School of Technology

Five Year Integrated M. Tech. Course in Cosmetic Technology

(Semester I and II)

Paper No. I Paper

Code: HCT1.1

COSMETIC CHEMISTRY – I

OBJECTIVE:

1. **Sources of impurities and their control in Cosmetic raw materials.**
2. **Basic concepts of Non-aq. titration of weak acid and weak bases**

Unit-1: Sources of impurities and their control in Cosmetic raw materials. Limit tests, limit test of chlorides, sulfates, lead, arsenic and heavy metals. **(15 L)**

Unit-2: Acid base theory, concept of pH, Buffer solutions, Acid Base titrations, Standard solutions, Acid base Indicators, Theory of Acid base titration curves. **(15 L)**

Unit-3: Non-aq. titration of weak acid and weak bases – indicators uses and application. (**15 L)**

Unit-4: Theoretical basis of qualitative inorganic analysis. **(15 L)**

OUTCOME: Students got familiar with:

1. **Acid base Indicators**
2. **Acid Base titrations**
3. **Cosmetic raw materials**

Paper No. II Paper
Code: HCT1.2
ANATOMY & PHYSIOLOGY – I

OBJECTIVE:
Upon completion of this Subjects study the student should be able to

1. Explain the gross morphology, structure and functions of various organs of the human body.
2. Identify the various tissues and organs of different systems of human body.
3. Explain endocrine system and temperature regulation of human body.

Unit-1: Cell Structure & Elementary tissues of body-

i) Epithelial Tissues ii) Connective Tissues

iii) Nervous Tissues iv) Muscular Tissues. **(15 L)**

Unit-2: i) Detail knowledge of structure and function of Skin

ii) Skin appendages –

1 Sweat gland & Sebaceous gland

2 Hair

3 Nails

iii) Eye

iv) Tooth **(15 L)**

Unit-3: a) Keratinisation

b) Colour and Pigmentation

c) Baby skin and adult skin. **(15 L)**

Unit-4: Endocrine glands and Hormones. Temperature conservation – Temperature regulation and heat balance of body. **(15 L)**

OUTCOME: Students will get familiar with:

1. Functions of Various skin appendages.
2. The mechanism of skin pigmentation, skin differentiation of adult and pediatric skin.
3. Endocrine glands and their hormones along with its function.

Paper No. III
Paper Code: HCT1.3
FUNDAMENTAL CHEMISTRY –I

OBJECTIVE:

1. Introduction of alkane, alkene and alkynes.
2. Introduction of Ethers, Carboxylic Acid , Aldehyde , Ketones.
3. Estimation and Quantitative Analysis.
4. Physical Properties and properties of liquids molecules

Unit-1: Hydrocarbons (Saturated) Alkanes, Terahedral natural of carbon, SP3 hybridisation, isomerism, liquid paraffin, hard paraffin, preparation and reaction of cyclolkanes. Hydrocarbon (Unsaturated) Alkenes SP2 Hybridisation, Markonikoff Rules, Cis-trans Isomerism, Dienes: preparation properties chemical reaction classification of dienes Alkynes SP – hybridization, preparation, properties, reactions of acetylene. **(15 L)**

Unit-2: Estimation and Quantitative Analysis : Estimation of elements and their principals, Determination of equivalent weight of acids and bases. Determination of empirical and molecular formula of acids and bases.

Ethers- Definition, preparation, properties and reaction of ethers, diethyl ether, an aesthetic ether, thioether and vinyl ethers. Aldehyde & Ketones- Definition and nomenclature, preparation, properties and chemical reaction of aldehyde and ketones. Carboxylic Acid – classification, structure, preparation and chemical reaction of monocharboxylic acid. Optical isomerism. **(15 L)**

Unit-3: Physical Properties and properties of liquids molecules.

i) Surface tension ii) Viscosity iii) Intermolecular forces and it's impact on states of matter, physical properties and chemical constitution, parachor, dipole moment. **(15 L)**

Unit-4: Osmotic pressure, osmosis, semi – permeable membrane, osmotic pressure measurement, laws of osmotic pressure Molecular wt. Calculations. **(15 L)**

OUTCOME :

1. Understanding the basic properties of aromatic compounds.
2. Understanding the Physical chemistry basic Laws.

Paper No. IV

Paper Code: HCT1.4

NATURAL COSMETIC AGENTS – I

OBJECTIVE:

1**.** To know History, development and role of natural product in cosmetic.
2. To develop the knowledge base regarding source, chemical constituents and uses of natural cosmetic agents.
3. To develop the ability about the understanding of performing chemical tests the identity and quality of natural cosmetic agents.

Unit-1: History, development and role of natural product in cosmetic & medicine. Different systems of classification of drugs of natural origin their merits & demerits **(15 L)**

Unit-2: Herbs description and morphology of organized and unorganized herbs. Organized herbs root, stem, leaf and fruit and seed. Unorganized herbs – mucilage, latex and extracts. **(15 L)**

Unit-3: Carbohydrate- Definition, classification and general identification tests.

study of following carbohydrates used in cosmetics with respect to their source, chemical constituents and uses-i) Starches – Wheat, maize, rice, potato ii) Gums- Acacia, gaur-gum. pectin, agar, and cellulose **(15 L)**

Unit-4: Lipids-

a) Definition, classification and general identification tests.

b) i) oils – castor, linseed, olive, sesame, coconut, arachise oil

ii) fat and waxes – kokum butter, lanoline, beeswax, spermaceti, carnauba wax, candellila wax, shea butter.space. **(15 L)**

Learning Outcomes:

1. Ability to explain the origin of drugs from natural sources.
2. Attain Knowledge of the important natural products, their origin, properties.
3. Help to carry out the microscopic and morphological evaluation.
4. Ability to explain the role of natural products and in identification of substance through various chemical tests.

