



DEPARTMENT OF CHEMISTRY

EMPLOYABILITY	ENTREPRENEURSHIP	SKILL DEVELOPMENT	EMPLOYABILITY / ENTREPRENEURSHIP
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SEMESTER –III
AGRICULTURAL CHEMISTRY
(Non - Major Elective Course –I A)

Theory Hours Exam Hours : 3	Course code : U21CH3NME1:1 Credits :2 Marks : Max marks -100 Ext - 75 Int- 25
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- ❖ To learn about physical and chemical properties of soils
- ❖ To study about fertilizers, micro nutrients and bio-fertilizers
- ❖ To create an awareness about organic and green manures
- ❖ To apply the controlling measures of pests

UNIT-I (6 Hours)

1.1. Soil physical properties- soil separates and particle size distribution-soil texture and structure bulk density, particle density, pore space, soil air, soil temperature, soil water, soil consistence significance of physical properties to plant growth.

1.2. Soil chemical properties- soil colloids-inorganic colloids –clay minerals-amorphous-organic colloids-soil organic matter-decomposition-humus formation-significance on soil fertility, soil reaction-biological properties of soil-nutrient availability.

UNIT II (6 Hours)

1.1. Fertilizer-definition-fertilizer recommendation based on soil testing-fertility index-nitrogenous fertilizers (preparation and structure is not necessary)-effect of nitrogen on plant growth and




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development. Phosphate fertilizers (preparation and structure is not necessary)-effect of phosphorous on plant growth and development.

1.2. Secondary and micro nutrient fertilizers-complex fertilizers-complex and mixed fertilizers sources, manufacture, properties and reactions in soils.

UNIT III (6 Hours)

1.1. Biofertilizer-nitrogen fixing biofertilizer-rhizobium, azospirillum-phosphate mobilizing biofertilizer-bacteria bacillus, pseudomonas, fungi-aspergillus, penicillium.

1.2. Preparation of slow release fertilizers – compatibility of fertilizers-fertilizer blending-preparation of different fertilizer mixtures-fertilizer prescription for different soils and crops.

UNIT IV (6 Hours)

4.1. Nutrient potential of different organic manures- agricultural, industrial and urban wastes. **4.2.** Green manures-green leaf manure-bulky organic and concentrated organic manures-compost enriched farm yard manures, composting of coir pith; sugarcane trash, leaf litters and farm wastes-oil cakes, bone meal, guano poultry manures-fertilizers use efficiency-integrated nutrition management.


UNIT V (6 Hours)

5.1. Pest management and control:

Pesticides-characteristics-uses-fate of pesticides in soil and plants-impact of pesticides on environment safety measures in the analysis and handling of pesticides.

5.2. Insecticides, Fungicides, Herbicides and Acaricides-definition –examples and uses (preparation and structure is not necessary).




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CHEMISTRY OF CONSUMER PRODUCTS

Non - Major Elective Course –I B)

Theory Hours :2 Exam Hours : 3	Course code : U21CH3NME1:2 Credits :2 Marks : Max marks -100 Ext - 75
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UNIT I:

Int- 25

SOAPS

Saponification of oils and fats. Manufacture of soaps. Formulation of toilet soaps. Different ingredients used. Their functions. Medicated soaps. Herbal soaps. Mechanism of action of soap. Soft soaps. Shaving soaps and creams. ISI specifications. Testing procedures/limits.

UNIT II:

DETERGENTS

a. Anionic detergents: Manufacture of LAB (linear alkyl benzene). Sulphonation of LAB – preparation of acid slurry. Different ingredients in the formulation of detergent powders and soaps. Liquid detergents. Foam boosters. AOS (alpha olefin sulphonates. b. cationic detergents: examples. Manufacture and applications. c. Non-ionic detergents: examples. Manufacture of ethylene oxide condensate. d. Mechanism of action of detergents. Comparison of soaps and detergents. Biodegradation – environmental effects. ISI specifications / limits.

UNIT III:

SHAMPOOS

Manufacture of SLS and SLES. Ingredients. Functions. Different kinds of shampoos – anti-dandruff, anti-lice, herbal and baby shampoos. Hair dye. Manufacture of conditioners. Coco betaines or coco diethanolamides – ISI specifications. Testing procedures and limits.

