wiley & Sons

## CT 1201 CHEMICAL PROCESS INDUSTRIES -II

LT P  
203

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

### UNIT-I

CEMENT INDUSTRIES: Definition of cement & Portland cement, major cement industries in India, composition of Portland cement, process description, raw material, flow sheet & major engineering problems associated with the dry processes for manufacturing of Portland cement.  
(12 Hrs.)

### UNIT-II

GLASS INDUSTRY: Definition of glass, general composition of glass, raw material, methods of manufacture of glass, manufacture of special glasses- fused silica and high silica glass.  
(10 Hrs.)

### UNIT-III

DESCRIPTION OF VARIOUS UNITS PROCESS: Alkylation - (toluene) Halogenation - (Chlorobenzene, D.D.T., Benzene Hexa Chloride) Diazotization (Benzene diazonium Chloride)  
(10 Hrs.)

### UNIT-IV

DESCRIPTION OF VARIOUS UNITS PROCESS: Nitration - (Nitrobenzene), Amination - (Aniline), Sulphonation - (Benzene sulphonic acid), Hydroxy benzene - (Phenol)  
(08 Hrs.)

### RECOMMENDED BOOKS

1. Outlines of Chemical Technology by Dryden, East-West Press Publishing.
2. Chemical Process Industries by Shreve, Mc Graw Hill Publication.
3. Text book of Chemical Technology Vol.-I & Vol.-II, by G.N. Pandey, Vikas Publication.

**HU-1201 COMMUNICATION SKILLS**

**L T P**  
**1 2 0**

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

**UNIT – I**

**TEXTUAL EXERCISES:** Exercises in Comprehension, Vocabulary and Composition (10 Hrs.)

**UNIT-II**

**GRAMMAR:** Textual Review of usage of Tenses, Articles and Narration (8 Hrs.)

**UNIT-III**

**CORRESPONDENCE:** Official, Business and Personal Letters (8 Hrs.)

**UNIT-IV**

**WRITING SKILLS:** Précis writing exercises, Drafting Invitations, Advertisements, Reporting events (7 Hrs.)

**TUTORIALS:** Using the Library, Declamations & Debates, Conversation Practice (7 Hrs.)

**RECOMMENDED BOOKS:**

<b>Title</b>	<b>Author</b>	<b>Publisher</b>
Brush Up Your English	J.D.Murthy	Book Palace
English Grammer& Composition	Wren & Martin	ELBS
A Course in Written English	Narayan swami	Orient Longman

## SEMESTER-III

### CT2101 ENGINEERING MATERIALS -I

**L T P**  
**3 1 2**

**Sessional Marks: 25**

**End Term Examination Marks: 75**

#### UNIT – I

Importance of consideration of engineering materials. (06 Hrs.)

Different types of engineering materials in use in chemical industries. (06 Hrs.)

#### UNIT – II

Properties expected for use of engineering materials in chemical industries. (06 Hrs.)

#### UNIT – III

**FERROUS METALS:** Important varieties of iron ores, cast iron; types, properties and uses of cast iron, pig iron: types of pig iron. Wrought iron: properties and uses of wrought iron; Steel: factors affecting physical properties of steel and uses of steel (no manufacturing process) (12 Hrs.)

#### UNIT – IV

**NON-FERROUS METALS:** Aluminum, cobalt, copper, lead, magnesium, nickel, tin and zinc, their properties and uses. Various alloys of aluminum, copper, magnesium nickel and steel.

**POLYMER:** PTFE and Fibre reinforced plastics as engineering materials (10 Hrs.)

#### **RECOMMENDED BOOKS:**

1. Materials in Industry by WJ Patton; Prentice Hall Publication
2. Introduction to Engineering Materials by Aggarwal; Tata McGraw Hill Publication
3. Material Science by Narula; Tata McGraw Hill Publication
4. Elements of Metallurgy by HS Bawa; Tata McGraw Hill Publication



## CT 2102 FUEL TECHNOLOGY

**L T P**  
**3 1 2**

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

### UNIT – I

INTRODUCTION: Introduction of various Solid, Liquid and Gaseous fuels.  
Simplified description of petroleum distillation and refineries (08 Hrs.)

### UNIT – II

SOLID FUELS: Wood, Charcol, Coal (Peat, Lignite, Bituminous and Anthracite) and Coke.  
Calorific value Definition and experimental determination by bomb calorimeter and calculations.  
Washing of coal, Purpose of washing, Carbonization. (Low temperature and High Temperature).  
(14 Hrs.)

### UNIT – III

LIQUID FUELS: (i) Fuel Oil, Gasoline, Diesel Fuels, Kerosene.  
(ii) Properties (Density, Viscosity, Flash & fire Point, cloud point, pour point, aniline point, Octane no, Cetane no. & Ignition delay).  
(iii) Advantages and disadvantages of liquid fuels. (10 Hrs.)

### UNIT – IV

GASEOUS FUELS: Natural Gas, LPG -Advantages and disadvantages of gaseous fuel.  
(08 Hrs.)

### Recommended Books:

- 1) **Bioethanol: Science and technology of fuel alcohol** by Graeme M. Walker, Book Boon
- 2) Understanding Clean Energy and Fuels from Biomass, Dr. H.S.Mukunda, Wiley India.
- 3) 3) advance in fuels and alternative energy resource, Swapan C. Sarkar, P. K. Bose, Everest Publishing co, - Pune

## CT2103 CHEMICAL PROCESS INDUSTRIES-III

**L T P**  
**3 1 2**

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

### UNIT – I

OILS: Vegetable oils and vanaspati: extraction methods, hydrogenation of vegetable oils  
Essentials oils: general methods of production. (10 Hrs.)

### UNIT – II

SOAP & DETERGENT INDUSTRY: Continuous hydrolysis & saponification process, flow sheet for continuous process, for fatty acids, soap & glycerine; types of surface active agents, different constituents of detergent, manufacturing process of detergent (sulfonation and Sulfation and compounding of detergent). (12 Hrs.)

### UNIT – III

PAINTS & VARNISHES: Brief description of requirements for surface coatings, simple flow sheet of paint coatings, simple flow sheets of paint manufacturing process, types & composition of different types of varnishes & their applications of primary ingredients of surface coating. (10 Hrs.)

### UNIT – IV

SUGAR MANUFACTURING PROCESS: Juice extraction - Clarification, evaporation - Pan boiling, Crystallization - Centrifugation, drying, grading and blending - Chemicals used in sugar industry. (08 Hrs.)

### RECOMMENDED BOOKS:

1. Outlines of Chemical Technology by Dryden, East-West Press Publishing.
2. Chemical Process Industries by Shreve, Mc Graw Hill Publication.
3. Text book of Chemical Technology Vol.-I & Vol.-II, by G.N. Pandey, Vikas Publication.
4. **Chemistry and Technology of Fertilizers**, by Vincent Sauchelli, Reinhold Pub. Corp.

## CT2104 INDUSTRIAL PROCESS CALCULATIONS

**L T P**  
**3 1 0**

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

### UNIT – I

Units and dimensions, dimensional consistency, inter conversion of units of pressure, volume force, work, power, energy and heat in SI, CGS, MKS (08 Hrs.)

### UNIT – II

Boyle's law, Charle's Law, Ideal gas equation, limitation of ideal gas equation, related numerical problems, limiting and excess reactants. (14 Hrs.)

### UNIT – III

Mole concept and expressing concentration of solution in different ways like molarity, molality and normality. (08 Hrs.)

### UNIT – IV

Definition and meaning of material balance, basic steps to be followed in the material balance calculation, numerical problem based on material balance without chemical reaction; (10 Hrs.)

### RECOMMENDED BOOKS:

1. Chemical Process Principles by Hougen and Watson; Wiley International Edition
2. Solved Examples in Chemical Engineering by GK Ray; Khanna Publication
3. Basic Principles and Calculations in Chemical Engineering by Himmelblau, Prentice Hall Publication

## SEMESTER-IV

### EE 2201 MEASUREMENTS AND PROCESS INSTRUMENTATION

**L T P**  
**3 0 2**

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

#### UNIT – I

INTRODUCTION & CLASSIFICATION OF INSTRUMENTS: Importance of instruments in Chemical process industries. General classification of industrial instruments. Indicating and recording type of instruments. (12 Hrs.)

#### UNIT – II

INTRODUCTION & CLASSIFICATION OF INSTRUMENTS: Static & Dynamic characteristics of instruments. Description and constructional details, working principle, ranges and application of following instruments. (12 Hrs.)