Paper No. V

Paper Code:

SCT1.1

ELEMENTARY MATHEMATICS

OBJECTIVE:

Upon completion of the course the student shall be able to:-

1. Know the theory and their application in Pharmacy
2. Solve the different types of problems by applying theory
3. Appreciate the important application of mathematics in Pharmacy

Unit-1: Algerbra: - Profit and loss, percentage calculation, Logarithms, Trigonometry: - Degrees and Radians trigonometric ratios. Identities for sum and difference of angles, multiple angles. **(15 L)**

Unit-2: Statistics: - Frequency Distribution, Histogram, Representation of data in a curve, Measures of Central tendency : Mean, Median, mode, Measures of dispersion: Standard deviation, Correlation, Coefficient of correlation only. **(15 L)**

Unit-3: Derivatives: Concept of derivative, derivative of some simple algebraic and trigonometric functions. Chain rule. **(15 L)**

Unit-4: Application of Derivatives: Maxima, Minima b) Rates and motion c) Velocity acceleration. **(15L)**

OUTCOME

Understood Concept of derivative , Correlation , Standard deviation Identities for sum and difference of angles, multiple angles.

Paper No. V

Paper Code:

SCT1.1

ELEMENTARY STATISTICS

OBJECTICE:

1. Introduction to data and types of data.
2. Basic concepts of median and mode for grouped and ungrouped data.

Unit-1: Introduction to data and types of data. Primary and Secondary data. Scales of measurement as ordinal, nominal, interval and ratio. **(15 L)**

Unit-2: Descriptive Statistics: Measures of central tendency, arithmetic mean, geometric mean, harmonic mean, median and mode for grouped and ungrouped data. Numerical Problems. **(15 L)**

Unit-3: Measures of dispersion: Range, quartile deviation, variance, standard deviation for grouped and ungrouped data. Numerical Problems. **(15 L)**

Unit-4: Correlation : Scatter diagram, Karl Pearson's coefficient of Correlation . Formula for ungrouped data. Numerical Problems. **(15L)**

OUTCOME

1. Understood Concept of , median and mode for grouped and ungrouped data. Numerical Problems.
2. Basic concepts of Primary and Secondary data.

Paper No. VI
Paper Code:
HCT2.1

COSMETIC CHEMISTRY – II

OBJECTIVE:

1. Some basic concepts of Precipitation titration and complex forming reactions.
2. To understand the post precipitation Practical aspects of gravimetric and applications.
3. Some basic concepts of complexation and chelation.

Unit-1: Nernst eq. Calculation of std. Potential, oxi-red titrations, study of common oxidizing agents and reducing agents, oxi-red curves, ceric ammonium sulfate, titanous chloride, 2-6 dichlor phenol indo phenol titration, their theory and applications. **(15 L)**

Unit-2: Iodometry and iodimetry, Gravimetric analysis. Quantitative separation, solubility product. Fractional precipitation, CO - & post precipitation Practical aspects of gravimetry and applications. **(15 L)**

Unit-3: Precipitation titration, Precipitation and complex forming reactions. Argentometric Titration, Gay-Iusac, Volhard's Mohr's and Fujan's Method. Mercuric nitrate titration. Complexometric titration, concepts of complexation and chelation, co-ordination number stability constant, titation curves, metal ion indicator, Masking and demasking agents, types of complexometic titration and applications **(15 L)**

Unit-4: Determination & significance of acid value, saponification value, iodine value, ester value. **(15 L)**

OUTCOME:

Student understood the Gravimetric analysis, titration curves, complex forming reactions,

Mercuric nitrate titration, 2-6 dichlor phenol indo phenol titration

Paper No. VII
Paper Code:
HCT2.2

ANATOMY & PHYSIOLOGY – II

OBJECTIVE:

Upon completion of this Subjects study the student should be able to

1. Explain the Anatomy and morphology of Cardiovascular, Respiratory and Digestive system.
2. Mechanism of blood flow, respiration, digestion and excretion.
3. Explain endocrine system and temperature regulation of human body.

Unit-1: I) Cardiovascular system Anatomy of Heart, flow of blood through heart, blood pressure, structure of artery, vein and capillaries.

II) Blood –

i) Composition & Function ii) Blood groups

iii) Coagulation of blood **(15 L)**

Unit-2: Respiratory system – Anatomy of organs, mechanism of respiration. **(15 L)**

Unit-3: (i) Digestive system – Anatomy of digestive organs, Digestion of carbohydrate, protein and fat.

(ii) Excretory system – organs of excretion, structure of kidney, Mechanism of urine formation. **(15 L)**

Unit-4: Nervous system – CNS, Brain, anatomy in short, spinal cord, ganglion cranial nerves, reflex action and reflex arch. **(15 L)**

OUTCOME:

Students will get familiar with:

1. Morphology and Mechanism of Respiratory, Digestive, Cardiovascular system
2. Understanding the digestion of various nutrients such as carbohydrate, fat and proteins
3. Central nervous system and reflect action mechanism.

Paper No. VIII
Paper Code:
HCT2.3

FUNDAMENTALS OF CHEMISTRY

OBJECTIVE:

1. Preparation and reaction of alkyl halide and Grignard reagents.
2. Basic fundamentals of Organic chemistry ,Inorganic chemistry, Physical chemistry, analytical chemistry

Unit-1: Halohydrocarbon: Preparation and reaction of alkyl halide and Grignard reagents and chloroform. Alcohols – Definition, classification, preparation, properties and chemical reaction of alcohols, fermentation, manufacture of ethyl alcohol, proof spirit, denatured alcohol, glycol and glycerol. **(15 L)**

Unit-2: Benzene and other aromatic compounds:

i) Benzene Resonance and structure – o-p & meta directing effect.

ii) Aromatic nitro compound (Nitrobenzenes): preparation & properties,

iii) Aromatic amines (Aniline) – Prearation & Properties.

iv) Aromatic carboxylic acids (Benzoic and Cinnamic acid, Salicylic acid.)

Fats & Oil : Definition, uses, properties. Analysis of fats and oils. Application of fats and oils in cosmetics. **(15 L)**

Unit-3: Law of mass action, Le-Chatelier's principle, homogeneous gaseous equilibria and homogeneous equilibra in liquid system.

Chemical kinetics: Introduction, molecularity, order and rate of reaction. Kinetics of first and second order reaction, their characteristics and some methods of determination. **(15 L)**

Unit-4: Phase rule : Phase rule, the terms involved in it and applications to one component system, water and sulphur system. Introduction to two component systems.