UNIT IV:

SKIN PREPARATIONS

Face and skin powders. Ingredients, functions. Different types. Snows and face creams. Chemical ingredients used. Anti perspirants. Sun screen preparations. UV absorbers. Skin bleaching agents. Depilatories. Turmeric and Neem preparations. Vitamin oil. Nail polishes: nail polish preparation, nail




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polish removers. Article removers. Lipsticks, roughes, eyebrow pencils. Ingredients and functions – hazards. ISI specifications.

UNIT V:

Leading firms, brand names, choosing the right product. Packing regulations. Marketing. Licensing – drug license – legal aspects. GMP – ISO 9000/12000 – consumer education. Evaluation of the product – advertisements.

SEMESTER IV INDUSTRIAL CHEMISTRY (Non Major Elective Course – IIA)

Theory Hours :2 Exam Hours : 3	Course code : U21CH4NME2:1 Credits :2 Marks : Max marks -100 Ext - 75 Int - 25
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UNIT – I

1.1 **Cement** : Manufacture – Wet process and dry process, types, Analysis of major constituents, setting of cement, Reinforced concrete. Cement industries in India.

1.2 **Glass** : types, composition, manufacture of optical glass, coloured glasses and lead glass.

UNIT – II

2.1 **Sugar** :Cane Sugar manufacture, recovery of sugar from molasses, sugar estimation, sugar industries in India.

2.2 **Paints and varnishes** : Primary Constituents of paints, Dispersion medium (Solvent), binder pigments.

UNIT – III

3.1 **Chemical explosives** : Origin of explosive, Preparation and chemistry of TNT, Dynamite, Cordite, Picric acid and gun power.

3.2 **Water Industry**: Pollution of Water by fertilizers, detergents, pesticides and industrial wastes, BOD, COD thermal pollution, Water treatment – Ion exchange, electro dialysis, reverse osmosis, softening of hard water.

UNIT – IV

4.1 **Coal** : Origin and economic importance of coal, types analysis and composition, coal gasification, coal – tar.

4.2 **Petroleum** : Origin, refining, cracking, reforming, knocking, and octane number.

UNIT-V




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5.1 Fuel gas: Large scale production, Storage, hazards and uses of coal gas, water gas, Producer gas.

5.2 Fertilizers: Fertilizer industries in India, manufacture of ammonia, ammonium salts, urea, super phosphate, triple super phosphate and nitrate salts.

SEMESTER IV

BASIC CLINICAL CHEMISTRY

(Non Major Elective Course – IIB)

Theory Hours :2 Exam Hours : 3	Course code : U21CH4NME2:2 Credits :2 Marks : Max marks -100 Ext - 75 Int - 25
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UNIT-I:

CLINICAL HYGIENE AND BIOCHEMICAL ANALYSIS

Definition of health. Ryde of WHO. Sterilization of surgical instruments. Disinfectants, antiseptics, sanitation. Biochemical analysis of urine, serum and fecal matter. Treatment for specific poisons-acids, alkalis, arsenic and mercury compounds.

UNIT-II:

COMMON DRUGS

Manufacture of drugs –quinine, reserpine, atopside and d – tubocurarine from indian medicinal plants. Narcotic analgesics (only morphine compds). Antipyretic analgesics (acetyl salicyclic acid, p – amino – phenol derivatives).

Muscle relaxants. i. Acting at neuromuscular junction (d – tubocurarine chloride). ii. Acting at spinal cord alone (glyceryl guaiacolate, diazepam).

Antibiotics -pencillin, Cardiovascular drugs-nitrates, beta blockers (propranalol and atinelol) and calcium channel blockers.

UNIT-III:

ENZYMES

Classification, specificity. Coenzymes, Cofactor, ATP, Mechanism of enzyme action and Immobilisation of enzymes.

Specific action of enzymes, factors affecting enzyme activity

UNIT-IV:

BODY FLUID




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Blood volume, blood groups, coagulation of blood. Plasma lipoproteins. Blood pressure. Arteriosclerosis, diseases affecting red cells: Hyperchromic and hypochromic anaemia. Blood transfusion. Blood sugar and diabetes.