#### UNIT – III

PRESSURE AND VACUUM GAUGES: Liquid column gauges, Bourdon tube gauge, Melleod gauge, Ionization and thermal conductivity meters. (08 Hrs.)

#### UNIT – IV

THERMO METERS AND PYROMETERS: Bimetallic thermometers, liquid expansion thermometers, thermocouples, resistance thermometers, optical and radiation pyrometers. (08 Hrs.)

#### RECOMMENDED BOOKS:

- 1) Electrical and electronics measurement and instrumentation, A.K.Sawhney, Dhanpat Rai & Co.
- 2) Electronic measurements & Instrumentation, Rajendra Prasad, Khanna Publishers
- 3) Electrical Measurement, J.B.Gupta, S.K.Kataraiya and sons

## CT 2201 ENGINEERING MATERIAL-II

**L T P**  
**3 0 2**

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

### UNIT – I

NON-METALLIC MATERIALS: Polymers: Nylon – 66, nylon – 6, polyesters, polycarbonates, Polyurethanes, PVC, Polypropylene, rubber, composites. (08Hrs.)

### UNIT – II

CERAMICS: Definition of ceramic, clays, properties of clay, earthen wares and stone wares, uses of stonewares Definition of refractory, classification of refractories, properties of refractories, common refractory bricks, fire clay bricks, dolomite bricks, high alumina bricks and carbon bricks Steel. (12 Hrs.)

### UNIT – III

GLASS: Definition, classification, composition, types and properties of glass. (08 Hrs.)

### UNIT – IV

MECHANICAL, THERMAL AND ELECTRICAL PROPERTIES : Tensile strength, compressive strength, shear strength, ductility and malleability, methods of improving strength; specific heat, glass transition temperature, crystalline melting temperature, thermal conductivity, dielectric strength, dielectric constant, power loss and electrical diffusivity. (12 Hrs.)

### RECOMMENDED BOOKS:

1. Materials in Industry by WJ Patton; Prentice Hall Publication
2. Introduction to Engineering Materials by Aggarwal; Tata McGraw Hill Publication
3. Material Science by Narula; Tata McGraw Hill Publication
4. Elements of Metallurgy by HS Bawa; Tata McGraw Hill Publication

## CT 2202 BASICS OF ENGINEERING THERMODYNAMICS

**L T P**  
**3 0 2**

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

### UNIT – I

**INTRODUCTION & BASIC CONCEPTS:** Systems, processes & surroundings, homogenous & heterogeneous systems, closed, open & isolated systems, intensive & extensive properties, state & path functions. Concept of internal energy, enthalpy, entropy, free energy & equilibrium. Equation of state, ideal gas law, Vander Waal's eqn. Amagat's law, Dalton's law, Henry's law, Raoult's law, Zeroth law of Thermodynamics. properties. (14 Hrs.)

### UNIT – II

First law of Thermodynamics for open & closed systems. Calculation of internal energy, enthalpy, heat and work for ideal gas undergoing reversible, isochoric, isothermal, isobaric, adiabatic and polytropic process. (12 Hrs.)

### UNIT – III

Second law of thermodynamics Entropy change and its calculations for a closed & open system, Carnot's cycle and its efficiency, thermodynamic temperature scale, reversible & irreversible process. Processes. (10 Hrs.)

### UNIT – IV

Third law of thermodynamics and its applications. (04 Hrs.)

### RECOMMENDED BOOKS:

1. Introduction to Chemical Engineering Thermodynamics by Smith and Vanness, Mc Graw Hill.
2. Chemical Engineering thermodynamics by K.V. Narayanan, Prentice Hall India.
3. Chemical Engineering Thermodynamics by Dodge, Mc Graw Hill.
4. Chemical Engineering Thermodynamics by YVC Rao
5. Engineering Thermodynamics by PK Nag
6. Thermal Engineering by Balleny

## CT 2203 ALTERNATE ENERGY SOURCES

**LT P**  
**3 0 3**

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

### UNIT – I

INTRODUCTION: Importance of alternate sources of energy, Present Scenario, Future prospects, Economic criteria. (6 Hrs.)

### UNIT – II

SOLAR ENERGY: Photovoltaic cell, Electricity generation, Solar water heaters, Solar furnaces, Solar Cookers, Solar stills. (10 Hrs.)

### UNIT – III

HYDRO ENERGY: Hydro-electric power plants. (6 Hrs.)

BIO-ENERGY: Biomass, Power generation by using bio-mass gasifies, bio-gas, biodiesel.

HYDROGEN ENERGY: Concept of storage, transport, and use of hydrogen as automobile fuel (6 Hrs.)

### UNIT – IV

WIND ENERGY: Wind mills, Electricity generation from wind. (6 Hrs.)

GEOHERMAL AND TIDAL ENERGY: Steam generation and electricity generation. (6 Hrs.)

### RECOMMENDED BOOKS:

1. Solar Energy - Principles of Thermal Collection and Storage by S P Sukhatme, Tata McGraw Hill Publication, New Delhi
2. Solar Energy Utilization by G D Rai, Khanna Publishers, New Delhi
3. Reviews of Renewable Energy Sources, Vol. 3, edited by M S Sodha, S S Mathur, MAS Malik, T C Kandpal, Wiley Eastern Limited, New Delhi
4. Energy Today and Tomorrow by Maheshwar Dayal, Publications Division, Ministry of Information and Broadcasting, Govt. of India, New Delhi

## HU 2201 ENTREPRENEURSHIP DEVELOPMENT PROGRAMME

**L T P**  
**2 0 0**

**Sessional Marks: 25**  
**End Term Examination Marks: 25**

### UNIT-I

Introduction to entrepreneurship, Meaning, Concept, Scope of entrepreneurship, qualities of an entrepreneur, problems faced by Indian entrepreneurs, Role of banks & financial institutions in the development of small scale industries. (12 Hrs.)

### UNIT-II

Communication, Communication process, Barriers to effective communication and communication channels, Effective communication, Motivation, Meaning, Motivating, and demotivating factors, Abraham Maslow's need hierarchy model, Theory X & Theory Y of motivation. (12 Hrs.)

### UNIT-III

Marketing management & Marketing Mix, Leadership and qualities of a successful leader. (08 Hrs.)

### UNIT-IV

Responsibilities of Professional Manager, Basic functions of Management viz. planning, organizing, directing & controlling. (08 Hrs.)

### Recommended Books:

<b>Title</b>	<b>Author/Publisher</b>
Management	Stephen P. Robbins, Mary (Pearson education Asia)
Entrepreneurship New venture creation	David H. Holt, PHI
Entrepreneurship & small Business Management	Nicholas, Siropholis, Houghton Mifflin Company, Boston-Newyork
Entrepreneurship development of India	C.B. Gupta/Sultan chand & sons



## CT 2204 POLLUTION CONTROL AND INDUSTRIAL SAFETY

LT P  
3 0 2

Sessional Marks: 25  
End Term Examination Marks: 50

### UNIT – I

**INTRODUCTION:** What is environment? What is Pollution? Classification of pollution e.g. Land, Water, Air, Noise. Impact assessment of development projects. Character and origin of industrial wastes. (08 Hrs.)

### UNIT – II

**ENVIRONMENT PROTECTION:** Environmental protection from hazardous Chemicals & Waste: - Terminology relating to chemical hazards and air pollution, classification of chemical Hazards and hazardous chemicals, codes of safety for operational hazards in laboratories, Industries etc. (Reference should be made of I.S. Codes) (12 Hrs.)

### UNIT – III

**POLLUTION ACTS:** A water pollution prevention control Act 1974, Air pollution Act 1981, Environment protection Act 1986, Hazardous chemical manufacturing, Storage and impact rules 1989 and hazardous waste and management and handling rules 1989, Noise Pollution Act. (12 Hrs.)

### UNIT – IV

**SAFETY:** Importance of safety in chemical industry, knowledge of statutory required for labour and industry. (08 Hrs.)