Solutions,: Raoult's law, and it's application, molecular weight determination by measuring vapour pressure, Boiling Pt. & freezing point. **(15 L)**

OUTCOME:

1. Understanding the basic properties of aromatic compounds.
2. Understanding the Physical chemistry basic Laws.

Paper No. IX
Paper Code:
HCT2.4

NATURAL COSMETIC AGENTS – II

OBJECTIVES:

1. To identify the common adulterations and substitutions.
2. To develop the knowledge base regarding source, chemical constituents, method of preparation and uses of natural cosmetic agents.
3. To develop the ability about the understanding of performing chemical tests the identity and quality of natural cosmetic agents.

Unit-1: Adulteration - types of adulteration, Method of adulteration and methods of detection of adulteration in Natural ingredients. **(15 L)**

Unit-2: Resin and balsum -

a) Definition, classification and general identification tests.

b) Study of following - Balsum of Tolu, Balsum of Peru, Benzoin, Storax, Colophony, Asafoetida. **(15 L)**

Unit-3:Tannins – Definition, Classification and Identification test.

Study of the following – Black Catechu, Tannic Acid, Amla, Behra, Hirda, Arjun, Pale catechu, Ashok. **(15 L)**

Unit-4: Study of mineral ingredients. Kaolin, Bentonite, Talc., Fuller's earth, Mica, Calamine. Herbs description and morphology of organized and unorganized herbs. **(15 L)**

OUTCOME:

1. Easy to identify the common adulterations and substitutions.
2. Attain Knowledge of the important natural products, their origin, properties.
3. Help to carry out the microscopic and morphological evaluation.
4. Ability to explain the role of natural products and in identification of substance through

various chemical tests.

Paper No. X Paper
Code: SCT2.1

ENGLISH COMMUNICATION SKILLS

OBJECTIVE

Upon completion of the course the student shall be able to
1. Understand the behavioral needs for a Student to function effectively in the areas of various operation in organization.
2. Communicate effectively (Verbal and Non Verbal)

Unit-1: Writing skills:- Letter Writing, Informal letter, Formal letter, Bio-data/Resume, job Application, Report Writing: Dialogue writing, Advertisement . **(15 L)**

Unit-2: Personality Development: Effective Public speaking, Goal setting, time management, stress management. (**15 L)**

Unit-3: Speech Writing : View and Counterview, Expansion of Ideas, completion and Developing a story. Listening skills: Loud Reading, Speaking, Conversations, Telephonic conversation. **(15 L)**

Unit-4: Interview techniques, group discussion, situational role play. **(15 L)**

OUTCOME:

1. Effectively manage the team as a team player
2. Develop interview skills 3. Develop Leadership qualities and essentials.

Paper No. X Paper
Code: SCT2.2

ANALYTICAL CHEMISTRY

OBJECTIVE:

1. Introduction of Potentiometery instrument.
2. Basis part of Acid and Base solutions.
3. General discussion of theory of colorimetry
4. Basic principles of electroplating

Unit-1: pH metry: pH and hydrogen ion concentration, pH calculation for weak acids and weak bases. Buffer solutions and types, mechanism of buffer action of acidic and basic buffers. Theories of acid base indicators. **(15 L)**

Unit-2: General discussion of theory of colorimetry : Lambert law, Beer's law (Derivation not expected), Terms used in Colorimetry, Application of Beer's law, Deviation from Beer's law. Classification of methods of 'colour' measurement or comparison, Photoelectric photometer method- single cell photo-electric colorimeter. (**15 L)**

Unit-3: E.M.F. of Galvanic cell, Std. Oxidation Potential of an electrode, glass, calomel, redox electrodes, Principles of potentiometric titration. **(15 L)**

Unit-4: Electrolysis, Faraday's laws, Cathode current efficiency. Basic principles of electroplating, cleaning of articles. Electroplating of Nickel and Chromium. Anodising. **(15 L)**

OUTCOME:

1. Understand the professional way of handling the instruments.
2. Understand the basic principle and working of all the instruments.

School of Technology

Five Year Integrated M. Tech. Course in Cosmetic Technology

(Semester III and IV)

Paper No. I
Paper Code: HCT3.1

COSMETIC TECHNOLOGY– I

Learning Objectives:

Upon completion of this course the students will be familiar with:
1. The students will be familiar with specific actives used in cosmetic formulations, their technical aspects and evaluation methods.
2. Students will be familiar with chemistry involved in cosmetic formulations.
3. They will know common natural raw materials, especially the basic functional group involved, their physical and chemical properties and their applications

Unit-1: Physical & Chemical properties of agents (Drug & Cosmetics) influencing design ofproducts forms. **(15 L)**

Unit-2:Monophasic liquid formulations, techniques of enhancing solubilities of ingredients in vehicles, otherproblems involved in preparation and stability of liquid with special emphasis on spray. **(15 L)**

Unit-3: Surface active agents – definition classification based on chemical nature and HLB scale, propertiesand significance in cosmetics (**15 L)**

Unit-4: Packaging and dispensing of cosmetic formulations: Importance of different materials for containersand closures. Packaging of cosmetic product and labeling. Environmental aspects of packagingmaterials, appropriate recycling and disposal. Green packaging. Hydrocolloids – definition classification, properties and significance in cosmetics **(15 L)**

Learning Outcomes:

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course, are described:
1. Able to do preformulation of excipients and cosmetic active agent.

2. Able to prepare monophasic formulations.

3. Able to select suitable surfactant to be used in cosmetics.

4. Able to decide the suitable packaging system for cosmetics.

Paper No. II
Paper Code: HCT3.2

INSTRUMENTAL METHODS OF ANALYSIS – I

Objectives:

To make the student familiar with use of instrumental techniques in the analysis and purification of cosmetic products.

Unit-1: Introduction to Instruments used for cosmetic analysis, Classification of instrumental Methods.

Spectroscopy: introduction to spectroscopy, electromagnetic radiation- its properties andspectrum. **(15 L)**

Unit-2: Colorimetric, UV and Visible spectroscopy - Basic Principles, essential parts of spectrophotometers, uses and application of spectrophotometer. Spectrophotometric titration. **(15 L)**

Unit-3: Flame photometry- Introduction, General principles, Instrumentations and applications **(15 L)**

Unit-4: Chromatography- Introduction and classification in General Principles, type – columns, paper and thin layer chromatography and their applications. **(15 L)**

OUTCOME:

The students can get the basic information and practical application of such sophisticated techniques in the use of cosmetic industries.