Knowledge of measuring blood pressure, influence of blood pressure, blood sugar control levels and medicine used to control blood pressure and blood sugars

UNIT-V:

BIOTECHNOLOGY

Heredity, recombinant DNA, Genetic engineering and its possible hazards, Gene splicing, manufacture of interferon and human insulin (Humulin),

Drug manufacture based on fermentation (only antibiotics)

Hydro Chemistry

Theory Hours :2 Exam Hours :3	Course code : U214CHSE1 Credits :2 Marks : Max marks -100 Ext - 75 Int - 25
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Unit-I

Water: Source of water - impurities in water - hardness of water – types of hardness - unit of hardness – important specifications of drinking water(WHO).

UNIT -II

Water pollution: Various water pollutants (sewage & other oxygen demanding wastes, infectious agents, exotic organic chemicals, inorganic minerals & chemical compounds, sediments, radioactive substances, heat, oil and detergents)

UNIT -III

Source and toxicity of Cr, Mn, Cu, Se, Mo, Cd, I, Hg, Pb, Fe and Zn - treatment of domestic water (primary, secondary treatments and tertiary treatments by ion exchange process and R.O. Process).

Unit-IV

Separation and Purification techniques: Principles and techniques of crystallization, fractional crystallization, sublimation, simple distillation, fractional distillation and steam distillation, distillation under reduced pressure and solvent extraction (using Soxhlet extraction) .

UNIT - V

Chromatographic techniques: Mobile phase and stationary phase- TLC and paper Chromatographic techniques (sampling, development, R_f values, identification)




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SEMESTER- V
SKILL ENHANCEMENT COURSE – II - THEORY
DOMESTIC CHEMISTRY

Theory Hours : 2 Exam Hours : 3	Course code : U215CHSE2 Credits :2 Marks : Max marks -100 Ext - 75 Int - 25
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Unit-I

Food: Nutritional classification of food (carbohydrate, proteins and amino acids, lipids, vitamins, minerals and water) and their functions in the body – examples for each class -rancidity of oil – anti oxidants.

Milk: composition– some commercial milk products

Unit -II

Soap: Definition, Preparation of soap by cold process and hot process - properties of soap.**Detergent:** Types, preparation, comparison of the properties of detergent with soap.**Preparation of some food products:** Tooth paste, Jam & Jelly, Garam masala powder, Tomato paste, tomato sauce and tomato soup

Unit-III

Polymers: Classification (based on physical property, composition & reaction mode of polymerization).**Properties of polymers:** The crystalline melting point. The glassy state and the glass transition temperature. Solubility of polymers. Thermal analysis of polymers. Polymer degradation – thermal, mechanical, high energy radiation, oxidative and hydrolytic.

Unit- IV

Paint: Requirements of good paint, constituents of paint and their functions – varnish - lacquer &enamel – emulsion paints - special paints (fire retardant, water repellent, heat resistant paint, anti fouling, luminous paints)

Unit- V

Preparation of some domestic products: Nail polish, hand cream, perfumes, rose water, sandal wood powder, shampoo, Mosquito coil, candle, chalk, ink, Phenyl, incense stick and Liquid blue (Formulation and Procedure).




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SEMESTER- V

SKILL ENHANCEMENT COURSE – III - THEORY

IMPACT OF MEDICINAL PLANTS ON SOCIETY

Theory Hours : 2 Exam Hours : 3	Course code : U215CHSE3 Credits :2 Marks : Max marks -100 Ext - 75 Int - 25
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UNIT –I

Medicinal plants- Importance and scope, cultivation of medicinal plants- processing and utilization. Chemical nature of crude drugs- Extraction, preparation and preservation of crude drugs.

UNIT –II

Traditional herbal teas. Herbs for woman, Babies and children. Concepts of herbal garden- Home, School Herbal gardens.

UNIT-III

Classification and estimation of primary metabolites – Carbohydrates, fatty acids, amino acids and proteins. Secondary Metabolites- Classification, General characters, Chemical nature, Extraction, and estimation methods for glycosides, Tannins, Volatile oils, Resinous substances, Terpenoids- phenolic compounds and alkaloids.

UNIT-IV

Antioxidants –Role of antioxidants- Estimation of antioxidants- Ascorbic acid, α –Tocopherol

UNIT-V

Post-harvest technology in medicinal plants: scope and importance. Importance of herbal marketing Future prospects and constraints of the herbal drug industry-Regulatory status of herbal medicine in India.