### RECOMMENDED BOOKS:

1. Safety and Accident Prevention in Chemical Operation by Fawelt and Wood, Inter Science Publication
2. Chemical Engineering, Vol I, II, III and IV by Coulson and Richardson, Pergamon Press Publication
3. Air Pollution by Perkins, McGraw Hill Publication
4. Fundamentals of Air Pollution by Williamson, Addison Wesley Publication
5. Liquid Wastes of Industries by Nemerow, Addison Wesley Publication
6. Waste Water Engineering by Metcalf and Eddy, McGraw Hill Publication

# **SERICULTURE & TEXTILE TECHNOLOGY**

**PROPOSED COURSE STRUCTURE FOR  
SERICULTURE & TEXTILE TECHNOLOGY**

**First Semester (July/August –December)**

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional Theory	Th. Exam	Practical	Total
1	AC 1101	Applied Chemistry	2	1	3	25	50	75	150
2	AM 1101	Applied Maths-I	3	2	0	25	100	-	125
3	AP 1101	Applied Physics-I	2	1	3	25	50	75	150
4	ME 1101	Fundamentals of Engineering	2	1	4	25	50	100	175
5	STE1101	Mulberry Cultivation	2	1	2	25	50	50	125
6	CS 1101	Computer Fundamentals Lab	0	0	3	-	-	75	75
<b>TOTAL</b>			<b>11</b>	<b>6</b>	<b>15</b>	<b>125</b>	<b>300</b>	<b>375</b>	<b>800</b>

**Second Semester (January to May)**

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional Theory	Th. Exam	Practical	Total
1	AC 1201	Chemistry & Environmental Science	3	0	3	25	50	75	150
2	AM 1201	Applied Maths-II	3	2	0	25	100	-	125
3	AP 1201	Applied Physics-II	2	1	3	25	50	75	150
4	STE 1201	Farm Management and Seri-Biotechnology	2	0	3	25	25	75	125
5	HU 1201	Communication Skills	1	2	0	25	50	-	75
6	ME 1201	Engineering Drawing	0	0	3	-	-	75	75
7	ME 1202	Workshop Practice	0	0	4	-	-	100	100
<b>TOTAL</b>			<b>11</b>	<b>5</b>	<b>16</b>	<b>125</b>	<b>275</b>	<b>400</b>	<b>800</b>

### Third Semester-A (June –August)

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional Theory	Th. Exam	Practical	Total
1	IT 2170	Industrial Training and Viva-	0	0	2	0	0	50	50

### Third Semester – B: (August –December)

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional Theory	Th. Exam	Practical	Total
1	STE 2101	Silkworm Seed	3	0	2	25	50	50	125
2	STE 2102	Rearing Requirements And Silkworm Pathology	3	0	2	25	50	50	125
3	STE 2103	Silkworm Rearing Technology	3	0	2	25	50	50	125
4	STE 2104	Silk Reeling Technology	3	2	0	25	100	-	125
5	STE 2105	Textile Fibre	3	1	0	25	75	-	100
6	STE 2106	Yarn Formation	3	0	3	25	50	75	150
<b>TOTAL</b>			<b>18</b>	<b>3</b>	<b>9</b>	<b>150</b>	<b>375</b>	<b>225</b>	<b>750</b>

### Fourth Semester (January to May)

Sl. No.	Subject Code	Subject Name	L	T	P	Sessional Theory	Th. Exam	Practical	Total
1	EE 2201	Measuring Instruments and Measurements	3	0	2	25	50	50	125
2	STE 2201	Fabric Formation	3	0	3	25	50	75	150
3	STE 2202	Chemical Processing of	3	0	3	25	50	75	150
4	STE 2203	Textile Testing & Instruments	3	0	2	25	50	50	125
5	HU 2201	Entrepreneurship Development Programme	2	0	0	25	25	-	50
6.	STE 2204	Non mulberry Silk, Reeling & Spinning	2	0	2	25	25	50	100
7	CS 2201	Computer Application in Textile Industry	0	0	4	-	-	100	100
<b>TOTAL</b>			<b>16</b>	<b>0</b>	<b>16</b>	<b>150</b>	<b>250</b>	<b>400</b>	<b>800</b>

## FIRST SEMESTER

### AC-1101 APPLIED CHEMISTRY

L T P  
2 1 3

Sessional Marks: 25  
End Term Exam Marks: 50

#### UNIT - I

**Structure of an Atom :** Recapitulation of fundamental particles of atom (e,p,n), e = electron; p=proton ; n=neutron, Atomic number, Mass number, Bohr's model of atom, Line spectrum of hydrogen, Modern concept of atom, quantum numbers, shells, sub-shells, orbitals (shapes of s and p orbitals), Pauli's exclusion principle, Aufbau Energy ranking rule, Hund's rule. (06 Hrs.)

**Periodic Table: Modern** periodic table, periodic properties (ionization potential, electron affinity, atomic and ionic radii) (04 Hrs.)

#### UNIT - II

**Chemical Arithmetic:** Mole concept, Empirical formula, Molecular formula (02 Hrs.)

**Oxidation and Reduction:** Electronic concept of oxidation and reduction, Redox reactions (direct and indirect), Balancing of simple redox reactions (oxidation number method and ion electron method)(3 Hrs.)

**Chemical Bonding :** Types of chemical bond (ionic, covalent, co-ordinate), Lewis structure, VSEPR theory, orbital concept of co-valency, formation of s-s, s-p, and p-p bonding with examples, Hybridization - sp, sp<sup>2</sup>, sp<sup>3</sup> (BeF<sub>2</sub>, BF<sub>3</sub>, CH<sub>4</sub>, H<sub>2</sub>O, NH<sub>3</sub>), Intermolecular forces (Vander Waal forces, Hydrogen bond), Metallic bond. (06 Hrs.)

#### UNIT - III

**Electrochemistry - I :** Conductance (specific, molar & equivalent conductance), Electrolysis, Faraday's laws and their applications. (04 Hrs.)

**Electrochemistry – II:**Electrochemical cell, type of electrodes, electrode potential and EMF, electrochemical series and its applications, effect of concentration on cell potential (Nernst equation), relationship of the cell potential and the equilibrium constant. (05 Hrs.)

#### UNIT – IV

**Chemical Equilibrium:** Law of Chemical equilibrium, Le chatelier principle, Ionization, factors affecting ionization of water, Ionic product, pH concept, Common Ion effect and solubility product, Concept of acids and bases (Arrhenius, Bronsted-Lowery, Lewis), Acid Base equilibrium, Buffer solutions. (05 Hrs.)

**Chemical Energetics:** Energy changes in chemical reactions, enthalpy changes, Heats of reactions and thermo chemistry, Hess's law of constant heat summation, elementary idea about entropy and free energy. (05 Hrs)

#### Recommended Books:

Chemistry for class XI and XII, published by NCERT

## AM-1101 APPLIED MATHEMATICS-I

L T P  
3 2 0

Sessional Marks: 25  
End Term Exam Marks: 100

### UNIT-I

Introduction to trigonometric formulas. Trigonometric ratios of multiple and sub-multiple angles (2A, 3A, A/2). Product formulae, conversion from sum or difference to product and vice-versa (without proof). Solutions of simple trigonometric equations. Inverse trigonometric functions and their properties. Permutation and combinations, elementary problems. Principle of mathematical Induction. (12 Hrs.)

### UNIT-II

Binomial theorem for positive integral index (without proof) and for any index (without proof), general and particular terms, first and second binomial approximation, simple problems. Complex number in the form of  $a+ib$ , Argand diagram, polar form, algebra of complex numbers, modulus and argument of a complex number, square root of a complex number, cube root of unity, triangle inequality, De-Moivre's theorem (without proof) and simple problems. (13 Hrs.)

### UNIT-III

Review of distance formula and section formula, equation of straight line in various standard forms, intersection of two straight lines, angle between two lines, condition of parallelism and perpendicularity, perpendicular distance formula. General equation of a circle, diameter form, centre and radius of a circle, circle through three non-collinear points, tangent and normal to a circle at a given point on it, condition of tangency. (13 Hrs.)

### UNIT-IV

Introduction to conic section, standard equation of parabola, ellipse and hyperbola (without proof), writing equations when directrix, focus and eccentricity are given; finding focus, directrix, latus-rectum, axes, eccentricity and vertex when equation is given. Arithmetic progression, geometric progression, arithmetico-geometric series. Special series:  $\sum n$ ,  $\sum n^2$ ,  $\sum n^3$ . (12 Hrs.)