Paper No. III

Paper Code: HCT3.3

COSMETIC ENGINEERING - I

Objectives:

Upon studying of the subject Cosmetic Engineering I student shall be able gain:

1. Handy knowledge on various properties of fluids such as fluid dynamic and fluid static.
2. To know various mechanical devices to control flow of fluid, to measure flow rate, various pumps used in the cosmetic as well as pharmaceutical Industry.

Unit-1: Flow of Fluids:Fluid statics, monometers, Reynolds No. Bernoulli's Theorem, fluid heads, frictional losses. **(15 L)**

Unit-2: Measurement of fluid flow meters. Orifice meters, Venturimeter, Pitot tube, Rotameter, displacement meter.**(15 L)**

Unit-3: Transportation of fluids:Pipes, pipe joints.

Pumps: various types of pumps: reciprocating, Piston, Duplex diaphragm, rotary, centrifugal andturbine pumps. **(15 L)**

Unit-4: Conveying : Belt, Apron, Buchet, Screw & pneumatic. **(15 L)**

OUTCOME: Students will get familiar with:

1. Various unit operations used in Pharmaceutical industries.

2. Working principle of various mechanical devices such as Pumps, Valves, Conveyers

3. Advantages and Disadvantages of various mechanical devices along with its application in Cosmetic Industry.

Paper No. IV Paper

Code: HCT3.4

COSMETIC CHEMISTRY - III

Objectives:

This syllabus mainly comprises the study of raw materials and its purification while using these materials in the manufacture of Cosmetic Products. This syllabi also shows the importance and use of Chemistry in the preparation of Cosmetic Products.

Unit-1: Amino Acids:

Classification, essential and non-essential amino acids, ketogenic& glycogenic aminoacids, Zwitterions. Physical & Chemical properties of amino acids with respect to their use in cosmeticpreparations .Their wide applications in cosmetics. **15 L**

Unit - 2 Proteins:

Sources, classification in detail, Physical and Chemical properties and relation of these properties inuse of proteins in cosmetic preparations. Importance of proteins in cosmetic and Pharmaceutical industries. **15 L**

Unit - 3 Enzymes:

Definition, nomenclature & classification. Mechanism of enzyme action. Coenzymes & Prostheticgroup. Properties of enzymes. Their industrial uses with respect to cosmetic and pharmaceuticalindustries. **15L**

Unit - 4 Clay minerals and the natural and synthetic silicates:Chemistry in brief of silicones. Properties, Natural silicates, synthetics, synthetics silicates. Their properties and uses in preparation of cosmetics and drugs. Toxicity of Silicones. Silk powder.

Learning Outcomes: Students will get familiar with:

1. Clay minerals.
2. Enzymes:
3. Proteins:
4. Amino Acids:

Paper No. V

Paper Code: SCT3.1

DRUG AND COSMETIC LAWS – I

Learning Objectives:

1. The subject exposes the student to important legislations related to cosmetic profession in India.
2. It imparts knowledge about the Drug and Cosmetic Act and its Rules.
3. It impart knowledge about requirements of factory premises for the manufacturing of cosmetics with G.M.P

Unit-1: Drugs & Cosmetic Acts and Rules (with reference to cosmetics). **(15 L)**

Unit-2: Drugs and Magic Remedies Act. Objectionable Advertisements. Prevention of Cruelty to Animal Act. **(15 L)**

Unit-3: The Medicinal and Toilet preparations (Excise duties) Acts and Rules. **(15 L)**

Unit-4: Schedule S & schedule Q of D & C act. Schedule M (ii) of Drug and Cosmetic Act with G.M.P. **(15L)**

Learning Outcomes:

1. Know the cosmetic legislations and their implications in the development and marketing.
2. Ability to know schedules and their applications in cosmetic as well as laws and penalties.
3. Ability to apply and knowledge of various licenses, registration certificate, cancellation of licenses.
4. Know the regulatory authorities and agencies governing the manufacture and sale of cosmetics.

Paper No. V

Paper Code: SCT3.2

INTRODUCTORY PHARMACOLOGY & TOXICOLOGY – I

Objectives:

Upon studying of the subject introductory pharmacology & toxicology – I student shall be able to:
1. Understand the Pharmacodynamic and Pharmacokinetics of drug molecule (concept of Absorption, Distribution, Metabolism and Excretion)
2. To know basic cause and pathogenesis of certain disease that effect skin, teeth, hair and sweat gland etc.

Unit-1: Scope of Pharmacology in Cosmetics, Terminologies and Definitions Routes of Administration of drug, giving special emphasis on Topical route, their advantages and disadvantages.**(15 L)**

Unit-2: Various processes of absorption of drug and the factors affecting absorption. Disposition of drug. **(15 L)**

Unit-3: General mechanism of drug action, site of drug action, type of drug action. **(15 L)**

Unit-4: Material safety data sheet (MSDS) its scope, significanceduring cosmetic material handling with examples. **(15L)**

OUTCOME:

Students will get familiar with:

1. Exact etiology and pathogenesis of various diseases related to skin appendages.

2. Treatments available for such disease.

3. Basics Mechanism of action of drug molecule utilized to treat diseases related to Skin, teeth, Hair, Sweat gland, Inflammation etc.

Paper No. VI Paper

Code: HCT 4.1

COSMETIC TECHNOLOGY – II

Learning Objectives

Upon completion of this course the students will be familiar with:

1. The students will be familiar with specific actives used in cosmetic formulations, their technical aspects and evaluation methods.
2. Students will be familiar with chemistry involved in cosmetic formulations.
3. They will know common natural raw materials, especially the basic functional group involved, their physical and chemical properties and their applications

Unit-1: Bisphasic liquid formulations:Emulsions & Suspensions. Emulsions – types, identification of emulsions, preparation, Suspensions –Floculated and non- floculated suspensions, selection of wetting suspending and dispensing agents, preparation and stability. **(15 L)**

Unit-2:Preservatives- origin of contamination, factors influencing the effectiveness of preservatives, Idealcharacters, uses and safety aspects

(15 L)

Unit-3: Semisolid formulations:

Ointments, paste, creams, jellies, sticks, selection of ideal bases, preparation and stability andpacking.**(15 L)**

Unit-4:Solid formulations - Bulk powders, incorporation of different varieties of powders viz. dusting,compact, face and talcum. Incompatibility – physical and chemical**(15 L)**

Learning Outcomes:

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course, are described:

1. Able to formulate different kinds of skin cosmetics.
2. Able to select correct humectants and antioxidant for cosmetics.
3. Able to formulate bath preparation.

