Punyashlok Ahilyadevi Holkar Solapur University, Solapur.

NAAC Accredited - 2022'B++'
Grade (CGPA 2.96)

Name of the Faculty: Science & Technology

CHOICE BASED CREDIT SYSTEM

Syllabus: Five Year Integrated M. Tech. in Cosmetic Technology

Name of the Course: M. Tech. IV (Semester- VII & VIII)

(Syllabus to be implemented w. e. f. June 2025)

Punyashlok Ahilyadevi Holkar Solapur University, Solapur Syllabus of
Five Year Integrated M. Tech. Course in 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. Pharmacy are eligible for the direct admission to 2nd year.
4. Students with B. Pharmacy 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: 5 Years 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 college assessment. Each practical paper will have 50 marks out of which 40 marks will be for Term End examination and 10 marks for college 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.

Nature of Theory question paper:

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 of false (6Marks)

Q.No.2) Answer the following (4 x 4 =16)
A)
B)
C)
D)

Q.No.3) Answer the following. (10 +6 or 8+8 =16)
A)
B)

Q. No.4) Answer the following (10 +6 or 8+8 =16)
A)
B)

Q.No.5) Answer of the following (10 +6 or 8+8 =16)
A)
B)

Q.No.6) Answer of the following (10 +6 or 8+8 =16)
A)
B)

Q.No.7) Answer of the following (10 +6 or 8+8 =16)
A)
B)

II) Nature of Practical question paper: Practical examination will be of 2 hours duration carrying 40 marks. 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
	1st	2nd	3rd	4th	5th									
Five Year Integrated M. Tech. In Cosmetic Technology	30	30	30	30	30	Cosmetic Technology	04 (SEM I)	04	16	2	24	48	64 (SEM I)	257
							03 (SEM II)	04	12	2	16	32	44 (SEM II)	
							05 (SEM III)	04	20	2	16	32	52(SEM III)	
							05 (SEM IV)	04	20	2	16	32	52 (SEM IV)	
							05 (SEM V)	04	20	2	16	32	52(SEM V)	
							05 (SEM VI)	04	20	2	16	32	52 (SEM VI)	
							05 (SEM VII)	04	20	2	12	24	44 (SEM VII)	
							05(SEM VIII)	04	20	2	12	24	44 (SEMVII)	
							02 (Sem IX)	04	08	2	08	16	24(SEM IX)	
							1 (Sem X)	02	02	6	14	84	86(SEM X)	

Staffing of pattern: Contract/CHB

Paper duration: 3 Hrs for Theory /3 Hrs for Practical.

To be introduced from: June 2025

Fourth Year syllabus **(according to the Semester Pattern Examination) to be effective from the Academic Year 2025-26**

