

**Punyashlok Ahilyadevi Holkar Solapur University, Solapur**



NAAC Accredited-2022  
'B<sup>++</sup>' Grade (CGPA 2.96)

**Name of the Faculty: Science & Technology**

**Syllabus: M.Tech. I (Semester- I&II)**

**Name of the Course: Five Year Integrated M. Tech.  
Course in Cosmetic Technology**

**(Syllabus to be implemented from June 2022)**

# **Punyashlok Ahilyadevi Holkar Solapur University, Solapur.**

## **Syllabus of Five Year Integrated M. Tech. (Cosmetic Technology)**

### **(Choice Based Credit System)**

#### **Preamble:**

In this course, there will be a clear study about the formulation, manufacturing, analysis and marketing of functional products. This area is mainly dependent on the subject of Pharmacy and Chemistry. The cosmetic technology course mainly revolves around industrial training and educational tours. This course includes studying raw materials, testing methods and laboratory procedures that are available worldwide.

#### **Objective of the Course:**

- 1) To formulate precise and effective cosmetic formulations by application of gained knowledge.
- 2) To apply new research and development in the field of Cosmetics to reduce environmental impacts.
- 3) To study the subjects which will have the skills, knowledge and scientific temperament for career in the field of cosmetics

#### **Course Outcome:**

- 1) Upon completion of programme students will have opportunities to work in cosmetic field related to Research & Development, Marketing & Academics of Cosmetic as well as Pharmaceutical Industries.
- 2) Students will be able to formulate a Research Design and complete a substantial work of new products.
- 3) Students will be familiar with relevant governmental regulations which will help to confirm product compliance in Domestic as well as International Market.
- 4) Programme will provide self employment opportunities.

#### **Eligibility Criteria:**

For Five Year Integrated M.Tech. Course in Cosmetic Technology following candidates are eligible.

1. Students with H.S.C. with Science Stream.
2. Students with B.Sc.(B group) subject: Chemistry, Zoology, Botany, Microbiology, Biotechnology, Biochemistry, Bioinformatics etc. are eligible for the direct admission to 3rd year after successful Completion of Orientation/ Induction program. Orientation/Induction program will be conducted by the School in V sem. of third year.
3. Students with D.Pharm are eligible for the direct admission to 2nd year.
4. Students with B.Pharm are eligible for the direct admission to 3rd year.
5. Students after completion of fourth year are eligible to award B. Tech. degree.

**Title of the Course:** Integrated M.Tech. (Cosmetic Technology)

**Fees for Course:** As per University norms.

**Strength of the Students:** 30

**Admission/Selection procedure:** As per university norms.

**Duration of the Course:** 4+1 (Integrated)

**Period of the Course:** (from June to April each academic Year)

**Teacher's qualifications:** M. Pharm. /M.Tech. (Cosmetic Technology)/ M.Sc./PhD.

**Standard of Passing:** As per University norms.

**Nature of question paper with scheme of marking:** Each theory paper will have 100 marks out of which 80 marks will be for Term End examination (University Examination) and 20 marks for Internal Assessment. Each practical paper will have 50 marks out of which 40 marks will be for Term End examination and 10 marks for Internal Assessment. The candidate has to appear for internal evaluation of 20 marks and external evaluation (University Examination) of 80 marks for each theory paper. The candidate also has to appear for internal evaluation of 10 marks and external evaluation (University Examination) of 40 marks for each practical paper.

**I) Nature of Theory questionpaper:**

**1) Q nos. 1 and 2 are compulsory**

**2) Attempt any three questions from Q No. 3 to Q No. 7**

**Q. No.1) A. Choose Correct alternative (MCQ) (10 Marks)**

**B. Fill in the blanks or write true or false (6Marks)**

Q.No.2) Answer the following (16 Marks)

- A)
- B)
- C)
- D)

Q.No.3) Answer the following. (16 Marks)

- A)
- B)

Q. No.4) Answer the following (16 Marks)

- A)
- B)

Q.No.5) Answer of the following (16 Marks)

- A)
- B)

Q.No.6) Answer of the following (16 Marks)

- A)
- B)

Q.No.7) Answer of the following (16 Marks)

- A)
- B)

**II) Nature of Practical question paper:** Practical examination will be of 2 hours duration carrying 40marks. VIVA & record book will be for 05 marks each.