Paper No. VII

Paper Code: HCT4.2

INSTRUMENTAL METHODS OF ANALYSIS II

Objectives:

1. Introduction of Raman spectroscopy and its instrumentation and application.
2. Introduction of Refractometer and its instrumentation and application.
3. Introduction of : Conductometry and its instrumentation and application.

Unit-1: Raman Spectroscopy.- Introduction, principle, Instrumentation, applications

Polarimetry:- Introduction, optical activity, General Principles, apparatus, application in thedetermination of optical rotation and specific optical rotation of liquid and solid substances. **(15 L)**

Unit-2: pH measurement: by pH indicators and by Pontentiometric method (pH meter) Its Instrumentation and applications.**(15 L)**

Unit-3: Refractometer – Introduction to refractive index, theory and principle of Abbe's Refrecotmeter, its application **(15 L)**

Unit-4: Conductometry:- Introduction, laws and definition of conductance, specific conductance, equivalentconductance, molecular conductance.Principles, instrumentation and applications.**(15 L)**

OUTCOME: Students will get familiar with:

1. Conductometry
2. pH measurement
3. Refractometer
4. Raman Spectroscopy

Paper No. VIII

Paper Code: HCT4.3

COSMETIC ENGINEERING II

Objectives:

Upon studying of the subject Cosmetic Engineering II student shall be able gain:

1. Handy knowledge on fundamental process behind Humidification, Heat transfer, radiation etc.
2. To know various determination processes for Humidification, Heat exchange and law's governing the fundamental processes such as Humidification, Heat transfer, radiation.

Unit-1: Humidification and air conditioning:Definitions, Humidity charts and uses, wet bulb theory, determination of Humidity, Humidifiers anddehumididiers. **(15 L)**

Unit-2: Flow of heat: Classification of heat flow processes, Fourier's law, Heat flow through cylinder, convection. Natural Convection, forced convection surface coefficients, overall heat transfer through boiling liquids and condensing vapours **(15 L)**

Unit-3: Radiations, Black body, Emmissivity, mometry, Heaters, Heat interchangers, Paralleland countercurrent Heat Exchangers, Finned tube heat changers.**(15 L)**

Unit-4: Fundamental concepts of material & energy balances:Units & Dimensions, dimensional analysis, material & energy balances for operations without chemical reactions.**(15 L)**

OUTCOME: Students will get familiar with:

1. Techniques used in cosmetic and pharmaceutical industry to estimate Humidity, heat transfer.
2. Fundamental concept behind material and energy balances, Heat flow and dimension analysis.

Paper No. IX Paper

Code: HCT 4.4

COSMETIC CHEMISTRY – IV

Learning Objectives:

1. Introductions of Lipids.
2. Introductions of Lanolin.
3. Vitamins
4. Pearls

Unit-1: Lipids : Sources, classification, structure of simple triglycerides. Waxes: classification, Composition, properties and importance of these properties in cosmetic formulations , uses. Fatty acids:classification essential fatty acids, Production method, Production method, Properties and uses offatty acids with respect to cosmetic and pharmaceutical establishments Lanolin : composition, derivatives& uses. Derivatives of fatty acids : Their role in Cosmetics,Fatty Alcohols : Chemistry, types & uses.(15 L)

Unit-2: I) Humectants and Polyols :Choice of humectant, unusual humectants, special uses of humectants.Lanolin :Source,composition, properties, derivatives & uses.II) Viscosity Modifiers – eg, gum, alcohol and electrolytes, solvents etc.

(15 L)

Unit-3: Vitamins: Definition, fat soluble and water soluble Vitamins, sources, structure, Physiological & Metabolic roleof Vit. A, D, E & K Importance in cosmetics &Pharmaceuticals.Structure& Sources of water soluble vitamins, B Complex &Vit. C. Their role in Cosmeticindustries. (15 L)

Unit-4: Pearls and Pearl Essence :Definitions, commercial uses, production methods, synthetic pearly substances.

Ion exchange resins and their cosmetic uses in case of purified water, Raw water, standards for wateras per IP, BP, USP (with recent amendments) (15 L)

Learning Outcomes:

1. Understood physical and chemical properties of lipids, Vitamins .
2. Understood biological values of lipids, Vitamins

Paper No. X Paper
Code: SCT 4.1

DRUG & COSMETIC LAWS – II

Learning Objectives:

1. The subject exposes the student to important legislations related to cosmetic profession in India.
2. It imparts knowledge about the various Act and its Rules.
3. It provides the basic idea regarding patenting in India.

Unit-1: Pharmacy Act..**(15 L)**

Unit-2: Factory Act.,Contract Act. (**15 L)**

Unit-3:Shop & Establishment Act. Sales Promotion Act.**(15 L)**

Unit-4: Standards of weight and measures Act (with reference to cosmetics) Patenting in India & Abroad.**(15 L)**

Learning Outcomes:

1. Describe the significance and relevance of various acts in India.
2. Ability to know various laws and penalties related to the various acts.
3. Ability to apply and knowledge of various licenses, registration certificate, cancellation of licenses.
4. Describe the Patent, process, advantage, essential documents with patent application amendments to Indian patent act.

Paper No. X Paper

Code: SCT 4.2

INTRODUCTORY PHARMACOLOGY & TOXICOLOGY – II

Objectives: Upon studying of the subject introductory pharmacology & toxicology – II student shall be able to:

1. Pharmacology of various topical applications (The preparations applied on skin surface)
2. Explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels.