### Recommended Books:

#### Text Book

Text books on Mathematics for XI, NCERT, New Delhi

#### Reference Books

Shanti Narayan, Coordinate Geometry, S. Chand and Co.  
Thomas & Finney, Calculus, Pearson Education

## AP-1101 APPLIED PHYSICS-I

L T P  
2 1 3

Sessional Marks: 25  
End Term Exam Marks: 50

### UNIT-I

**UNITS AND MEASUREMENTS:** Need for measurements, system of units, S.I. units, fundamental and derived units. Dimensional formula, dimensional equations and their applications. Error in Physical measurements-causes & types. Combination of errors (qualitative ideas). Numerical Problems (04Hrs.)

**VECTOR ANALYSIS:** Scalars and vectors, vectors in two and three dimensions, unit vector, laws of vector addition, Resolution of a vector in a plane, rectangular components, scalar and vector products. Numerical Problems (06Hrs.)

### UNIT-II

**DESCRIPTION OF MOTION:** Motion in a straight line, uniform motion, speed and velocity, equations of motion, instantaneous velocity and acceleration. Motion in two dimensions, projectile motion, uniform circular motion, qualitative concepts of torque, angular momentum, conservation of angular momentum, centripetal and centrifugal forces. Numerical Problems (06Hrs.)

**LAWS OF MOTION:** Force and inertia, first law of motion, momentum, second law of motion, impulse, third law of motion, conservation of linear momentum, qualitative concepts of rocket propulsion. Friction and its cause, Static and kinetic friction, self-adjusting nature of friction, laws of limiting friction, rolling friction, angle of friction and angle of repose, methods to reduce friction. Numerical Problems. (06Hrs.)

### UNIT-III

**WORK, POWER AND ENERGY:** Work and its scalar representation, Work done by a constant force, kinetic and potential energy, conservation of energy (free fall motion of a body), Power. Numerical Problems. (05 Hrs.)

**GRAVITATION:** Universal law of gravitation, Inertial and gravitational mass, relation between 'g' and 'G', variation of acceleration due to gravity (with altitude and depth), orbital velocity, escape velocity, elementary ideas of geo-stationary satellite. Numerical Problems (04 Hrs.)

### UNIT-IV

**SIMPLE HARMONIC MOTION:** Periodic motion, simple harmonic motion (S.H.M.) K.E. and P.E. in S.H.M., simple pendulum and oscillations of mass attached to vertical spring. Concepts of simple pendulum, Wave motion, its kinds & properties, speed, frequency, amplitude, time period and displacement of wave, principle of superposition. Numerical Problems. (04 Hrs.)

**PROPERTIES OF MATTER:** Interatomic and intermolecular forces, elastic properties, Hooke's law, Three moduli of elasticity, Poisson's ratio, surface tension and surface energy, angle of contact, examples of drops and bubbles, capillary rise, Viscosity, Stoke's law (treatment by dimensional analysis), Streamline and turbulent flow, Bernoulli's theorem. Numerical Problems. (05Hrs.)

#### Recommended Books:

Fundamental Physics Class (XI) by K L Gomber & K L Gogia Pardeep Publications  
Fundamental of Physics by Haliday & Resnick and Walker John Wiley & Sons

## ME 1101 FUNDAMENTALS OF ENGINEERING

L T P  
2 1 4

Sessional Marks: 25  
End Term Exam Marks: 50

### UNIT –I

Definition of Voltage, Current, Power, Energy etc. with their units. Differences between AC and DC. Various applications of electricity, Advantage of Electrical energy over other type of energy, Distinction between single phase and three phase, Name the different instruments used to measure voltage, Current and energy, Pictorial diagram of a three phase transmission and distribution system. Brief function of following accessories transformer, supports, conductors and insulators. (12 Hrs.)

### UNIT –II

Various accessories and parts of installation and identification of different wiring systems. Different types of circuit like circuit to control one lamp with one switch, circuit to control one lamp with two way switch, circuit to control one lamp, fan and 3 pin outlet socket by single way switch, circuit to control the three phase motor. (06 Hrs.)

Purpose of Earthing, Different method of earthing, other safety precautions while working on electrical equipment, Principle construction and working of AC and DC motors, Introduction to different types of motors i.e. single phase, three phase, various applications of single and three phase motors, Distinctions between single and three phase motors. (06 Hrs.)

### UNIT –III

Transmission of Power through belt, rope drives and pulleys and their applications, chain drive and its comparison with belt drives, Gear drives, type of Gears, Simple gear trains and velocity ratio.

Classification and application of IC engines, working principles of two stroke, four stroke petrol and diesel engines, cooling system and lubrication of IC engines, General maintenance of engine. (08 Hrs.)

### UNIT –IV

Basic principles of refrigeration and air conditioning. Working of centralized air conditioning, concept of split air conditioning and its application. General Idea of raw material used for construction, introduction to different construction techniques. Properties and uses of Brick, lime, cement and timber. Brief idea about the different types of foundation, concrete proportions, mixing water ratio, RCC and its uses (08Hrs.)

#### **Instruction strategy:**

While imparting instructions, teachers are expected to lay more emphasis on the concepts and principles. It will be better if the classes for the general engineering.



## STE 1101 - MULBERRY CULTIVATION

L T P  
2 1 2

Sessional Marks: 25  
End Term Exam Marks: 50

### UNIT –I

**History of Sericulture** – Introduction, History, Silk Road (04 Hrs.)

**Morphology of Mulberry**- Introduction, Distribution of Mulberry, Mulberry varieties, systematic position, morphology of mulberry (06 Hrs.)

### UNIT –II

**Taxonomy of Mulberry**- Introduction, mulberry taxonomy, non-mulberry taxonomy, conditions required for mulberry growth (06 Hrs.)

**Soils and Preparation of Land**- Introduction, types of soils and properties, soil P<sup>H</sup> and reclamation, selection of land , land preparation, soil erosion, moisture and conservation. (08 Hrs.)

### UNIT –III

**Propagation of Mulberry**- Introduction, sexual propagation, asexual propagation. (06 Hrs.)

**Cultivation and Cultural Practices**- Introduction, garden implements, selection of mulberry varieties, mulberry plant spacing, weeds and inter-cultivation, pruning and training, importance of water shed, methods of irrigation (06 Hrs.)

### UNIT –IV

**Leaf Harvesting**- Introduction, harvesting methods, preservation of mulberry leaves. (04 Hrs.)

#### Practical:

1. Morphology and Taxonomy of Mulberry
2. Identification of Different types of Soils
3. Soil sampling and Recording of Soil PH
4. Identification of different garden implements
5. Selection and preparation of Land
6. Soil moisture and conservation methods
7. Propagation of mulberry through seeds, cuttings, graftings, budding and layering
8. Preparation of cutting
9. Identification of different types of weeds
10. Pruning methods
11. Preparation of compost and vermi-compost
12. Leaf harvesting
- 13 Preparation of Herbarium viz Mulberry Leaf varieties and weeds
- 14 Visit to nearest Mulberry Farms

#### Recommended Books:

##### Text Books:

1. Text Book on Mulberry Cultivation, BIE, Hyderabad by Jaya Rao and Ramaswamy, 1994.
2. Mulberry Cultivation by P. Srinivas and M. Madan Mohan, SIVE, DIE, Hyderabad 2001

##### Reference Books:

1. Rangaswami, et.al, 1995, sericulture manual 1 Mulberry cultivation, FAO. Oxford and IBH Publishing.Co.Pvt.Ltd. New Delhi

## SECOND SEMESTER

### AC-1201 CHEMISTRY & ENVIRONMENTAL SCIENCE

L T P  
3 0 3

Sessional Marks: 25  
End Term Exam Marks: 50

#### UNIT – I

**ORGANIC CHEMISTRY – I:** Classification, nomenclature of organic compounds, Electronic displacement in a covalent bond; inductive effect, electrometric effect, resonance and hyper conjugation. Fission of a covalent bond; free radicals, electrophiles, nucleophiles, carbocation's and carbanions. (07 Hrs.)

#### UNIT – II

**ORGANIC CHEMISTRY – II:** Preparation and properties of alkanes, alkenes, alkyne and benzene, Common types of organic reactions: Addition, Substitution ( $S_N^1$ ,  $S_N^2$ ), Elimination ( $E_1$ ,  $E_2$ ) and rearrangement reactions. (08 Hrs.)

#### UNIT – III

**ORGANIC CHEMISTRY – III:** Stereoisomerism: Optical and geometrical isomerism, chirality, DL and RS notation. Conformation in butane and cyclohexane (chair and boat form). (07 Hrs..)

#### UNIT – IV

**CHEMICAL KINETICS:** Molecularity, rate and order of reaction, factors influencing rates of reaction, activation energy, rate equation for first and second order reaction, pseudo-unimolecular reactions. (04 Hrs.)