**List of Laboratory Equipments Instruments, Measurements etc:** Potentiometer, Colorimeter, pH meter, conductometer, Microscope etc.

**Rules and regulations and ordinance if any:** NA

**Medium of the language:** English

**Allotment of workload (Theory/Practical)**

Class	Intake Capacity				Subject	No of theory papers	No of lectures per week	Total theory work load	No of practical batches	No of practical per week per batch	Total practical work load	Work load	Total work load
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>									
Five Year Integrated M. Tech. In Cosmetic Technology	30	30	30	30	Cosmetic Technology	05 (SEM I)	04	20	2	16	32	52 (SEM I)	200
						06 (SEM II)	04	24	2	16	32	56 (SEM II)	
						05 (SEM III)	04	20	2	14	28	48 (SEM III)	
						06 (SEM IV)	04	24	2	14	28	52 (SEM IV)	
						05 (SEM V)	04	20	2	14	28	48 (SEM V)	
						05 (SEM VI)	04	20	2	14	28	48 (SEM VI)	
Class	Intake Capacity				Subject	No of theory papers	No of lectures per week	Total theory work load	No of practical batches	No of practical per week per batch	Total practical work load	Work load	Total work load
Five Year Integrated M. Tech. In Cosmetic Technology	30	30	30	30	Cosmetic Technology	05 (SEM VII)	04	20	2	14	28	48 (SEM VII)	200
						05 (SEM VIII)	04	20	2	14	28	48 (SEM VIII)	

**Staffing of pattern:** Contract/CHB

**Paper duration:** 2 hrs 30 min Theory /2 hrs 30 min Practical.

**To be introduced from:** June 2022

**First Year syllabus (according to the Semester Pattern Examination-CBCS)**

**w. e. f. Academic Year 2022-23**

Semester	Code	Title of the Paper	Semester Examination			L	T	P	Credits	
			Theory( UA)	CA	Total					
Sem-I		Hard Core								
	HCT1.1	Cosmetic Chemistry - I	80	20	100	4	--	--	4	
	HCT1.2	Fundamentals of Anatomy and Physiology	80	20	100	4	--	--	4	
	HCT1.3	Natural Cosmetic Agents-I	80	20	100	4	--	--	4	
	HCT1.4	English (communication skill)*	40	10	50	2			2	
		Soft Core (Any one)								
	SCT1.1	Fundamental Chemistry	80	20	100	4	--	--	4	
	SCT1.2	Elementary Mathematics	80	20	100	4	--	--	4	
	HCP1.1	Cosmetic Chemistry – I Practical	40	10	50	--	--	04	2	
	HCP1.2	Fundamentals of Anatomy and Physiology– Practical.	40	10	50	--	--	04	2	
	HCP1.3	Natural Cosmetic Agents-I-Practical	40	10	50	--	--	04	2	
		Seminar/Tutorial/ Industrial Visit/ Field Tour	---	25	25	--	1	--	1	
	<b>Total for Semester-I</b>			<b>480</b>	<b>165</b>	<b>625</b>	<b>16</b>	<b>01</b>	<b>16</b>	<b>25</b>
Sem-II		Hard Core								
	HCT2.1	Cosmetic chemistry (Analytical Methods) – II	80	20	100	4	--	--	4	
	HCT2.2	Natural Cosmetic Agents - II	80	20	100	4	--	--	4	
	HCT2.3	English (communication skill)*	40	10	50	2			2	
	HCT2.4	Democracy, Elections and Good Governance	40	10	50	3	--	--	NC	
		Soft Core (Any one)								
	SCT2.1	Analytical Chemistry	80	20	100	4	--	--	4	
	SCT2.2	Elementary Statistics	80	20	100	4	--	--	4	
		Seminar/Tutorial/ Industrial Visit/ Field Tour	---	25	25	--	1	--	1	
	HCP2.1	Cosmetic Chemistry – II Practical	40	10	50	--	--	04	4	
	HCP2.2	Natural Cosmetic Agents – II Practical	40	10	50	--	--	04	4	
	<b>Total for Semester-II</b>			<b>400</b>	<b>125</b>	<b>525</b>	<b>17</b>	<b>01</b>	<b>08</b>	<b>23</b>

**L=Lecture T=Tutorials**

**P=Practical**

**CA=College Assessment**

**HCT=HardCore Theory**

**SCT=SoftCore Theory**

**HCP=HardCore Practical**

**UA = University Assessment**

\*Ability Enhancement compulsory Course (AECC)

**Paper Code: HCT1.1**  
**COSMETIC CHEMISTRY – I**

**OBJECTIVE:**

1. To study sources of impurities and their control in Cosmetic raw materials.
2. To understand the basic concepts of Non-aq. titration of weak acid and weak bases.