Unit-1: Pharmacology of Topical drugs, Introduction. Types of Topical drugs:

a. Protective absorbents

b. Demulcents

c. Emollients

d. Astringents and antiperspirants-deodarant

e. Irritants, Rubefacients and Vesicants.

f. Sclerosing Agents.

g. Caustics and Escharotics

h. Keratolytics (Desquamating Agents)

i. Cleansing preparations.

j. Miscellaneous Dermatologics- mouth washes, gargals, sunscreens, melanizers& demelanizers **(15 L).**

Unit-2: Miscellaneous Topical Drugs – Local antinfective agents- classification, properties, method of estimation of potency and mechanism of action of antibacterial agent, antifungal agent,ectoparasiticides (**15 L)**

Unit-3:Pharmacology of Cosmeceuticals used for Antiaging, Antiwrinkle, Fairness-bleaching& Sunscreens, Antidandruff, Anti inflamatary, Anti acne/pimple, Pigmentation etc.Autocoids: histamine, its pharmacological role and antihistamines. **(15 L)**

Unit-4:Heavy metals and metal antagonist: Symptoms and management of mercury, Arsenic,& lead poisoning. **(15 L)**

OUTCOME: Students got familiar with:

1. Mechanism of action of various drugs such as Anti-infective, Antidandruff, Antiaging, Anti-inflammatory etc.

2. Applying the basic pharmacological knowledge in the prevention and treatment of various diseases.

School of Technology

Five Year Integrated M. Tech. Course in Cosmetic Technology

(Semester V and VI)

SEMESTER - V

HCT – 5.1 Perfumes-I

Learning Objectives:

1. To provide student with the theory, knowledge, and practical skills necessary to enhance their performance as a natural perfumer.
2. To provide support and education on an adaptable worldwide basis.
3. To provide students with the education to effectively navigate the natural perfume industry with confidence.

Unit:1 **15 L**

A)Essential oils – Production equipment, water distillation, Steam distillation, steam and water distillation, treatment of condensate water after distillation.

B] Flower oils – Extraction with cold fat and hot fat, alcoholic extracts, absolute of enflurages and chassis. Extraction with volatile solvents, selection of solvent and extraction apparatus.

Unit:2 **15 L**

Resins, Gum&Exedution – Their extraction processes e.g. SoxhletApparatus, Percolation, Maceration. Oleo Resins – Ginger oleoresins.Oleo gum resins – Gum Styrax, Gum Benzion and Balsams – Balsam Peru, Myrrh

Unit:3 **15 L**

Isolates – Methods of Isolation, properties & uses of following:
Eugenol, Pinene, Linalool, Citral and Geraniol.
Flavours – Sources and properties of Vanilla, Rose, Pineapple, Peppermint, Mango, Raspberry, Orange & Lemon

Unit:4 **15 L**

Alcohols - Manufacture of ethanol, Purification of Ethanol, Deodorization of ethanol.

Learning Outcomes:

1. Students will learn to recognize perfumery ingredients and study classic formulas before beginning to create their own perfumes. .
2. Students will learn various extraction processes for the extraction of perfumery compound present in various part of the plant, so that would be used in perfumes preparation as well as in various cosmetic products.

HCT – 5.2

Cosmetic Technology-III

Learning Objectives

Upon completion of this course the students will be familiar with:

1. The students will be familiar with specific actives used in cosmetic formulations, their technical aspects and evaluation methods.
2. Students will be familiar with chemistry involved in cosmetic formulations.
3. They will know common natural raw materials, especially the basic functional group involved, their physical and chemical properties and their applications.

Unit: 1 **15 L**

Skin Creams : Introduction, classification of skin creams, cleansing creams, Night and massage creams, Moisturizing, vanishing and foundation creams, Pigmented foundation creams, hand creams, hand and body cream, all purpose creams. Manufacturing, Packing and storage of creams.

Unit:2 **15 L**

I) Humectants – Introduction, drying out, types, hygroscopicity, stability, safety, skin moisturization, Application of humectant

II) Anti oxidant : Introduction, General oxidative theory, measurement of oxidation and assessments of oxidant efficiency, choice of antioxidants and Application of antioxidants .

Unit:3 **15 L**

Soaps –Introduction, ingredients, types of soaps-bathing, toilet soaps, antibacterial soaps transparent soaps, liquid soaps,syndates (synthetic detergent bars), Manufacturing technology, evaluation and uses.

Unit:4 **15 L**

Bath Preparation: Foam baths, Introduction, formulation and foam baths, types of products, product assessment, bath salts, ingredient and formulations.

Bath Oils: introduction floating and spreading oils, dispersible or blooming oils soluble oils, foaming oils.

Learning Outcomes:

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course, are described:

1. Able to formulate different kinds of skin cosmetics.
2. Able to select correct humectants and antioxidant for cosmetics.
3. Able to formulate bath preparation.

HCT 5.3 Principle of Cosmeceutics – I

Learning Objectives

Upon completion of this course the students will be familiar with:

1. State the physicochemical properties like solubility and interfacial phenomena.
2. They will know physicochemical concepts to be considered during formulation of solution, emulsion and suspension.
3. Students will be familiar with evaluation method and assessment of emulsion shelf life of solution, emulsion and suspension.

Unit:1 **15 L**

Solubility: Mechanism of solute – solvent interaction, ideal solubility and Hildebrand – wood Scatchard equation, salvation and association, quantitative approach to the factors influencing solubility of drugs.

Unit:2 **15 L**

Interfacial Phenomenon:

a) Cohesion adhesion and spreading, absorption at solid and liquid interfaces, absorption isotherm's applications.

b) Electrical properties at interface, origin of charge, electric double layer, Nerst and Zeta potential, effect of electrolyte.

Unit:3 **15 L**

Suspension: Particle interaction and behaviour, flocculation and deflocculation, sedimentation parameters, Role of wetting, controlled flocculation and structured vehicle in formulation, evaluation of suspension stability.

Unit:4 **15 L**

Emulsion:

Types, detection, thermodynamic considerations, mechanism of droplet stabilization, theories of emulsification, properties and stability of emulsion, assessment of emulsion self life.

Learning Outcomes:

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course, are described:

1. Explain the role of surfactants and interfacial phenomenon.
2. Understand the physical properties of solutions and disperse systems.
3. Understand of physicochemical properties of drugs including solubility.
4. Have basic knowledge of pharmaceutical suspensions and emulsions.

HCT 5.4 Beauty Culture-I

Learning Objectives

1. Introduction of Structure of skin and skin blemishes and their treatment
2. Introduction to common skin problems like blackhead, Whiteheads, methods for removal of unwanted hairs.
3. Basic concept behind Mask therapy, aroma therapy.

Unit:1 **15 L**

Structure of skin and skin blemishes and their treatment.
a) Recognition of skin types.b) Different types of treatments suitable to skin conditions and skin types.c)various methods to remove unwanted hair i) threading ii) waxing.d)Skin care in different seasons.d) Diet and Exercises for healthy skin.Different types of skin blemishes and their treatment.
i. Black heads ii. White heads iii Acne iv. Open pores.
v. Freckles vi. Treatment for curing wrinkles.