Semester	Code	Title of the Paper	Semester Examination			L	T	P	Credits
			(UA)	CA	Total				
Sem-VII		**Hard Core**							
	HCT7.1	Perfumes & Colours	**80**	**20**	**100**	**4**	**--**	**--**	**4**
	HCT7.2	Cosmetic Technology- V	**80**	**20**	**100**	**4**	**--**	**--**	**4**
	HCT 7.3	Quality Assurance Techniques	**80**	**20**	**100**	**4**	**--**	**--**	**4**
	HCT 7.4	Herbal Cosmetics-I	**80**	**20**	**100**	**4**	**--**	**--**	**4**
		Soft Core (Any one)							
	SCT 7.1	Organization & Management of Industries	**80**	**20**	**100**	**4**	**--**	**--**	**4**
	SCT 7.2	Material Management & Inventory Control	**80**	**20**	**100**	**4**	**--**	**--**	**4**
		Practicals							
	HCP 7.1	Perfumes & Colours Practical	**40**	**10**	**50**	**--**	**--**	**2**	**2**
	HCP 7.2	Cosmetic Technology- V Practical	**40**	**10**	**50**	**--**	**--**	**2**	**2**
	HCP 7.3	Quality Assurance Techniques Practical	**40**	**10**	**50**	**--**	**--**	**2**	**2**
	HCP 7.4	Herbal Cosmetics-I Practical	**40**	**10**	**50**	**--**	**--**	**2**	**2**
	Total for Semester- VII		**560**	**140**	**700**	**20**		**08**	**28**
Sem-VIII		**Hard Core**							
	HCT 8.1	Colours in Cosmetics	**80**	**20**	**100**	**4**	**--**	**--**	**4**
	HCT 8.2	Cosmetic Technology- VI	**80**	**20**	**100**	**4**	**--**	**--**	**4**
	HCT 8.3	Cosmeceuticals Microbiology	**80**	**20**	**100**	**4**	**--**	**--**	**4**
	HCT 8.4	Herbal Cosmetics-II	**80**	**20**	**100**	**4**	**--**	**--**	**4**
		Soft Core (Any one)							
	SCT 8.1	Management and Organizational Behavior	**80**	**20**	**100**	**4**	**--**	**--**	**4**
	SCT 8.2	Plant Design	**80**	**20**	**100**	**4**	**--**	**--**	**4**
		Dissertation	**--**	**50**	**50**	**--**	**2**	**--**	**2**
		Practicals							
	HCP 8.1	Colours in Cosmetics Practical	**40**	**10**	**50**	**--**	**--**	**2**	**2**
	HCP 8.2	Cosmetic Technology- VI Practical	**40**	**10**	**50**	**--**	**--**	**2**	**2**
	HCP 8.3	Cosmeceuticals Microbiology Practical	**40**	**10**	**50**	**--**	**--**	**2**	**2**
	HCP 8.4	Herbal Cosmetics-II Practical	**40**	**10**	**50**	**--**	**--**	**2**	**2**
	Total for Semester- VIII		**560**	**190**	**750**	**20**	**2**	**8**	**30**

L=Lecture T=Tutorials P=Practical UA=University Assessment CA

=College Assessment HCT=Hard Core Theory SCT=Soft Core

Theory, HCP=Hard Core Practical

Additional Skill Course (Swayam/MOOCs):

Sr. No.	Topic	Semester	No. of Credits
1	Spectroscopic Techniques for Pharmaceuticals and Biopharmaceutical Industries	VII	04
2	Academic and Writing		
3	Analytical chemistry		
4	Entrepreneurship		
5	Drug Delivery: Principles and Engineering		

OR

Add on Course: CERTIFICATE COURSE IN FUNDAMENTALS OF BEAUTY LAB

HCT- 7.1 Perfumes & Colours

Learning Objectives:

1. To understand process, involve in extraction different perfumes from their respective source.
2. To provide knowledge of incorporation of perfumes and colours in cosmetic preparation.
3. To provide students with the education to effectively navigate the natural perfume industry with confidence.

Learning Outcomes:

1. 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 and also about the incorporation of colours in various cosmetic products.
2. Students will learn to recognize perfumery ingredients and study classic formulas before beginning to create their own perfumes.

Unit 1: **(15 L)**

A) **Classification of perfumes**: -

a. Perfumes obtained from plant sources.

b. Perfumes obtained from animal sources

c. Various terms used in perfumery

d. Chemical classification of perfumes

B) **Specially perfumed products** – formulation and processing of:

a. Alcoholic fragrance solution

b. Emulsified and solid fragrances.

c.Solubilized perfumes.

Unit :2 **(15 L)**

Synthetic substances used to formulate different perfumes, their sources, properties and composition of following natural herbs: lavender, Rose, Jasmine, violet, Orris, Cypre, Amber, carnation, Muguet, Lilac, Acacia, Cassie, narcissus, Kewda, Mineral water essences.