**OUTCOME:** At the end of the course students will understand:

1. The impurities and limits of heavy metals and harmful ions in Cosmetic raw materials
2. The fundamental of Acid Base titration and uses of Indicators in Acid base titration.
3. The basic concept of Non-Aqueous titration and cosmetic

**Unit-1: Impurities** **(15 L)**

Definition- Impurities, Pure chemical compound, Official Substance, Official Preparations. Sources and types of impurities and their control in raw materials.

Test for Purity and Methods used in purification of Inorganic substances.

Introduction to limit test, limit test of chlorides, sulfates, lead, arsenic and Heavy metals.

**Unit-2: Acid and base** **(15 L)**

Theory of acids and bases with their advantages and disadvantages, concept of pH and pH scale, Concept of Buffer- Definition, Types, Buffer action. Standard solutions-Types and examples, Preparation of standard solution. (Definition with examples)Introduction to Acid Base titration, Theory of Acid base titration curves. Applications of Acid Base titration.

**Unit-3: Non-aq. Titration** **(15 L)**

Introduction to non-aqueous titration, Principle, Solvents used in non-aqueous Titrations, advantages and disadvantages.

Titration of weak base with perchloric acid.

End point detection- Methods to determine end point,

Non-aq. Titration of weak acid and weak bases- Indicators used and its application

**Unit-4:** **(15L)**

**Cosmetic Thickeners:**

Introduction, Purpose of use of Cosmetic Thickener, Choice of Thickener, Types of thickener with example.

**Reference Books:**

1. Text book of Practical Pharmaceutical Chemistry by Beckette and Stenlake.
2. Quantitative Inorganic analysis by I. Vogel.
3. Cosmetic Chemistry -I by Dr. Sheela Kulkarni

**Paper Code: HCT1.2**  
**FUNDAMENTALS OF ANATOMY AND PHYSIOLOGY**

**OBJECTIVE:**

1. To study gross morphology, structure and functions of various organs of the human body.
2. To Identify the various tissues and organs of different systems of human body.
3. To understand mechanism of blood flow, Blood component with function.

**OUTCOME:** At the end of the course 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. Morphology and different types of blood group.

**Unit-1: A) Cell** – Definition and Structure, function of organelle of a Cell. **(15L)**  
**B) Tissues of body-** Definition, Structure and Function of following  
i) EpithelialTissues      ii)ConnectiveTissues  
iii) NervousTissues      iv)MuscularTissues.

**Unit-2 A) Blood–** **(15L)**  
I) Study of blood components- Protein, Plasma, Different blood cells.  
II) Blood groups – Definition, Types of Blood group and its system.  
**B) Blood coagulation-**  
Definition, Factors involved in blood coagulation and Process of blood coagulation.

**Unit-3: A) Skin-** Detailed structure and Function of Skin. **(15L)**  
**B) Skin appendages–**  
1.Detailed knowledge of Sweat gland & Sebaceous gland  
2. Structure of Hair  
3.Structure and functions of Nails  
**C) Structure and function of Eye**  
**D) Structure, Types and function of Tooth**

**Unit-4 A) Keratinisation** - Definition-Keratin (including types) **(15L)**  
Keratinization. Etiology of Keratinization  
**B) Colour-** Types of Color related to Skin and Pigmentation- Definition of Pigments, Pigmentation. Pigments responsible for skin colorization. Development process of Pigmentation.  
**C) Baby skin and adult skin differentiation.**

**Reference Books:**

1. The LivingBody by Best andTaylor
2. Human Physiology andAnatomy by Kimber
3. Anatomy and physiology in health and illness by Ross&Wilson
4. Anatomy and physiology for Nurse –byWindwoodR.S.