Unit:2 **15 L**

Muscles of facial expression.

a) Bones of the Cranium and face (Only labeled diagrams)
b) Face pack ingredients and their effects
c) Facial: i. Cleaning ii. Toning, iii. Face Massage techniques

iv. Different types of facial

Unit:3 **15 L**

Mask Therapy
i. Setting masks. ii. Peel off masks.
iii. Thermal types- paraffin wax masks iv. Non-setting masks. v. Hot oil marks

Unit:4 **15 L**

Introduction to aroma therapy.

a) Methods of extraction of essential oils.
b) Blending & precautions. Properties of essential oils & carrier oils
c) Patch testing, safety & precautions.
d) Different aroma therapy formulations for skin and hair care.

Learning Objectives: Student understood,

The basic procedures of mask therapy including their types, Extraction of essential oils for aroma therapy. Recognition of skin type.

SCT 5.1Cosmetic Engineering-III

Objectives: Upon studying of the subject Cosmetic Engineering III student shall be able gain:

1.Handy knowledge on various processes undergoing in pharmaceutical as well as cosmetic industries such as size separation, size reduction, Filtration, Mixing

2. To know various mechanical used in processes above mentioned.

Unit:1: **15L**

Size reduction: Introduction to Size reduction, theory of size reduction, energy for size reduction, factors influencing size reduction, mechanism, classification of size reduction equipment's with construction , working and uses.

Unit:2: **15L**

Size separation: Introduction, official standards, Types of screening equipment, Air separation method, cyclone separators, bag filters, classifiers, simple and mechanical classifiers, size separation by setting and difference in density.

Unit:3: **15L**

Filtration: Introduction, theory and mechanism of filtration, factors affecting filtration, filter media and aids, classification of filtration equipments, selection of filters, study of filter press, Rotary, drum leaf filters, meta filters, disc filters, membrane filters.

Unit:4: **15L**

Mixing: Introduction, mechanism, factors affecting, classification of equipments, mixing of solids, liquids, immiscible liquids and semisolids.

OUTCOME: Students will get familiar with:

.1. Various unit operations used in Pharmaceutical industries.

2. Working principle of equipment's used in size separation, size reduction, Filtration, Mixing.

3. Advantages and Disadvantages, Classification, various factors affection of the processes mentioned above.

SCT 5.2 - Pharmacology & Interaction-I

Objectives: Upon studying of the subject introductory pharmacology & toxicology – I student shall be able to:

1. Understand the Pharmacodynamics and Pharmacokinetics of drug molecule (concept of Absorption, Distribution, Metabolism and Excretion)

2. To know basic cause and pathogenesis of certain disease that effect skin, teeth, hair and sweat gland etc.

Unit:1 **15 L**

Introduction to scope of pharmacology in cosmetics: Introduction, terminologies, pharmacokinetics, pharmacodynamics. pharmacology of cosmeceuticals: antiaging, antiwrinkle, antiacne, antiinflammerty, antidandruff, fairness- bleaching and sunscreen

Unit:2 **15 L**

Study of side effects of cosmetic ingredients & products coming in contact with below body parts-

i) Nails ii)Hair iii)Sweat gland iv) Sebaceous gland

Unit:3 **15 L**

a) Study of disorders of skin and treatment

b) Skin pigmentation, disorder of pigmentation, various pigmentary and depigmentary agents used on above disorders

Unit:4 **15 L**

Study of disorders and treatment of teeth. Study of side effects of dentifrices mouth wash &gargles.

OUTCOME: Students got familiar with:

1. Exact etiology and pathogenesis of various diseases related to skin appendages.

2. Treatments available for such disease.

3. Basics Mechanism of action of drug molecule utilized to treat diseases related to Skin, teeth, Hair, Sweat gland, Inflammation etc.

SEMESTER -VI

HCT 6.1 Perfumes-II

Learning Objectives:

1. The source, basic structure of a fragrance along with commonly used ingredients, fragrance strengths, notes and the role of perfumers.
2. The typical approach to fragrance selection, by notes or classification.
3. To know the manufacturing method (Types of reaction) involved in preparation of fragrance.

Unit:1 **15 L**

A) Fixatives – Sources, Classification, Chemical composition and uses -i) Animal Source – Civet, Musk, Ambergris.
ii) Resinous Fixatives – Benzoins, Balsam, Myrrh.
iii) Essential oil Fixatives – Sandalwood, Lemon, Cinnamon.
iv)Synthetic Fixatives. Diethyl Pthalate, Benzyl Benzoate, alcohols.
B) Selection and uses of fixatives.
C) Building of perfumes and body of the perfumes.

Unit:2 **15 L**

Odorous materials manufactured synthetically by(Reaction and flow diagrams)
a) Condensation –Coumarin, Diphenyl oxide and cinnamic aldehyde and Esterification – Benzyl acetate, Benzyl Benzoate.
b] Nitration – Musk ambrette, musk xylene and Musk Ketone.

Unit:3 **15 L**

Odorous materials manufactured synthetically by (Reaction and flow diagrams) Oxidation – Vanillin, Heleotropins, anisaldehyde, Benzaldehyde

Unit:4 **15 L**

Odorous materials manufactured synthetically by (Reaction and flow diagrams) Grignard's Process –Phenyl ethyl alcohol and Hydrogenation – Citronellal from citronellal.

Learning Outcomes:

1. Students will learn to recognize perfumery ingredients.
2. Source, role or uses, note will know that will be helpful in selecting fragrance.
3. Recognization and Utilization of proper manufacturing methods (Types of reaction) for preparation of fragrance substance.

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HCT 6.2 Cosmetic Technology-IV

Learning Objectives:

Upon completion of this course the students will be familiar with:

1. The students will be familiar with specific actives used in cosmetic formulations, their technical aspects and evaluation methods.
2. Students will be familiar with chemistry involved in cosmetic formulations.
3. They will know common natural raw materials, especially the basic functional group involved, their physical and chemical properties and their applications.

Unit:1 **15 L**

a) Productive creams and hand cleansers: Introduction; barrier material; protective cream and gels and formulation aspects.

b) Skin lightener of bleaches: Formulation aspects.