Unit :3 **(15 L)**

a) Methods of Preparation and manufacture of perfumes: - Including (Natural & Synthetic) general operation flow sheets for manufacturing of various essential oils and perfumes, statistics.

b) Adaptation and incorporation of perfumes and colours in skin care cosmetic products like **creams** -cold cream, vanishing cream, cleansing cream, Foundation cream, moisturising cream **lotions**-Hand lotion ,body lotion, **powders**-perfumed powder ,baby powder, Adult powder, medicated powder , **soaps**-baby soap ,Adult soap.

c) Use of perfumes in skin cosmetics, hair cosmetics, men's toiletries.

Unit :4 **(15 L)**

A) Adaptation and incorporation of perfumes and colours in **Hair** care cosmetic products like shampoo, hair oils, conditioners, hair colorants and dyes.

B) Incorporation of perfume and color in **Eye** preparations like eye shadow, Mascara-cake Mascara,liquid Mascara, eye cream ,eye liner Nail preparations like **Nail** paint,cuticle removers,stain removers,Nail bleach , **Lip** preparations like- Lipstick,Lip balm,lip liner,lip gloss lip oillip plumper.

Books Recommended:

1 Perfumes, Flavours & Essential oil Industry by S. B. Srivastava.
2 Manufacture of perfumes, cosmetics and detergents by Giriraj Prasad.
3 Perfumes: History & Chemistry Vol-I- Dr. D. D. Wasule
4 Cosmetic: Science & Technology by Sagarin.
5 Industrial Pharmacy by Leon Lachman.
6 An introduction to perfumery – by Tony Curtis and David Williams
7 New cosmetic science by T Mitsui
8 The chemistry and manufacture of cosmetics Vol IV
9 Cosmetic and drug preservation- principals and practice edited by John J. Kalard.
Pouchers perfumes cosmetics and soaps.

HCT- 7.2 Cosmetic Technology- V

Learning Objectives:

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

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 hair care preparation e.g.: Shampoo, hair colorants, hair tonics and conditioner.
2. Able to select safer hair cosmetics.
3. Able to select suitable hair care preparation.

1) Shampoos:
Introduction, Detergency, Evaluation of detergents as shampoo bases, raw materials for shampoos, Principle and auxiliary surfactants, formulation of shampoo, clear liquid shampoos, Anti-dandruff shampoo, Medicated shampoo, Synthetic shampoo, Herbal shampoo, Baby shampoo, Aerosol shampoos, Acid balanced Shampoos, safety of shampoos. **(15 L)**

2) Hair setting lotions, sprays and dressings:
Use and purpose of hair dressings, Mechanism of hair styling, women hair dressings, setting lotions, heated curlers and blow drying, hair sprays, Men's hair dressing – formulation brilliantines, non oily fixatives, aerosols, emulsion gels, effect of styling products, evaluation of performance. **(15 L)**

3) **A)** Hair Tonics & Conditioners: Introduction–formulation of medicated hair tonics, conditioners, evaluation of conditioning, hair thickeners, rinses.
B) Hair strengtheners: Introduction, Chemistry behind curly hair, chemistry behind hair straightening, hot comb method, caustic preparations, chemical hair reducing preparations, Naturals way of straightening. **(15 L)**

4) Hair colorants:
Introduction – Hair colouring systems, characteristics of an ideal hair colourants, the process of hair colouring. Temporary hair dyes dye stuffs – commercial, semi-permanent products and their formulations, permanent hair dyes, Bases couplers of modifiers, formation of colour in the hair. Toxicity and dangers of Para dyes. Formulation of permanent hair dyes, other dyes for hair – Aromatic polyhydroxy compounds, vegetable hair dyes, metallic hair removers, Bleaching and lightening. **(15 L)**

Books recommended:

1. Text Book of Cosmeticology by Harry
2. Cosmetic Science and technology by Sagari

HCT- 7.3 Quality Assurance Techniques.

Learning Objectives:

1. To develop basic practical skills using instrumental techniques.
2. To understand the important aspects like cGMP, QC tests, documentation, quality certifications.
3. To understand and gain knowledge on troubleshooting in adopting various methodologies using instrumental techniques.