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SEMESTER – VI

MAJOR BASED ELECTIVE COURSE- (E -II B)

FOOD CHEMISTRY

Theory Hours :6 Exam Hours : 3	Course code : U21CH6MBE2:2 Credits : 5 Marks : Max marks -100 Ext - 75 Int - 25
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UNIT-I

1.1 Cereals definition - Classification, Processing - Structure of Cereals - Composition and nutritive value. Pulses definition - Classification - Processing - Structure of Pulses - Composition and nutritive value - Toxic Constituents in pulses - medicinal value of cereals and pulses.

1.2 Sugar and related products. Sugar Structure and Properties. Nutritive value - Sugar composition in different food items. Sugar related product - Classification & nutritive value. Artificial sweeteners - example - advantages and disadvantages.

UNIT-II

2.1 Vegetables - classification - composition & nutritive values - Fruits- Classification - Composition & nutritive values.

2.2 Fungi and algae as food - enzymatic browning and non enzymatic browning - Nutritive value of some common foods - milk, egg., soyabeans

UNIT-III

3.1 Beverages - definition and examples - Classification of beverages
Fruit beverages - Milk based beverages - malted beverages - examples.
Alcoholic and non alcoholic beverages - examples.

3.2 Appetizers - definition - classification - examples - Water - functions and deficiency.

UNIT-IV

4.1 Food Preservatives - definition - classification - Food Spoilage - definition - Prevention. 4.2 Methods of preservation - classification - Low and high temperature - preservatives examples -Dehydration - osmotic pressure - food irradiation.

UNIT-V

5.1 Food additives - Definition – classification - their functions - chemical substance.

5.2 Packaging of foods - Classification-Materials used for packaging.




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SEMESTER – VI
MAJOR BASED ELECTIVE COURSE – (E-II C)
ROLE OF CHEMISTRY IN LIFE

Theory Hours :6 Exam Hours : 3	Course code : U21CH6MBE2:3 Credits : 5 Marks : Max marks -100 Ext - 75 Int - 25
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UNIT I : HEALTH

Definition: Food, Food Pyramid - Health-Hygiene- mal, under and over nutrition, their causes and remedies, sanitation.

UNIT II DRUGS

Drugs - Types of drugs-depressant, anticonvulsant, narcotics, antipyretics, antibiotics, antiseptics, analgesics, muscle relaxants and cardiovascular and vaso depressants, steroids (Only Applications).

UNIT III BODY FLUIDS

Blood volume, groups, coagulation, blood pressure, anaemia, blood sugar, Haemoglobin, Chemistry of urine.

UNIT IV ENZYMES AND HORMONES

Types of enzymes and enzyme action, Characters of hormones action, examples of essential hormones.

UNIT V COMMON DISEASES

Common diseases - Jaundice, vomiting, fever, night blindness, ulcer, and diabetes.




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SEMESTER – VI

MAJOR BASED ELECTIVE COURSE- (E-III A)

PHARMACEUTICAL CHEMISTRY

Theory Hours :5 Exam Hours : 3	Course code : U21CH6MBE3:1 Credits :5 Marks : Max marks -100 Ext - 75 Int - 25
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UNIT-I

1.1 Definition of the following terms - Drug, Pharmacophore, Pharmacology, Pharmacopoeia, Bacteria, Virus, Chemotherapy and Vaccine.

1.2 Causes, Symptoms and Treatment for Jaundice, Cholera, Malaria and Filaria - First Aid for Accidents - Antidotes for Poisoning.

1.3 Organic Pharmaceutical Aids - Their Role as Preservatives, Antioxidants, Colouring, Flavouring and Sweetening agents – Examples.

UNIT-II

2.1 Causes, Detection and Control of Anaemia and Diabetes - Diagnostic tests for Sugar, Salt and Cholesterol in Serum and Urine.

2.2 Blood - Composition of Blood and Blood Plasma – RBC – Structure and Functions - Functions of Haemoglobin – WBC - Structure and Functions - Rh Factor – Blood Coagulation – Identification and Estimation of Cholesterol in Blood - Blood Pressure – Hypertension and Hypotension - Normal, High and Low to Control.