**Paper Code: HCT1.3**  
**NATURAL COSMETIC AGENTS – I**

**OBJECTIVE:**

1. To know History, development and role of natural product in cosmetics.
2. To develop the knowledge base regarding source, chemical constituents and uses of natural cosmetic agents.
3. To develop the ability to understand performing chemical tests, to identify natural cosmetic agents.

**Learning Outcomes:** At the end of the course students will be:

1. Able to explain the origin of natural ingredient from natural sources.
2. Able to understand the knowledge of the important natural products, their origin, properties.
3. Able to carry out the microscopic and morphological evaluation.
4. Able to explain the role of natural products and in identification of substance through various chemical tests.

**Unit-1: Introduction to Natural Cosmetic Agents** (15 L)

History, development and role of natural product in cosmetic & medicine.  
Different systems of classification of drugs of natural origin-Alphabetical, Morphological, Taxonomical, Chemical, Pharmacological and Chemo taxonomical with their merits & demerits

**Unit-2: Herbs.** (15L)

- I) Definitions- Herbs, organized and unorganized.  
II) Herbs description.  
III) Morphology of following organized and unorganized herbs.  
A) Organized herbs– Root, Stem, Leaf, Fruit and Seed.  
B) Unorganized herbs – Mucilage, Latex and Extracts.  
C) Distinguish between organized and unorganized herbs.

**Unit-3: Carbohydrate-** (15L)

- A) Definition, classification and general identification tests of carbohydrates.  
B) 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.

**Unit-4: Lipids-** (15L)

- A) Definition, classification and general identification tests.  
B) Study of following Lipids with respect to their source, preparation, chemical constituent  
I) oils – Castor, Linseed, Olive, Sesame, Coconut, Arachise oil.  
II) Fat and waxes – Kokum butter, Lanoline, Beeswax, Spermaceti, and Carnauba wax.

**Reference Books:**

1. Text book of Pharmacognosy – Trease and Evan's
2. Pharmacognosy – By Claus and Tayler.
3. Text Book of Pharmacognosy – T.E. Wallis.
4. Materia Medica – By Nadkarni.
5. Indian medical plants: by Kirtikar & Basu
6. Pharmacognosy – by Dr. Kokate
7. Naturals and Cosmetics – by Dr. Satish Sakharwade



**Paper Code: HCT1.4**  
**English (communication skill)**

**1) Objectives of the Course:**

- To introduce to the students various forms of communication.
- To make the teaching of English more practical and student centric.
- To introduce to the students poems from across the globe.
- To acquaint the students with different forms of prose.
- To acquaint the students with different language skills.

**2) Outcome:** At the end of the course students will:

- Understand the concepts of communication.
- Expand their vocabulary after reading the prescribed texts.
- Attain writing, speaking, reading, & listening competence.
- Be aware of the correct usage of English grammar
- Become familiar with selected literary forms, develop and strengthen their imaginative ability and the mability to analyze different literary forms.

**Unit no:1-Prose: (10L)**

1. The Birth of Khadi – M.K.Gandhi
2. Jadav Payege: The Forest Man of India
3. The Portrait of a Lady- Khushwant Singh

**Unit no: 2- Poetry (10L)**

1. Let Me Not Pray to be sheltered from Dangers- Rabindranath Tagore
2. The Lotu- Toru Dutt
3. The Toys – Coventry Patmore

**Unit no: 3 – Grammar and Vocabulary (10L)**

1. Word formation- Prefixes and Suffixes
2. Part of Speech

**Unit no: 4 – Communication and other Skills (10L)**

**I**

1. What is Communication?
2. Communicating effectively, Types of Communication.

**II**

1. Narration
2. Description

**III (Soft Skill)**

1. Intrapersonal Skills

**List of Reference Books:**

- 1) Literary Voyage A compulsory English Textbook., Macmillan education.