**ENVIORNMENTAL CHEMISTRY :** Environmental pollutants; soil, water and air pollution; chemical reactions in atmosphere, kind of smog, major atmospheric pollutants; acid rain, ozone and its reactions, effects of the depletion of ozone layer, green house effect and global warming, green chemistry as an alternative tool for reducing pollution. (14 Hrs.)

#### Recommended Books:

Chemistry for class XI and XII, published by NCERT  
Organic Chemistry, Morrison & Boyd.  
Physical Chemistry, G. W. Castellan  
Environmental Chemistry, A. K. De

## AM-1201 APPLIED MATHEMATICS-II

**L T P**  
**3 2 0**

**Sessional Marks: 25**  
**End Term Exam Marks: 100**

### UNIT-I

Function, types of functions, domain and range. Concept of limit. Standard limits. Continuity of a function (with simple examples). Physical & geometrical meaning of  $\frac{dy}{dx}$ , differentiation of  $x^n$ ,  $\sin x$ ,  $\cos x$ ,  $\tan x$ ,  $e^x$ ,  $a^x$  and  $\log x$  from the first principle. Differentiation of sum, difference, product and quotient. (10 Hrs.)

### UNIT-II

Differentiation of function of a function. Chain rule of differentiation, differentiation of inverse trigonometric functions, logarithmic and parametric differentiation. Differentiation of implicit function. Maxima and minima of a function. Equations of tangent and normal (for explicit function only). (12Hrs.)

### UNIT-III

Integration as an anti-derivative, fundamental integrals involving algebraic, trigonometric, exponential and logarithmic functions. Integration by substitution, by parts and by partial fractions. Integration of rational and irrational functions. (08 Hrs.)

### UNIT-IV

Evaluation of definite integral by substitution, properties of definite integral (without proof). Application of definite integral in finding area under a curve and area between two Curves involving line, circle, parabola and ellipse only. (12 Hrs.)

### Recommended Books:

#### Text Book

Text books on Mathematics for XII, NCERT, New Delhi

#### Reference Books

Shanti Narayan, Differential Calculus, S. Chand & Co.

Shanti Narayan, Integral Calculus, S. Chand & Co.

**UNIT- I**

**ELECTROSTATICS:** Coulomb's law (scalar & vector forms), electric field, electric field due to a point charge, electric dipole and its moment, electric fields along the axial and equatorial lines, concept of dielectric and dielectric constant, Gauss's theorem and its application to find electric field due to an infinite wire and plane sheet of charge. Conductors and insulators, force and torque experienced by a dipole (in uniform electric field), capacitance, parallel plate capacitor with air/dielectric medium between the plates, series and parallel combinations of capacitors, energy of a capacitor. Numerical Problems. (06 Hrs.)

**CURRENT ELECTRICITY:** Electric current, Ohm's law, resistance, resistivity, combination of resistances in series and parallel, internal resistance of a cell and its E.M.F, Kirchoff's laws, principle of potentiometer and its application for comparing e.m.f. of two cells and determination of internal resistance of a cell. Numerical Problems (04 Hrs.)

**UNIT- II**

**MAGNETISM:** Magnetism and its origin, Magnetic lines of force and magnetic dipole, current loop as a magnetic dipole, earth's magnetic field and its source (elementary ideas), concepts and properties of Para, Dia and Ferro-magnetic substances with examples. Numerical Problems (04 Hrs.)

**THERMAL AND MAGNETIC EFFECTS OF CURRENT:** Electric energy and power, Joule's law of heating, thermoelectricity (Seebeck effect), Biot-Savart's law, magnetic field due to a straight wire and a circular loop. Force on a moving charge in a uniform magnetic field, force between two parallel current carrying conductors, definition of Ampere, elementary idea of moving coil galvanometer and its conversion into ammeter and voltmeter. Numerical Problems (06 Hrs.)

**UNIT- III**

**ELECTROMAGNETIC INDUCTION AND ALTERNATING CURRENT:** Electromagnetic induction, Faraday's law, Induced e.m.f., Lenz's law, Lorentz magnetic force, self and mutual inductance, alternating current & e.m.f., mean and r.m.s. value of AC, elementary idea of working of transformer. Numerical Problems. (05Hrs.)

**HEAT AND THERMODYNAMICS:** First law of thermodynamics, specific heat at constant volume and constant pressure of ideal gas, relation between  $C_p$  and  $C_v$ . Thermodynamic processes (reversible, irreversible, isothermal and adiabatic), second law of thermodynamics. Thermal conductivity, black body radiation, Wien's law, Stefan's law, Newton's law of cooling. Numerical Problems (05Hrs.)

**UNIT- IV**

**RAY OPTICS AND OPTICAL INSTRUMENTS:** Laws of reflection and refraction, refractive index, lens and curved mirrors, lens and curved mirror formula, linear magnification, dispersion of light by prism and dispersive power (qualitative ideas), total internal reflection and its application in optical communication (elementary ideas), Prism Spectrometer, Optical instruments- simple microscope, Galilean telescope and magnifying power. Numerical Problems (06 Hrs.)

**WAVE OPTICS :** Wave front and Huygen's principle, interference of light, Young's double slit experiment, coherent sources of light, diffraction of light, diffraction due to a single slit, polarization of light (general idea). Numerical Problems (04 Hrs.)

**Recommended Books:**

Fundamental Physics Class (XII) by K L Gomber & K L Gogia Pardeep Publicatios  
Fundamental of Physics by Haliday & Resnick and Walker John Wiley & Sons

## STE - 1201 FARM MANAGEMENT AND SERI-BIOTECHNOLOGY

L T P  
2 0 3

Sessional Marks: 25  
End Term Exam Marks: 50

### UNIT- I

**Farm Management**- Introduction, mulberry farming, labour management, farm records  
(03 Hrs.)

**Mulberry Diseases** – Introduction, fungal diseases, bacterial diseases, viral diseases, nutrient deficiency diseases and control  
(06 Hrs.)

### UNIT- II

**Mulberry Pests** – Introduction, Lepidopteran pests, Jassids, Thrips, Mites, Beetles  
(06Hrs.)

**Estimation of Leaf Yield** – Introduction, methods of estimation  
(05 Hrs.)

**Economics of Mulberry cultivation** – Introduction, Nursery, Rain-fed cultivation, irrigation cultivation, Economics of 1 acre Mulberry.  
(06 Hrs.)

### UNIT- III

**Seri- Bio Technology** – Introduction, Tissue and Organ culture, Plant Bio-Technology, Silkworm Bio-Technology.  
(05 Hrs.)

**Secondary Food Plants and Diet** – Introduction, Secondary Food Plants, Artificial diet, composition of diet, preparation of diet.  
(05 Hrs.)

### UNIT- IV

**Cytology and Genetics of Mulberry** – Introduction, Mitosis and meiosis, Mendelian principles of genetics, importance of mulberry breeding.  
(04 Hrs.)

#### Practical:

- 1 Identification and control of leaf diseases
- 2 Identification and control of stem diseases
- 3 Identification and control of root diseases
- 4 Identification and control of pests of Mulberry
- 5 Identification of deficiency diseases
- 6 Maintenance of Farm records
- 7 Estimation of Leaf yield
- 8 Study of different farms in the village
- 9 Field studies on the pests of Mulberry
- 10 Identification of Secondary food plants
- 11 Preparation of Artificial diet
- 12 Preparation of Organ culture media
- 13 Observation of Mitosis in Onion root-tip
- 14 Collection of Mulberry diseased leaves, stem, root and pests.

#### Recommended Books:

Text Book on Farm Maintenance and Seed Technology, BIE, Hyderabad by Adithya Kumar and Somi Reddy, 1994.