2.3 Indian Medicinal Plants and Their Uses - Tulasi, Neem, Kizhanelli, Mango, Semparuthi, Adadodai and Thoothuvelai.


UNIT-III

3.1 Antibacterials - Sulpha drugs – Sulphanilamide Derivatives – Mode of action of Sulpha drugs - Examples - Prontosil, Sulphathiazole and Sulphafurazole – Uses - Antibiotics - Definition – Gram positive and Gram negative bacteria - Uses of Ampicillin, Streptomycin and Tetracyclines.

3.2 Antiseptics and Disinfectants - Definition and Distinction - Phenolic compounds, Chloro compounds and Cationic surfactants.

3.3 Vitamins – Definition – Classification of Vitamins – Sources and Uses –




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Deficiency Diseases caused by Vitamins.

UNIT-IV

4.1 Analgesics – Definition - Classification - Narcotic and Non- narcotic – Antipyretic analgesics – Mechanism of action - Morphine and its derivatives - Pethidine and Methadone - Salicylic acid derivatives – Antipyretics and Antiinflammatory Agents - Definition and Actions – Aspirin, Paracetamol, Ibuprofen - Disadvantages and Uses.

4.2 Anaesthetics – Definition – Classification - Local and General – Volatile – Uses of volatile liquids as Inhalation Anaesthetics – Chloroform - Gaseous Anaesthetics - Nitrous Oxide, Ether and Cyclopropane - Uses and Disadvantages – Intravenous Anaesthetic Agents – Thiopental sodium, Methohexital and Propofol.

4.3 Drugs affecting CNS - Definition, Distinction and Examples for Tranquilizers, Sedatives (Phenobarbital, Diazepam) - Hypnotics, Psychedelic Drugs – LSD, Hashish Their effects.

UNIT-V

5.1 Antineoplastic Drugs - Causes and Types of Cancer - Treatment of Cancer – Antineoplastic Agents – Antimetabolites - AIDS - AZT, DDC.

5.2 Hormones – Definition - Classification – Physiological Functions of Insulin, Adrenaline, Thyroxin and Oxytocin.

5.3 Sex hormones – Androsterone, Testosterone, Progesterone and Estrogen - Biological functions – Disorders of Hyposecretion and Hypersecretion of Hormones.

SEMESTER –VI

MAJOR BASED ELECTIVE COURSE- III(B)

BIO CHEMISTRY

Theory Hours :5 Exam Hours : 3	Course code : U21CH6MBE3:2 Credits :5 Marks : Max marks -100 Ext - 75 Int - 25
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UNIT-I: Chemistry of Carbohydrates

Definition and Classification of carbohydrate. Monosaccharides - occurrence, structure; physical and chemical properties, linear and ring forms (Haworth formula) for glucose and fructose. Disaccharides - occurrence, structure; physical and chemical properties of sucrose and lactose. Polysaccharides - occurrence, structure, physical and chemical properties of starch.

UNIT-II: Chemistry of amino acids




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Definition and classification of amino acids. Reaction with ninhydrin, common properties of amino acids, amphoteric nature, isoelectric point, isoelectric pH and Zwitter ion.

UNIT-III: Chemistry of Proteins

Classification based on solubility, shape and size. Physical properties: salting in and salting out, denaturation, peptide bond. Structure of protein: primary, secondary, tertiary and quaternary structure.

UNIT-IV: Chemistry of Lipids

Definition, classification and functions of lipids. Occurrence, chemistry and biological functions of simple lipids, compound lipids (e.g. phospholipids) and derived lipids: steroids (e.g. cholesterol). Physical property-emulsification. Chemical property-saponification. Functions of bile acids and bile salts.

UNIT-V: Chemistry of Nucleic acids

Definition - nucleoside, nucleotide and polynucleotide. Double helical model of DNA and its biological functions. Structure, types and functions of RNA: tRNA, mRNA and rRNA. Differences between DNA and RNA.

SEMESTER –VI

MAJOR BASED ELECTIVE COURSE- III(C)

APPLIED CHEMISTRY

Theory Hours :5
Exam Hours : 3

Course code :
U21CH6MBE3:3 Credits :5
Marks : Max marks -100
Ext - 75
Int - 25

UNIT I

1.1 Petroleum - Origin – Composition of Petroleum - Inorganic, Engler and Modern theories – Classification – Refining (Simple Refinery) – Cracking – Thermal and Catalytic – Knocking – Octane Rating – Antiknock Compounds – Cetane Rating – Synthetic Petrol – LPG.