**Paper Code: SCT1.1**  
**Fundamental Chemistry**

**OBJECTIVE:**

1. Introduction of Thermochemistry, Odorous materials manufactured synthetically and Polymers
2. Introduction of Alcohols, Aldehydes, Ketones, Phenols and Esters.
3. Basic fundamentals of Organic chemistry, Inorganic chemistry, Physical chemistry, analytical chemistry

**OUTCOME:** At the end of the course students will

1. Understand the basic properties of Alcohols, Aldehydes, Ketone, Phenol and Esters and its applications in Cosmetics.
2. Understand the basics of Thermal chemistry and Polymer chemistry.
3. Understand the manufacturing of synthetic odorous materials

**Unit-1: Study of Introduction, Nomenclature, Physical properties, Chemical Properties and its uses/application in Cosmetics of following**

- A) Alcohols
- B) Phenols
- C) Aldehydes
- D) Ketones
- E) Esters

**Unit-2: Odorous materials manufactured synthetically** **(15 L)**

Introduction to Condensation, Nitration, Hydrogenation, Oxidation and Nitration.  
Odorous materials manufactured synthetically by (Reaction and flow diagrams) Oxidation – Vanillin, Heleotropins, Anisaldehyde, Benzaldehyde.

**Unit-3: Thermo chemistry** **(15 L)**

Introduction, heat of reaction at constant volume and constant pressure, Heat of combustion, heat of neutralization, heat of solution and their determination. Laws of thermo chemistry. Physical Properties and properties of liquids molecules such as i) Surface tension ii) Viscosity iii) Intermolecular forces and its impact on states of matter, physical properties and chemical constitution, parachor, dipole moment, Water and Its types viz. Distilled water, Deionised water, Purified water and Water For Injection as per Pharmacopoeia and its process of production.

**Unit-4: Polymers** **(15 L)**

1. Introduction
2. Basic concept and definition.
3. Classification of polymers-Organic and Inorganic polymers.
4. Comparison between organic and inorganic polymers.
5. Polymer backbone
6. Homoatomic Inorganic polymer containing –i) Phosphorus ii) Fluorocarbons.
7. Heteroatomic Inorganic polymer-i) Silicones ii) Phosphonitrilic compounds.
8. Introduction to Natural Polymers and Its applications in cosmetics.

**Reference Books:**

1. Text Book of Organic Chemistry by Morrison and Boyd.
2. Text book of Organic Chemistry by Bahl & Bahl.
3. A.N. Martin – Physical Pharmacy
4. Glasstone – Elements of Physical Chemistry
5. A. J. Med – Physical Chemistry
6. Vogel- Quantitative Inorganic Analysis.
7. Bahl and Tuli : Essentials of Physical Chemistry

**Paper Code: SCT1.2**  
**ELEMENTARY MATHEMATICS**

**OBJECTIVE:**

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

**OUTCOME:** At the end of the course students will

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

**Unit-1:** Algebra:-Profit and loss, percentage calculation, Logarithms, Trigonometry:

- Degrees and Radians trigonometric ratios. Identities for sum and difference of angles, multiple angles (15L)

**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. (15L)

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

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

**Reference Books**

1. 1 Higher Engineering Mathematics by B. S. Grewal (UnitI,II,V).
2. Higher Algebra by Hall and Knight (UnitI)
3. Plane Trigonometry Part I by S.L. Loney (UnitII)

**Paper Code: HCP1.1**  
**Cosmetic Chemistry-I**  
**Practical**

1. Calibration of volumetric apparatus  
Preparation of solutions: 1 normal, 1 molar, % w/v solution, % v/v solution
2. Volumetric estimation involving Measurement of the strength of acids and alkali by using Acidimetry (HCl), Alkalimetry (NaOH).
3. Experiments based on limit tests of chlorides, Arsenic, sulphate & Heavy metals.
4. Practical significance of Material Safety Data Sheet (MSDS).

\*\*\*\*\*

**Paper Code: HCP 1.2**  
**Fundamentals of Anatomy and Physiology**  
**Practical**

1. Study of following (with the help of Charts and models, Educational Videos, Presentations etc.)
  - a) Skin
  - b) Hair
  - c) Tooth
2. Microscopic examination of Epithelial, Cardiac, Smooth Muscles, Skeletal muscles and other tissues.
3. Recording of body temperature, Pulse and Blood Pressure
4. Determination of clotting time.
5. Determination of bleeding time
6. Determination of hemoglobin content.

**Paper Code: HCP 1.3**  
**Natural Cosmetic Agents-I**  
**Practical**

1. Study of general identification test of Carbohydrate.
2. Study of Organoleptic properties, Identification and microscopic studies of the following:
  - A.**
    - a. Rice Starch
    - b. Maize starch
    - c. Potato starch
    - d. Wheat starch
  - B.**
    - a. Agar
    - b. Gum Acacia.
    - c. Tragacanth.
    - d. Guar Gum
    - e. Pectin
3. Study and identification test of fixed oils.