Learning Outcomes:

1. Students will be able to describe the working principles behind various instruments used in analysis
2. Continue to develop particle skills.
3. Students will understand the cGMP aspects, the importance of documentation, the scope of quality certifications, the responsibilities of QA& QC departments.

1) Introduction: **(15L)**

I. Concept:
1. Quality Assurance
2. Good Manufacturing Practice
3. Quality Control.

II. Documentation:
1. BMR
2. Validation and its types
3. Process Validation
4. Qualification
5. SOP
6. Change Control
7. Deviation

2) **Theoretical aspects, basic instrumentation and application of following Technique: (15L)**

I. Separation Technique:
1. Gel Filtration
2. HPLC
3. HPTLC
4. GC

II. Spectroscopy Technique:
1. IR
2. NMR
3. Mass

III. Light scattering method:
1. Nephelometery
2. Turbidimetery

3) **Stability Testing:** **(15L)**

Role of stability testing,
Stability testing guidelines,
Stability testing methods:
1. Real-time stability testing
2. Accelerated stability testing
3. Retained sample stability testing
4. Cyclic temperature stress testing

Stability testing under different climatic zones (I, II, III, IV) and conditions:
1. Long term testing conditions
2. Accelerated testing conditions
3. Intermediates testing conditions
4. Determination of shelf life.

4) **Evaluation of finished products:** **(15L)**
(**Performance characteristics:** pH, viscosity, spreadability, foaming ability etc and **product characteristics:** Fragrance, color, consistency, package)

1. Shampoos
2. Toothpastes
3. Sunscreen preparation
4. Lipsticks
5. Soaps
6. Skin creams
7. Face wash

Books recommended:

1. A.O.A.C. (Association of official analytical collaboration- International)
2. Badlsametal: Cosmetic Science & Technology Vol. I, II, III, Ed.: Wiley Itervcine.
3. W. A. Poucher: Perfumes, Cosmetics & Soaps Vol. I, II, III, Ed.: Chapman &Hall.
4. Indian Standard Institution Booklets.
5. A. H. Backett & J. B. Stanlake: Practical Pharmaceutical Chemistry.
6. Garret: Text Book & Pharmaceutical Analysis
7. A. I. Vogel: Quantitative inorganic Analysis.
8. Ewing: Instrumental Method of Chemical Analysis
9. Connoers: Text Book of Pharmaceutical Analysis
10. Higuchi: Pharmaceutical Analysis
11. Principle of Instrumental analysis by D. A. Skoog
12. Instrumental methods of chemical analysis by B. K. Sharma
13. Instrumental methods of chemical analysis by G. R. Chatwal and S. K. Anand
14. Introduction to instrumental analysis by F. D. Brawn
15. Analytical Chemistry by G. D. Christian
16. ClassificationofcosmeticrawmaterialsandadjunctsIS3958ofIndianStandard
17. F. V. Smith, J. T. Stewart Text Book of Biopharmaceutical analysis.
18. Indian Pharmacopoeia 2007 controller of publication Govt. of India, New Delhi
19. K. A. Cannors, Text Book of Pharmaceutical analyzer.

HCT- 7.4 Herbal Cosmetics-I

Learning Objectives:

1. To develop the knowledge base regarding source, chemical constituents and uses of herbs in various cosmetic formulation.
2. To understand the scope of Herbal ingredients in Cosmetic Industry.

Learning Outcomes:

1. Students will know the source, chemical constituents and uses of the herbs in various cosmetic formulations.
2. Students will come to know the scope of Herbal ingredients in Cosmetic industry.