1.2 Gobar Gas – Production – Feasibility and Importance of Biogas with special reference to Rural India.




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1.3 Petrochemicals – Elementary study – Definition - Chemicals from Natural Gas, Petroleum, Light naphtha and Kerosene – Origin – Composition - Synthetic Gasoline.

UNIT II

2.1 Paper technology – Introduction – Manufacture of pulp – Various raw materials used for the preparation of pulp - Preparation of Sulphite pulp, Soda pulp and Rag pulp.

2.2 Various processes - Beating, Refining, Filling, Sizing and Colouring.

2.3 Manufacture of Paper – Calendering – Uses.

UNIT III

3.1 Sugar industry - Sugar industries in India – Sugarcane and sugar beet - Manufacture of cane sugar – Extraction of juice – Concentration – Separation of crystals.

3.2 Recovery of Glucose from Molasses – Defection – Sulphitation – Carbonation – Testing and Estimation of Sugar – Double Sulphitation Process.

3.3 Preparation of Bagasse – Use of Bagasse for Manufacture of Paper and Electricity - Preparation of Alcohol from Molasses - Preparation of Absolute Alcohol - Manufacture of Wine, Beer, Methylated Spirit and Power Alcohol.

UNIT IV

4.1 Explosives – Primary, Low and High Explosives – Single compound explosives - Binary explosives – Plastic explosives – Dynamites – Blasting explosives - Preparation and Uses of Lead Azide, Nitroglycerine, Nitrocellulose, TNT, Cordite, Picric Acid and Gun Powder – Introduction to Rocket Propellants.

4.2 Photography – Chemical Principle – Preparation of Sensitive Emulsion – Exposure – Developing – Fixing and Printing – Colour photography – Xerographic copying.

4.3 Coal – Classification by rank – Proximate and Ultimate analysis – Low and High Temperature Carbonisation – Otto-Hoffmann's by-product - Distillation of Coal Tar.

UNIT V

5.1 Milk – Definition – Physico-Chemical properties of milk - Constituents of milk and Their Physico chemical Properties.

5.2 Chemical change taking place in Milk due to Processing Parameters - Boiling, Pasteurisation,





Sterilisation and Homogenisation.

5.3 Definition and Composition of Creams, Butter, Ghee and Ice Creams - Milk Powder Definition, Need for making powder - Principles involved in Drying process - Spray drying and Drum drying.

SKILL ENHANCEMENT COURSE –I THEORY
TEXTILE CHEMISTRY (2Hours)

Theory Hours :2 Exam Hours : 2	Course code : P20SET Credits :2 Marks : Max marks -100 Ext - 75 Int - 25
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UNIT – I

Textile fiber and pretreatment: Classification of textile fibers – concept and techniques of Ginning, Sizing, Desizing, Scouring, Bleaching, and Mercerization- fiber identification tests (Flame test – microscopical& solubility test)

UNIT –II

Dye chemistry: Colour and sensation - theories of colour and chemical constitution – Witt's theory - chromospheres - auxochrome – chromogen - classification of dye based on application .

Unit-III

Technical terms in dyeing: M.L.ratio – % of shade– % of exhaustion – equilibrium absorption.

Non textile uses of dyes: Leather dyeing, paper dyeing, solvent dyes, food colours, hair colours and fluorescent brightening agents

Unit-IV

Dye bath assistants: Explanation and mechanism of exhausting agent, wetting agent, levelingagent, dispersing agent and carrier.




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Fastness properties – Light, Washing Rubbings, sublimation and perspiration

fastness. **Unit-V**

Textile proofing – Water proofs, moth proofing, mildew proofing & fire

proofing. **Dyeing machineries:** Padding mangle, Jigger, and Winch.