**Paper Code: HCT2.1**  
**COSMETIC CHEMISTRY (Analytical Methods) – II**

**OBJECTIVE:**

1. To study some basic concepts of Acid Base and complex forming reactions.
2. To understand the volumetric titration with example.
3. Some basic concepts of complexation and chelation.

**OUTCOME:** At the end of the course students will understand Volumetric analysis, titration curves, complex forming reactions.

**Unit-1: Electrochemistry**

**(15L)**

Nernst equation, Calculation of std. Potential, Redox titrations, study of common oxidizing agents and reducing agents, Redox curves, ceric ammonium sulfate, titanous chloride, 2,6-dichlorophenolindophenol titration, their theory and applications.

**Unit-2: Volumetric Analysis:**

**(20L)**

2.1 Introduction, Terminology:- Titrant; Titrand, Standard solution; Titration Indicator; Equivalence point; End point. Primary standard, Secondary standard. Strength of solution, volumetric analysis & their types.

2.2 Acid Base Titration i) Introduction ii) Theory of Acid-Base indicator : A) Colour change Interval B) Theories-Ostwald's theory & Quinoid theory, iii) Neutralization curve and choice of indicator for following titrations : A) Strong acid and Strong Base B) Strong Acid and Weak Base C) Weak Acid and Strong Base

**Unit-3: A. Physical Processes Permitted in Processing of Organic Cosmetic and Personal Care Products**

**(15L)**

Physical processes: Filtration, Extraction, Sterilization and other physical treatments.

**B. Complexometric titration-**

Concepts of complexation and chelation, A) General account, B) Types of EDTA Titrations, C) Metallochromic Indicator w.r.t. Eriochrome Black-T, co-ordination number stability constant, titration curves, metal ion indicator, Masking and demasking agents, types of complexometric titration and its applications

**Unit-4:** Determination & significance of acid value, saponification value, iodine value, ester value of an oil and fats used in cosmetic formulations.

**(10L)**

**Reference Books:**

1. Text book of Practical Pharmaceutical Chemistry by Beckett and Stentake.
2. Quantitative Inorganic analysis by I. Vogel.
3. Cosmetic Chemistry -1 by Dr. Sheela Kulkarni

**Paper Code: HCT2.2**  
**NATURAL COSMETIC AGENTS – II**

**OBJECTIVES:**

1. To identify the common adulterant 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 to understand performing chemical tests, to identify natural cosmetic agents.

**OUTCOME:** At the end of the course students will

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.

**Unit-1: Ingredients of Mineral origin (15L)**

Study of following Ingredients of Mineral origin with respect to their source, preparation, chemical constituent, chemical tests and uses.

Kaolin, Bentonite, Talc, Fuller's earth, Mica, Calamine.

**Unit-2: Resin and balsam (15L)**

- A) Definition, classification and Isolation.
- B) Study of following Resins and Balsam with respect to their source, preparation, chemical constituent, chemical tests and uses.  
Balsam of Tolu, Balsam of Peru, Benzoin, Storax, Colophony, Asafoetida.

**Unit-3: Tannins (15L)**

- A) Definition, Classification and Chemical Test.
- B) Study of following Tannins with respect to their source, preparation, chemical constituent, chemical tests and uses.  
Black Catechu, Tannic Acid, Amla, Behra, Hirda, Arjun, Palecatechu, Ashok

**Unit-4: Adulteration (15L)**

Definitions and types of adulteration. Method of adulteration.  
Methods of detection of adulteration in Natural ingredients- Physical method, Chemical method, Microscopic and Macroscopic (Organoleptic) method, Biological method.

**Reference Books:**

1. Text book of Pharmacognosy by Trease and Evan's
2. Pharmacognosy – By Claus and Tayler.
3. Text Book of Pharmacognosy by T.E. Wallis.
4. Materia Medica – By Nadkarni.
5. Wealth of India – CSIR
6. Indian medical plants: by Kirtikar & Basu
7. Pharmacognosy – by Dr. Kokate
8. Naturals and Cosmetics – by Dr. Satish Sakharwade



**Paper Code: HCT2.3**  
**English (communication skill)**

**1) Objectives of the Course:**

- To introduce to the students various forms of communication.
- To make the teaching of English more practical and student centric.
- To introduce to the students poems from across the globe.
- To acquaint the students with different forms of prose.
- To acquaint the students with different language skills.