Unit:2 **15 L**

Face packs and Masks: Introduction; water based systems, Rubber – Based systems, vinyl – based systems, hydrocolloid – based systems, Earth based systems, anti-wrinkle preparation and their formulation aspects.

Unit:3 **15 L**

Skin Products for Babies: introduction, skin problems in babies, functions, requirement of body products, safety of baby products, example, formulatrions.

Unit:4 **15 L**

a)Coloured Make-up Preparations: Lipstick- Introduction. Ingredients of lipstick, Example formulation. Manufacture of lipsticks, Treatment lipstick, lip salves, liquid lipsticks. Rouge Introduction, Dry rouge, Wax based rouge, cream rouge, liquid rouge.

b] Eye make-up, Introduction, Mascara, Eyeshadow, Eyeliner, Eyebrow pencil.

Learning Outcomes:

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course, are described:

1. Able to formulate different Productive creams and hand cleansers.
2. Able to select correct Skin Products for Babies.
3. Able to formulate Face packs and Masks.
4. Able to formulate Coloured Make-up Preparations

HCT 6.3 Principles of Cosmeceutics-II

Learning Objectives:

Upon completion of this course the students will be familiar with:

1. State the physicochemical properties like Particle size, distribution phenomenon and rheology.
2. They will know physicochemical concepts to be considered during formulation of Colloidal Dispersion.
3. Students will be familiar with evaluation method and assessment of distribution phenomenon, Colloidal Dispersion, micromeritics and Rheology.

Unit:1: 15 L

Distribution phenomenon: Distribution of solute between immiscible liquids, ionic dissociation and molecular association influencing partitioning, Applications of distribution phenomenon.

Unit:2 15 L

Colloidal Dispersion:Properties of colloids – Optical, kinetic and electrical and their applicability in determining molecular weight of polymer, stability of colloiadal systems mechanism of peptization.

Unit:3 15 L

Rheology:Types of flow behaviour, thixotropy and thixotropic co-efficient measurement of various reheological properties, factors influencing reheology of dispersed systems.

Unit:4 15 L

Micromeritics:Particle size, size distribution, shape and surface area and their determination in heterogeneous systems. Porosity density and packaging arrangements in flow properties and their influence on processing of solid preparations.

Learning Outcomes:

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course, are described:

1. Explain the role of distribution phenomenon and Rheology.
2. Understand the physical properties of colloidal dispersion.
3. Understand of physicochemical properties of drugs including particle size.

HCT 6.4 Beauty Culture-II

Objectives: Upon studying of the subject Beauty Culture II student shall be able gain:

1. Different types of Makes ups along with pre-make up, and its techniques.
2. Concept of corrective make up.
3. Information regarding the general problems related with hair, nail along with its care.

Unit:1 **15 L**

a) Beautician's attitude to client and professional ethics Ib)
Different shapes of faces

Unit:2 **15 L**

Make – up :

a) i.Pre Make-up skin care. ii. Make-up Techniques – Complexion planning.

b) Application of cosmetics

i. Cleanser ii. Toner iii. Astringent. iv. Moisturizer v. Foundation. vi. Powder.
vii. Blusher. viii Lipsticks.

c) Different types of make-ups

i) Day Make-upii) Evening Make-up.iii) Party Make-up.iv) Bridal Make-up

Unit:3 **15 L**

I) Corrective Make-up for

a) Face shapes b) Eyes c) Lips c) Nose

II) Application of false eye lashes method and contraindication.

Unit:4 **15 L**

Hair and nail care:
Structure and types of hair,a) General problems and care for hair.b) Natural Dyes and Chemical Dyes
c) Shampoo &Conditioner.
Nail care: manicure, pedicure.

Learning Outcomes:

1. Students will learn the different types and techniques of make up
2. Proper utilization of applications of cosmetics
3. learn about proper hair and nail care procedure.

SCT 6.1 Cosmetic Engineering-IV

Objectives: Upon studying of the subject Cosmetic Engineering IV student shall be able gain:

1. Handy knowledge on various processes undergoing in pharmaceutical as well as cosmetic industries Distillation, Separation of azeotropes, Evaporation and Drying.
2. To know various mechanical devices/ equipment's used in processes mentioned above.

Unit:1 **15 L**

Distillation : Raoult's law & Henry's law, theory of distillation of binary mixtures of miscible, immiscible and partially miscible liquids, study of distillation equipment used for simple vacuum steam, reflux & molecular distillation.

Unit:2 **15 L**

Separation of Azeotropes (Binary & Ternary) and liquids of similar volatility. Rectification &fractionation.

Unit:3 **15 L**

Evaporation: factors affecting evaporation, study of short tube long tube, agitated, film, evaporator performance of rubular evaporator, improving efficiency of evaporation.

Unit:4 **15 L**

Drying : Definition purpose of drying, theory of drying / loss on drying, moisture content and equilibrium moisture content, classification of dryers, study of tray, Rotary, Vacuum, fluidized bed dryers.

OUTCOME: Students will get familiar with:

1. Various unit operations used in Pharmaceutical industries and Cosmetic Industry.
2. Working principle of equipment's used in Distillation, Evaporation Drying.
3. Advantages and Disadvantages, Classification, various factors affection of the processes mentioned above.

HCT 6.2 Pharmacology & Interaction-II

Objectives: Upon studying of the subject introductory pharmacology & toxicology – II student shall be able to:

3. Pharmacology of various topical applications (The preparations applied on skin surface)
4. Explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels.

Unit:1 **15 L**

Allergy and antigen – antibody reaction, types of Hypersensitivity reaction and disorders due to hyper sensitivity reactions and a topic dermatitis.

Unit:2 **15 L**

a) Dermatitis – various types and their clinical feature.

Acute Toxic contact dermatitis, Allergic contact dermatitis, Irritant contact dermatitis, Phototoxic contact dermatitis.

b) Dermatological testing as per BIS specification patch testing, repeated insult patch testing cumulative irritation test photoallergic test phogotoxicity test.

Unit:3 **15 L**

Disorders and treatment of feet, foot cosmetics.

Unit:4 **15 L**

Methods for animal testing for safety evaluation of cosmetics

OUTCOME: Students will get familiar with:

1. Mechanism of action of various drugs such as Anti-infective, Antidandruff, Antiaging, Anti-inflammatory etc.

2. Applying the basic pharmacological knowledge in the prevention and treatment of various diseases.