SEMESTER - II

ELECTIVE COURSE - II (B)

CHEMISTRY IN EVERY DAY LIFE

UNIT I (15 hours) Basic Ideas and Industrial Wastes: Basic idea about unit operation – flow chart – chemical conversion – batch versus continuous processing – chemical process selection – design – chemical process control. Types of industrial wastes – treatment of wastes or effluent with organic impurities – treatment of wastes or effluent with inorganic impurities – treatment of some important chemical wastes. **UNIT II (15 hours) Petroleum and Petrochemicals:** Introduction – saturated hydrocarbons from natural gas – uses of saturated hydrocarbons – unsaturated hydrocarbons – acetylene, ethylene, propylene, butylene – aromatic hydrocarbons – toluene and xylene. Preparation of rectified spirit from beat – methylated spirit – preparation of absolute alcohol from rectified spirit – petrochemicals in India. **UNIT III (15 hours) Manufacture of Cement:** Introduction – types of cement – high alumina cement, water proof cement, slag cement, acid resisting cement, white cement, coloured cement, Pozzolan cement. Setting of cement – properties of cement – testing of cement – uses of cement – concrete – cement industries in India. **UNIT IV (15 hours) Pulp and Paper and Manufacture of Paper:** Introduction – manufacture of pulp – types of pulp – sulphate or craft pulp, soda pulp, Rag pulp – beating, refining, filling, sizing and colouring. Calendaring – uses – paper industries in India.

UNIT V (15 hours)

Soaps, Detergents and Perfumes: Introduction – types of soaps – hard and soft soaps – manufacture of soap (hot and continuous process only) – cleansing action of soap – detergents – surface active agents – biodegradability of surfactants, amphoteric detergents. Introduction – production of natural perfumes – flower perfumes – jasmine, rose and lily – production of synthetic perfumes – muscone and nitro-musks

SEMESTER - II

MAJOR BASED ELECTIVE COURSE – II (A)

ANALYTICAL CHEMISTRY

UNIT - I (15 hours) Instrumental Methods of Analysis: Principles and applications of extended X-ray absorption fine structure (EXAFS) – surface extended X-ray absorption (SEXAFS) – atomic absorption spectroscopy (AAS) – flame emission spectroscopy (FES) – turbidimetry – theory and applications.

UNIT - II (15 hours) Data and Error Analysis: Various types of error – accuracy, precision, significant figures – frequency distributions, the binomial distribution, the Poisson distribution, n and normal distribution – describing data, population and sample, mean, variance, standard deviation,




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Hypothesis testing, levels of confidence and significance, test for an outlier, testing variances, means t-Test, paired t-Test – analysis of variance (ANOVA) – correlation and regression. Curve fitting, fitting of linear equations, simple linear cases, weighted linear case, analysis of residuals – general polynomial equation fitting, linearizing transformations, exponential function fit – r and its abuse – multiple linear regression analysis, elementary aspects.

UNIT – III (15 hours) Chromatography : Solvent extraction – principles of ion exchange, paper, thin-layer and column chromatography techniques – columns, adsorbents, methods, R_f values, Mc Reynold's constants and their uses – HPTLC, HPLC techniques – adsorbents, columns, detection methods, estimations, preparative column – GC-MS techniques – methods, principles and uses.

UNIT – IV (15 hours) Thermo Analytical Methods and Fluorescence

Spectroscopy

Principles – instrumentations and applications of thermogravimetry analysis (TGA), Differential Thermal Analysis (DTA) and Differential Scanning Colorimetry (DSC) – thermometric titrations – types – advantages.

Basic aspects of synchronous fluorescence spectroscopy – spectral hole burning – flow cytometry – fluorimeters (quantization) – instrumentation – applications.

UNIT- V (15 hours) Electroanalytical Techniques: Electrochemical sensors, ion-sensitive electrodes, glass – membrane electrodes, solid-liquid membrane electrodes – ion-selective field effect transistors (ISFETs) – sensors for the analysis of gases in solution.

Polarography – principles and instrumentation – dropping mercury electrode – advantages – Ilkovic equation – applications of polarography – polarographic maxima – oscillographic polarography, AC polarography – cyclic voltammetry – advantages over polarographic techniques – chronopotentiometry – advantages – controlled potential coulometry.

Amperometric titrations: principles – techniques – applications – estimation of lead.