**2) Outcome :** At the end of the course students will

- Understand the concepts of communication.
- Expand their vocabulary after reading the prescribed texts.
- Attain writing, speaking, reading, & listening competence.
- Be aware of the correct usage of English grammar
- Become familiar with selected literary forms, develop and strengthen their imaginative ability and the mability to analyze different literary forms.

**Unit no:1-Prose: (10L)**

1. Of Discourse – Francis Bacon
2. Does Education do Harm – Bertrand Russell
3. The Spirit of Freedom - Rabindranath Tagore

**Unit no: 2- Poetry(10L)**

1. Our Earth Will Not Die – Niyi Osundare
2. Ode on Solitude – Alexander Pope
3. Remember- Christina Rossetti

**Unit no: 3 – Grammar and Vocabulary (10L)**

1. Synonyms and Antonyms
2. Tenses

**Unit no: 4 – Communication and other Skills (10L)**

**I**

1. Describing Process
2. Making Presentations

**II**

1. Letter Writing ( Formal /Informal)

**III (Soft Skill)**

1. Intrapersonal Intelligence

**List of Reference Books:**

- 2) Literary Voyage A compulsory English Textbook., Macmillan education.

**Paper Code: SCT2.1**  
**ANALYTICAL CHEMISTRY**

**OBJECTIVE:**

1. Introduction to Potentiometer
2. Basics of Acid and Base solutions.
3. General discussion of theory of colorimetry
4. Basic principles of electroplating

**OUTCOME:** At the end of the course students will

1. Understand the professional way of handling the instruments.
2. Understand the basic principle and working of all the instruments.
3. Applications of learned principles, procedures in cosmetic analysis.

**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. **(15L)**

**Unit-2:** General discussion of theory of colorimetry: Lambert, 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. **(15L)**

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

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

**Reference Books:**

1. Text book of Quantitative Inorganic Analysis - By A. I. Vogel (ELBS and Longman3rdEdition).
2. Instrumental methods of Chemical analysis by Willard, MeritandDean.
3. Instrumental methods of Chemical analysis by Chatwal and Anand (Himalaya Publication).
4. Text Book of Physical Chemistry by S. Glasstone, MacmillanIndiaLtd.
5. Elements of Physical Chemistry by D. Lewis and S.Glasstone(Macmillan).
6. Principles of Physical Chemistry by Maron andLando(Amerind).
7. An Introduction to Electrochemistry byS.Glasstone.

**Paper Code: SCT2.2**  
**ELEMENTARY STATISTICS**

**OBJECTICE:**

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

**OUTCOME**

1. Understood Concept of , median and mode for grouped and ungrouped data.NumericalProblems.
2. Basic concepts of Primary and Secondary 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 forungroupeddata. Numerical Problems. **(15 L)**

**Reference Books**

1. Fundamentals of Mathematical Statistics by S.C. Gupta and V. K.Kapoor

**Paper Code: HCP2.1**  
**Cosmetic Chemistry-II**  
**Practical**

**Cosmetic Chemistry-II**

1. Preparation and standardization of Ceric Ammonium Sulphate, Assays Based on use of Arsenic trioxide, 8% NaOH, Dil. H<sub>2</sub>SO<sub>4</sub> and Ferroin sulfate.
2. Preparation and standardization of Perchloric acid, Assay based on use of glacial acetic acid and acetic anhydride.
3. Preparation and standardization of Sodium EDTA. Assay based on EDTA.
4. Preparation and Standardization of Silver Nitrate, assay based on use of Sodium chloride
5. Gravimetric determination of Fe as Fe<sub>2</sub>O<sub>3</sub>.

**PaperCode: HCP2.2**  
**Natural Cosmetic Agents-II**  
**Practical**

1. Organoleptic study and identification of following resins containing agents  
a. Benzoin    b. Storax    c. Colophony    d. Asafoetida
2. Morphological study and identification of following tannin containing agents:  
a. Black Catechu.                      b. Amla                                      c. Palecatechu
3. Organoleptic study of Kaolin, Bentonite, Talc, Fuller's earth, Mica, Calamine.

\*\*\*\*\*