## HU-1201 COMMUNICATION SKILLS

L T P  
1 2 0

Sessional Marks: 25  
End Term Exam Marks: 50

### UNIT – I

**TEXTUAL EXERCISES:** Exercises in Comprehension, Vocabulary and Composition (10 Hrs.)

### UNIT-II

**GRAMMAR:** Textual Review of usage of Tenses, Articles and Narration (08 Hrs.)

### UNIT-III

**CORRESPONDENCE:** Official, Business and Personal Letters (08 Hrs.)

### UNIT-IV

**WRITING SKILLS:** Précis writing exercises, Drafting Invitations, Advertisements, Reporting events (07 Hrs.)

**TUTORIALS:** Using the Library, Declamations & Debates, Conversation Practice (07 Hrs.)

#### **Recommended Books:**

Brush Up Your English, J.D.Murthy, Book Palace  
English Grammar & Composition, Wren & Martin, ELBS  
A Course in Written English, Narayan swami, Orient Longman

**THIRD SEMESTER**  
**STE – 2101 SILKWORM SEED TECHNOLOGY**

**L T P**  
**3 0 2**

**Sessional Marks: 25**  
**End Term Exam Marks: 50**

**UNIT – I**

**Systematic Position of *Bombyxmori*** – Introduction, Systematic position and classification, types of Silkworms. (03 Hrs.)

**Morphology and life History of *Bombyxmori*** – Introduction, study of life stages and history, sex differences in larva, pupa and moth, metamorphosis. (06 Hrs.)

**UNIT – II**

**Parental Races** – Introduction, distribution and seed organization, races, voltinism and moultinism. (06 Hrs.)

**Grainage Equipment** – Introduction, Prerequisite of Grainage, Grainage model building, equipment and uses, disinfection (06 Hrs.)

**UNIT – III**

**Grainage Operations** – Introduction, selection of seed races, procurement of seed, sex separation, synchronization, moth emergence, coupling and decoupling, ovi position. (06 Hrs.)

**Seed Production** – Introduction, preparation of layings, math examination, surface sterilization, assessment of laying incubation of eggs. (06 Hrs.)

**UNIT – IV**

**Acid treatment and Cold storage** – Introduction, types of eggs, physical and chemical stimulants, types of acid treatments, cold storage of eggs. (07 Hrs..)

**Practical:**

- 1 Morphological study of *Bombyx mori*
- 2 Study of Different races of silkworms
- 3 Study plan of Model Grainage building
- 4 Identification of Grainage equipment
- 5 Preparation of Disinfectants and Disinfection of Grainage
- 6 Processing and Preservation of Seed Cocoons
- 7 Sex separation of Pupa and moths
- 8 Synchronization of moth emergence
- 9 Coupling, Decoupling and ovi position
- 10 Preparation of egg cards
- 11 Preparation of loose egg cards
- 12 Moth Examination
- 13 Sorting and Disinfection of eggs
- 14 Collection and preservation of *Bombyx mori* life stages
- 15 Maintenance of Grainage records
- 16 Visits to nearest Grainages

**Recommended Books:**

1. G.Ganga and Sulochana chetty 2010, An Introduction to Sericulture, Oxford and IBH Publishing.Co.Pvt.Ltd. New Delhi.
2. Tribhuwan Singh, et.al 2004 Principles and Techniques of Silkworm Seed Production, Discovery Publishing House. New Delhi

## STE - 2102 REARING REQUIREMENTS AND SILKWORM PATHOLOGY

L T P

Sessional Marks: 25

3 0 2

End Term Exam Marks: 50

### UNIT – I

**Non- Mulberry Silk Worms** – Introduction, Distribution, salient features of non-mulberry silkworms. (03 Hrs.)

### UNIT – II

**Rearing House** – Introduction, Site selection, CSB model, types of rearing houses. (05 Hrs.)

**Rearing Equipment** – Introduction, equipment and uses, disinfectants and uses. (05 Hrs.)

**Preparation for Rearing** – Introduction, cleaning, preparation for disinfection, disinfection methods, maintenance of hygienic conditions. (08 Hrs.)

### UNIT – III

**Environmental Conditions** – Introduction, Temperature, humidity, air, light, regulation of environmental conditions. (04 Hrs.)

**Equipment required for Rearing 300 DFLs** – Introduction, equipment for Chawki shoot rearing. (03 Hrs.)

### UNIT – IV

**Silkworm Anatomy** – Introduction, Silk glands, digestive system, reproductive system of moths. (05 Hrs.)

**Silkworm Diseases and Pests** – Introduction, protozoan diseases, bacterial diseases, viral diseases, fungal diseases, minor pests, major pests, integrated disease and pest management. (07 Hrs.)

#### Practical:

- 1 Identification of different Non-Mulberry Silkworms and Cocoons
- 2 Study plan of CSB model rearing house
- 3 Identification of different rearing appliances and drawings
- 4 Preparation of Disinfectants and Disinfection
- 5 Identification of different mountages
- 6 Maintenance of Rearing records
- 7 Identification and control measures of Protozoan diseases
- 8 Identification and control measures of Bacterial diseases
- 9 Identification and control measures of Viral diseases
- 10 Identification and control measures of Fungal diseases
- 11 Identification and control measures of minor and major pests
- 12 Dissections of Silk glands, Digestive system and reproductive system.

#### Recommended Books:

1. Text Book on silkworm rearing, BIE, Hyderabad by Dr.Srinivas and Y.Ramaswamy, 1994.
2. S.Krishnaswami, et.al, 1995 sericulture manual 2 Silkworm rearing, FAO. Oxford and IBH Publishing.Co.Pvt.Ltd. New Delhi.
3. Principles of Silkworm Pathology, Mc Devaiah, Tk Narayana Swamy, Govindan R, Seri Scientific Publishers, 1998



## STE - 2103 SILKWORM REARING TECHNOLOGY

L T P  
3 0 2

Sessional Marks: 25  
End Term Exam Marks: 50

### UNIT – I

**Hatching and Brushing** – Introduction, blue egg and black boxing, hatching and hatching percentage, methods of brushing. (04 Hrs.)

**Chawki Rearing** – Introduction, Chawki rearing methods, quality of mulberry leaf, leaf selection, feeding schedules, bed cleaning, spacing, moulting, chawki rearing centers( C. R.C's) (08 Hrs.)

### UNIT – II

**Late age Rearing** – Introduction, late age rearing methods, quality of mulberry leaf, leaf selection, feeding schedules, bed cleaning, spacing, moulting (07 Hrs.)

**Effective Rate of Rearing (E.R.R.)** – Introduction, calculation of E.R.R. by weight, calculation of E.R.R. by number, calculation of L.C.R. (Leaf Cocoon Ratio) (06 Hrs.)

### UNIT – III

**Spinning and Mounting** – Introduction, ripening of worms, process of spinning, mounting, types of mountages, environmental conditions, care during mounting, cocoon harvesting, transport. (06 Hrs..)

**Bivoltine Rearing** – Introduction, bivoltine races, rearing aspects, advantages of bivoltine. (03 Hrs.)

### UNIT – IV

**Economics** – Introduction, economics of rearing 300 DFL's or 1 acre mulberry, by products of sericulture and their utilizations, rearing records. (06 Hrs.)

#### Practical:

- 1 Identification of Blue egg stage and black boxing
- 2 Calculation of Hatching percentage
- 3 Methods of Brushing and report.
- 4 Rearing methods for young age larvae
- 5 Rearing methods for late age larvae
- 6 Spacing and bed cleaning in chawki and late age rearing
- 7 Shoot rearing methods
- 8 Identifications of mountages
- 9 Harvesting and sorting of cocoons
- 10 Calculation of E.R.R. and L.C.R.
- 11 Preparation of rearing report
- 12 Visit to nearest rearing houses

#### Recommended Books:

1. Text Book on silkworm rearing, BIE, Hyderabad by Dr.Srinivas and Y.Ramaswamy, 1994.
2. S.Krishnaswami, et.al, 1995 sericulture manual 2 Silkworm rearing, FAO. Oxford and IBH Publishing.Co.Pvt.Ltd. New Delhi.
3. Silkworm rearing, Ananthanarayanan S.K., Delhi: Biotech Books, 2008

## STE - 2104 SILKWORM REELING TECHNOLOGY

L T P  
3 2 0

Sessional Marks: 25  
End Term Exam Marks: 100

### UNIT – I

**Silk Reeling Industry** – Introduction, importance of reeling industry, scope and limitations, properties of silk (03 Hrs.)  
**Cocoon Quality** – Introduction, physical characters, commercial characters, principles for assessment, model problems. (04 Hrs.)

### UNIT – II

**Cocoon Sorting** – Introduction, Tactile and Numerical Tests, Good cocoons, defective cocoons, model problems (06 Hrs.)  
**Cocoon Marketing** – Introduction, Rules and Acts, Price Fixation, model problems (05 Hrs.)  
**Cocoon Stifling** – Introduction, Stifling methods, storage of cocoons, sorting of cocoons, deflossing, Riddling, mixing. (06 Hrs.)