SEMESTER –II

VALUE ADDED COURSE – TEXTILE CHEMISTRY PRACTICAL

II. Combination on percentage of shade

0.5% shade, 1% shade, 2% shade, 2% Combination shade

III. Fiber - Identification test

For cotton, Wool, Jute, Viscose, Silk, Polyester

IV. Preparation of Dye




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Methyl orange and Phenol red

References

1. Chemistry of Dyes and Principles of dyeing by Dr.V.A.Shenai
2. Technology of textile fibre Dr.V.A.Shenai

SEMESTER -III

ELECTIVE COURSE – III (A)

MEDICINAL CHEMISTRY

UNIT - I (15 hours) First aid– Definition - rules of first aid – first aid for cuts, abrasions, bruises, bleeding, fractures, burns, fainting and poisonous bites. First box –detection hallucinogens and poisons and antidotes for poisoning **Some common poison and their antidotes**- Acid poisoning, alkali poisoning , poisoning by disinfectants, Poisoning of hallucinogens atropine, alcohol, Mercury poisoning.

UNIT- II (15 hours) Indian medicinal plants –Adathodavasica, Ocimum sanctum, Hibiscus rosa-sinensis, Mangiferaindica, Azadirachtaindica, Ficus,Solanumtrilobatum, Phyllanthusniruri.

Biological role of some inorganic compounds –Sodium, potassium ,calcium , iodine, copper ,zinc and its compounds

UNIT - III (15 hours) Antibiotics : Definition.

Chloromphenicol –properties, structure, uses , SAR (Structure activity relationship). Pencillin- structure, uses , SAR.


Anesthetics- Definition - Characteristics

General anesthetics – volatile general anesthetics chloroform preparation, properties ,advantages and disadvantages. Non-volatile general anesthetics –thiopental sodium preparation ,properties , advantages and disadvantages.

Local anesthetics – Requisites, cocaine, procaine, amithocainestructure , properties, advantages and disadvantages.

UNIT- IV (15 hours) Organic pharmaceutical Aids- Classification.




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Preservatives – Definition , Characteristics, Benzoic acid, Hydroxy benzoate, sodiumbenzoate properties and its uses

Antioxidant –Definition, galic acid, propyl galate, properties and uses.

General study of Sequestrants, emulsifying agents, colouring, flavouring and sweetening agents.

Stablizing and suspending agents, ointment bases and related agents and solvents **UNIT - V (15 hours)**

Important drugs – Availability, uses and side effects ofAspirin,paracetamol, trimethoprim, ibuprofen, gentamycin, diazepam, doxycycline, erthromycin, tetracycline , ranitidine, digoxin, verapamil,glibenclamide,cephalexin, rifampicin, furosemide, phenobarbitone, nitroglycerin, captopril, theophyline

Diabetes – Definition,types, control of diabetes.

AIDS – causes , symptoms, prevention and treatment

SEMESTER-IV

ELECTIVE COURSE - IV(B) INDUSTRIAL CHEMISTRY

UNIT I (15 hours) Basic Ideas and Industrial Wastes: Basic idea about unit operation-flow chart

- chemical conversion - batchversus continuous processing-chemical process selection-design-chemical process control.

Types of industrial wastes treatment of wastes or effluent with organicimpurities - treatment of wastes or effluent with inorganic impurities -treatment of some important chemical wastes.

UNIT II (15 hours) Petroleum and Petrochemicals: Introduction - saturated hydrocarbons from natural gas uses of saturatedhydrocarbons - unsaturated hydrocarbons - acetylene, ethylene, propylene,butylene- aromatic hydrocarbons- toluene and xylene. Preparation of rectified spirit from beat methylated spirit - preparation ofabsolute alcohol from - rectified spirit-petrochemicals in India.

UNIT III (15 hours) Manufacture of Cement: Introduction - types of cement - high alumina cement, water proof cement, slagcement, acid resisting cement, white cement, coloured cement, Pozzolana cement. Setting of cement properties of cement-testing of cement - uses of cement-concrete- cement industries in India.

UNIT IV (15 hours) Pulp and Paper and Manufacture of Paper: Introduction - manufacture ofpulp - types of pulp - sulphate or craft pulp,soda pulp, Rag pulp - beating, refining, filling, sizing and colouring Calendaring-uses - paper industries in India.

UNIT V (15 hours) Soaps, Detergents and Perfumes: Introduction - types of soaps - hard and soft soaps- manufacture of soap (hotand continuous process only) - cleansing action of soap detergents surfaceactive agents biodegradability of surfactants, amphoteric detergents Introduction production of natural perfumes flower perfumes - jasmine, rose and lily-production of synthetic perfumes-muscone and nitro-musks.




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