### UNIT – III

**Cocoon cooking and Brushing** – Introduction, cooking and methods of cooking, Brushing and methods of Brushing (05 Hrs.)  
**Reeling – Introduction**, Reeling Apparatus and operations, Reeling machines, re-reeling, silk Examination, Lacing and skinning, book making and baling. (04 Hrs.)

### UNIT – IV

**Raw Silk Testing and Economics** – Introduction, Testing Methods, Parameters, Standard Testing appliances, Conditioning of Raw silk, classification of Raw silk, Economics of Charaka and multi-end reeling machines (07 Hrs.)

#### Recommended Books:

1. Hand Book of Silk Technology, Tammanna N. Sonwalkar, Taylor & Francis, 1993
2. Silk Reeling, S K Ananthanarayanan, Biotech Books, Delhi

## **STE 2105 – TEXTILE FIBRE**

**L T P**  
**3 1 0**

**Sessional Marks: 25**  
**End Term Exam Marks: 75**

### **UNIT – I**

Textile fibres, Requirements of textile fibres, Classification of textile fibres with examples.  
(4 Hrs.)

### **UNIT – II**

Natural fibres. Overview on physical and chemical properties of cotton, jute, sisal, flax, ramie, wool and their application in Textiles.  
(12 Hrs.)

### **UNIT – III**

Synthetic fibres, Overview on physical and chemical properties of Polyester, Nylon, Viscose, Acrylic and their application in Textiles. Merits & demerits of synthetic fibres over natural fibres.  
(12 Hrs.)

### **UNIT – IV**

Silk fibres, Different types, Physical and chemical properties of different types of silk fibres, Use of different types of silk fibres in textile products.  
(12 Hrs.)

### **RECOMMENDED BOOKS:**

1. Textile Science by E. P. G Gohl and L. D. Vilensky
2. Tant-O-Rang by T. N. Basu
3. Hand Book of Textile fibres Vol. I & II by J. Gordon Cook.

## STE 2106 – YARN FORMATION

L T P  
3 0 3

Sessional Marks: 25  
End Term Exam Marks: 50

### UNIT – I

Fibre requirements for yarn formation, Principle of Yarn formation, Process sequence for yarn formation, Different hand spinning systems like Plain charkha, Throstle spinning, Ambar charkha.

(10 Hrs.)

### UNIT – II

Yarn formation by machine, Process sequence, Overview on task of different process sequence ----- Blow Room, Carding, Drawing, Combing, Roving, Spinning, Finishing. Types of yarns -- - Single, Ply, Cable and their characteristics.

(22 Hrs.)

### UNIT – III

Different yarn packages, Advantages and their suitability in use in Textile Industry

(4 Hrs.)

### UNIT – IV

Fancy or decorative yarn, common types, their application in textile designing.

(4 Hrs.)

### Yarn Formation (practical) Syllabus

- 1) Measurement of pitch of gear, Speed calculation from train of wheels of various combinations, Speed calculation of pulleys driven by belts, ropes, chains etc.
- 2) Handling of Roller eccentricity tester.
- 3) Handling of shore hardness tester.
- 4) Observation on the process sequences of Ambar Charkha Spinning system.
- 5) Yarn sample preparation by Ambar Charkha
- 6) Observation on the process sequences of Conventional Ring Spinning system
- 7) Observation on the individual process sequence like Blow Room, Carding, Draw Frame, Comber, Speed Frame & Ring Frame of Conventional Ring Spinning system and studies on functions of various components of individual machine.

### **Recommended Books:**

1. Manual of Cotton Spinning by Textile Institute
2. Cotton Spinning by William Taggart
3. Yarn Spinning by Subramonium
4. Spun Yarn Technology by Oxtoby
5. Ashford Book of Hand Spinning by Reeve
6. Complete Guide to Spinning Yarn by Brenda Gibson

## **FOURTH SEMESTER**

### **EE 2201 MEASURING INSTRUMENTS AND MEASUREMENTS**

**L T P**  
**3 0 2**

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

#### **UNIT – I**

**INTRODUCTION & CLASSIFICATION OF INSTRUMENTS:** Importance of instruments in Textile processing industries. General classification of industrial instruments. Indicating and recording type of instruments.

(12Hrs.)

#### **UNIT – II**

**INTRODUCTION & CLASSIFICATION OF INSTRUMENTS:** Static & Dynamic characteristics of instruments. Description and constructional details, working principle, ranges and application of different instruments such as pH Meter, mechanical tachometer, Electrical tachometer, stroboscope, Bourdon tube pressure gauge, Electrical strain gauges etc.

(12 Hrs.)

#### **UNIT – III**

**PRESSURE AND VACUUM GAUGES:** Liquid column gauges, Bourdon tube gauge, Melleod gauge, Ionization and thermal conductivity meters.

(8Hrs.)

#### **UNIT – IV**

**THERMO METERS AND PYROMETERS:** Bimetallic thermometers, liquid expansion thermometers, thermocouples, resistance thermometers, optical and radiation pyrometers.

(8 Hrs.)

#### **RECOMMENDED BOOKS:**

- 1) Electrical and electronics measurement and instrumentation, A.K.Sawhney, Dhanpat Rai & Co.
- 2) Electronic measurements & Instrumentation, Rajendra Prasad, Khanna Publishers
- 3) Electrical Measurement, J.B.Gupta, S.K.Kataraiya and sons

## STE 2201 FABRIC FORMATION

L T P  
3 0 3

Sessional Marks: 25  
End Term Exam Marks: 50

### UNIT – I

**Preparatory processes:** Introduction, sequence of processes.

**Winding:** a) Introduction, b) need for winding, c) charka winding device d) different types of packages and package builds in machine e) winding parameters: winding rate, wind and traverse ratio, gain, winding angle, e) winding faults f) unwinding — side and over end withdrawal, g) classification of winding machines — spindle and drum driven machines.  
(10 Hrs.)

### UNIT – II

**Weft winding-** a) Introduction b) need, c) shape and build of the pirn, d) concept of basic terms — pirn density, cohesion, bunch building, chase, winding and binding coils,  
**Sizing:** a) Introduction, b) sizing process, c) size ingredients and their purpose f) preparation of the size paste- formulation and equipments g) sizing faults and their remedies.  
(10 Hrs.)

### UNIT – III

**Reaching-in and Drawing-in :** a) Introduction, b) need, c) process d) Related calculations  
(5 Hrs.)

### UNIT - IV

**Weaving:** a) The fabric, b) methods of fabric formation, c) a technical introduction to weaving, d) Classifications of looms e) different motions of a loom and their objectives, f) path of warp through a loom, g) common fabric faults and their remedies. (8 Hrs.)  
**Fabric Structure:** a) Introduction, b) Concept of weave and repeat, c) Methods of weave representation, d) Concept of weaving plan and its elements like weave repeat, draft, lift and denting order, e) Fundamental weaves (like plain, twill and satin/sateen) and their derivatives.  
(7 Hrs.)

### Practical:

1. Observation of Charkha winding machine, its function, and preparation of sample bobbins & pirns.
2. Warp preparation using various techniques.
3. Size preparation and application.
4. Observation of Handloom, Functions of different components and studies on various motions.
5. Heald & Reed count calculations.
6. Sample Fabric analysis and determination of appropriate Heald, Reed to manufacture the fabric.
7. Preparation of fabric sample of plain, simple twill & satin weave in Handloom.
8. Observation of Power loom, Functions of different components and studies on its various motions.

**Recommended Books:**

1. Weaving Mechanism, N N Bannerjee, Sevak Publisher.
2. Tant-O-Rang, T N Basu, The New Book Stall, Kolkata-9.
3. Yarn Preparation, Talukdar, Sevak Publishers [Bani Library/Biswas Book Stall, College Street, Kolkata].
4. Watson's Textile Design and Colour, Z Grosicki, Woodhead Publishing Ltd.
5. Grammar of Textile Design, Nisbet, Mahajan Publishing Pvt. Ltd., Ahmedabad-380009, Gujrat.
6. Yarn Preparation Vol. 1 by R Sengupta

## STE 2202 CHEMICAL PROCESSING OF TEXTILES

L T P  
3 0 3

Sessional Marks: 25  
End Term Exam Marks: 50

### UNIT - I

**Introduction:** Overview of different stages of preparation of cotton/cellulosic, silk materials, prelims of preparation: grey testing-stamping-mending-stitching.

**Desizing:** Objective, methods of desizing, Different Desizing methods, enzymatic desizing — factors, methods; some commercial names of enzymes, merits and demerits, precautions, method of evaluation of desizing efficiency. (8 Hrs.)

### UNIT – II

**Scouring:** Objective, impurities of cotton fibre-their chemical nature and possible methods of removal, merits and demerits of each process, importance of alkali scouring, surfactants, factors of scouring, methods of scouring, different scouring equipment e.g., High pressure kier, combi-steamer, their construction, working principle, capacity, solvent scouring, method of evaluation of scouring efficiency, enzymatic scouring.

**Bleaching:** Objective, classification of bleaching methods, different bleaching agents, their relative merits and demerits; hypochlorite, peroxide bleaching — bleaching parameters, role of chemicals used in bleaching, method of evaluation of bleaching efficiency; method of application of optical whitening agents. (12 Hrs.)

### UNIT – III

**Mercerisation:** Objective; action of alkali on the morphological/fine structure of cellulose, methods — cold and hot; relative merits and demerits; evaluation.

Optical whitening agents.

**Singeing:** Objectives, materials suitable, singeing methods; gas singeing — merits, demerits, precautions

**Dyeing:** Definition, General theory of dyeing Chromophores and auxochrome Different dyes and their use. Application of Direct, Reactive and acid on cellulosic and silk material.

(10 Hrs..)

### UNIT-IV

**Preparation of silk:** Impurities present, degumming/scouring, bleaching,

**Printing:** Theory of printing, Methods & styles of Printing. Printing on silk and cotton.

(10Hrs..)

#### Practical:

1. Desizing, Scouring, Bleaching, Combined Scouring & Bleaching of Cloth sample.
2. Mercerizing of yarn and cloth sample.
3. Degumming of silk fabric sample.
4. Dyeing of Cotton Yarn/fabrics sample using direct, vat and reactive dyes.
5. Dyeing of silk Yarn/fabrics sample using Acid dyes.
6. Preparation of screens for printing.
7. Preparation of printing paste & printing on cotton, silk fabric samples with block & screen.
8. Printing with other styles like discharge & resist.



**Reference Subjects:**

1. Engg .Chemistry (Ch201), 2.Textile Fibres I & II (TT301 & TT401), 3. Chemical Processing of Textiles II, III & IV (TT404, TT503 & TT603).

**Text Books:**

1. Textile Chemistry, Vol. II by R.H. Peters,
2. Textile Scouring and Bleaching by E.R. Trotman
3. Technology of Bleaching and Mercerising by V.A. Shenai,
4. Engineering in Textile Colouration by C. Duckworth,
5. Dyeing and Chemical Technology of Textile Fibres by E.R. Trotman,
6. Handbook of Fiber Science and Technology, Vol. I, Fundamentals and Preparation, Part A and B by M. Lewin and S.B. Sello,
7. Chemical Technology of Fibrous Materials by F. Sadov, M. Korchagin and A. Matetsky,
8. Mercerisation by J.T. Marsh,
9. Surfactants in Textile Processing by A. Datyner,
10. The Preparation and Dyeing of Synthetic Fibres by H.U. Schmidlin
11. Textile Finishing by W S Murphy

## STE 2203 TEXTILE TESTING & INSTRUMENTS

L T P  
3 0 2

Sessional Marks: 25  
End Term Exam Marks: 50

### UNIT - I

**Introduction to textile testing:** Importance of Textile Testing, selection of samples for testing, preliminary statistical ideas. (8 Hrs.)

### UNIT - II

**Fibre Testing:** Measurement of fibre length; fibre fineness, maturity of cotton, moisture in fibres, foreign matters content, tensile characteristics of fibres. Conditioning of raw silk, Identification of common fibres. (10 Hrs.)

### UNIT - III

**Yarn testing:** Yarn dimensions and numbering: linear density, yarn numbering systems, determination of yarn count, conversion from one system to another, measurement of twist: effect of twist on fabric properties, methods of twist measurement, tensile characteristics of yarns. (12 Hrs.)

### UNIT - IV

**Fabric testing:** Thread density, Cover factor, crimp and comfort properties (handle, drape, thermal, air permeability. tensile characteristics of fabrics. (10 Hrs.)

#### Practical:

1. Observation of longitudinal & Cross section shapes of cotton, Jute, Ramie, Sisal, Flax, Silk, Wool, Viscose, Nylon, Polyester fibres.
2. Measurement of fibre length, fibre fineness.
3. Measurement of trash content in cotton fibre.
4. Measurement of yarn number using Wrap Reel & Balance, Direct count testing instrument & Beesley's Yarn Balance.
5. Measurement of single yarn twist, plied yarn twist using Twist Tester.
6. Measurement of crimp in yarn.
7. Measurement of Thread density, cover factor & thickness of fabric.

#### Text Books:

1. Principles of Textile Testing by J. E. Booth,
2. Textile Testing by Skinkle,
3. Handbook of Textile Testing and Quality Control by Elliot B Grover and D. S. Hamby

## HU 2201 ENTREPRENEURSHIP DEVELOPMENT PROGRAMME

**LT P**  
**2 0 0**

**Sessional Marks: 25**  
**End Term Examination Marks: 25**

### UNIT-I

Introduction to entrepreneurship, Meaning, Concept, Scope of entrepreneurship, qualities of an entrepreneur, problems faced by Indian entrepreneurs, Role of banks & financial institutions in the development of small scale industries. (12 Hrs.)

### UNIT-II

Communication, Communication process, Barriers to effective communication and communication channels, Effective communication, Motivation, Meaning, Motivating and demotivating factors, Abraham Maslow's need hierarchy model, Theory X & Theory Y of motivation. (12 Hrs.)

### UNIT-III

Marketing management & Marketing Mix, Leadership and qualities of a successful leader. (08 Hrs.)

### UNIT-IV

Responsibilities of Professional Manager, Basic functions of Management viz. planning, organizing, directing & controlling. (08 Hrs.)

### Recommended Books:

<b>Title</b>	<b>Author/Publisher</b>
Management	Stephen P. Robbins, Mary (Pearson education Asia)
Entrepreneurship New venture creation	David H. Holt, PHI
Entrepreneurship & small Business Management	Nicholas, Siropholis, Houghton
Mifflin Company, Boston-Newyork	
Entrepreneurship development of India	C.B. Gupta/Sultan chand & son

### UNIT – I

**Non-mulberry silk:** Varieties & availabilities, non-mulberry taxonomy. Characteristics of different non-mulberry silk.

**Non-mulberry Cultivation Practices:** Cultivation of Tasar Food Plants, Cultivation of Muga Food Plants, Cultivation of Eri Food Plants.

**Non- Mulberry Silkworm Diseases and their Management:** Diseases and Pests of Non-Mulberry Host Plants and their Management, Diseases and Pests of Non-Mulberry Silkworms and their Management

### UNIT – II

Introduction to non-mulberry cocoon reeling. Reeling & spinning of non-mulberry silk, different techniques, characteristics of non-mulberry silk yarns.

### UNIT – III

Characteristics of fabrics produced from non-mulberry varieties of silk. Exploration of new areas of application.

#### Practical:

1. Morphology of egg, larva, pupa, cocoon and moths of *Antheria mylitta* (tasar silkworm) Different ecotypes of *Antheria mylitta*.
2. Rearing appliances used in rearing and seed preparation of non-mulberry silkworms (Drawings and sketches).
3. Determination of physical and commercial characters of cocoon, study of different reeling and spinning machines (drawings), identification of different types of yarn, Spun silks and waste.
4. Spinning of cocoons: spinning appliances—Hand spinning, takli, charkha, spinning machines..

#### Recommended Books:

1. Morphological studies of food plants of non-mulberry silkworm viz., *T. tomentosa*, *T. arjuna*, *R. communis* (castor) with reference to taxonomic traits.
2. Waste silk spinning by Hollins Rayner (Abhishek Publication, Chandigarh)

## **CS 2201 COMPUTER APPLICATION IN TEXTILE INDUSTRY**

**L T P**  
**0 0 4**

**End Term Practical Exam Marks: 100**

### **UNIT-I**

Fundamentals of Software Packages like COREL DRAW and its application to create motifs & repeats for textile design.

### **UNIT-II**

Fundamentals of Software Packages like PHOTO SHOP and its application to create motifs & repeats for textile design, checks & stripes etc..

### **UNIT-III**

Application of Textile CAD software for creation of woven and print design.