1) Study of following herbs used in- skin care cosmetic formulations with reference to their biological and geographical sources, chemical constituents, cosmetic or cosmeceuticals uses of following: **(15 L)**
   Cleansing agents - *lodra,*
   Emollients – aloe vera
   Freshening agent - chandan, *cucumber*
   Skin Pigmentation - amba haldi *Jeshthamadh, Haldi*
   Antibacterial –Babhool, Neem, *Bawchi*

2) Study of following herbs used in- Hair care cosmetic formulations with reference to their biological and geographical sources, chemical constituents, cosmetic or cosmeceutical uses of following:

   Hair growth promotors: Brahmi, Jatamanasi, kapurkachari

   Hair Tonics: Bavachi,

   Anti-dandruff: Nagarmotha

   Hair colorants: henna, bhringaraja

   Hair cleansing: Rita, shikakai, Alma **(15 L)**

3) Study of storage of herbal actives in cosmetics and store house.

   Key Elements of Modernized Storage Solutions, Sterilization of raw herbs, testing the quality of raw herbs, guidelines for storage. **(15 L)**

4) A) Preparation of herbal actives in cosmetics for commercial market.
   B) Current trends in herbal cosmetics
   C) Future scope of Herbal ingredients in Cosmetic Industry **(15 L)**

Books recommended:

1. Treas & Erans: Text Book of Pharmacognosy.
2. Claus &Tyler: Pharmacognosy.
3. Nadkarni: Meterial Medica
4. C.S.I.R.: Wealth of India
5. Pharmacognosy by C.K. Kokate, A.P. Purohit, S.B. Gokhale- Nirali Prakashan.

SCT- 7.2 Material Management & Inventory Control

Learning Objectives:

1. To know the basic principle of material management.
2. To learn about purchase procedure and tender.
3. To learn different techniques of inventory control.

Learning Outcomes:

1. Students will understand inventory management and store management of cosmetic industry/ store.
2. Students will understand concept behind budgeting, forecasting, material planning

1] Principles of Materials Management and Planning:
Definition, Scope & Functions, Objectives. Classification of Materials-Consumable, Nonconsumable working out quantities required- Forecasting, Budgeting, Availability of materials, Procurement methods. **(12 L)**

2] A) Purchase Management and Purchase Procedures:
Objectives, Purchase system- Centralized, Decentralized, Local purchase. Legal aspects of purchasing. Purchase Procedures: Selection of Suppliers, tendering procedures, Analyzing bids, Price negotiations, Issue of purchase orders, Rate Contracts.

B) Receipt of Materials:
Inspection of materials, Preparation of defect/Discrepancy Report, Disposal of rejected items, Stocking of accepted items, Accounting of materials.

C) Scientific Purchasing: Types of Buyer, Consumer, Personality Traits for Purchasing Executive. Speculative buying v/s Conservative buying, Concentrated buying v/s Diversified Buying. Online Purchasing: Concept, advantages, procedure of online purchasing and Current online purchase practices. **(18 L)**

3] Store Management:
Layout of stores - factors affecting, importance. Functions of Store Manager/ Store keeper, Codification – features, methods and advantages. Material control activities. Computerization of inventory transactions, Disposal of scrap/unserviceable materials, Sub-stores in various departments, Physical stock taking. **(15 L)**

4] Inventory Control:
Aims & objectives, Scope of Inventory Control. - Essentials of successful inventory - control system. Activities of Inventory of control techniques - Lead-time, Buffer stock, Reorder level, Two Bin System, EOQ. Techniques of Inventory Control- ABC, VED, Others. **(15 L)**

Books recommended:

01. Handbook of Materials Management – By P. Gopalkrishnan – PrenticeHall India.
02. Purchasing & Materials Management – By P. Gopalkrishnan – Tata McGraw Hill.
03. Materials & Logistic Management – By Prof. L.C. Jhamb – Everest Publications.
04. Introduction to Materials Management – By Tony Arnold – Peerson.
05. Stores, Management & Logistics – By – P. Gopalkrishanan –Sultanchand& Co., New Delhi.
06. Purchasing and Storekeeping by Dr. P. K. Bangar and Dr. B. S. Rupnawar -Himalaya Publication House.
07. Purchasing and Materials Management by Nair N. K – Vikas Publication.
Purchasing and Storekeeping by Gupta D. R. - Tata McGraw Hil

HCP 7.1: Perfumes & Colours Practical

1) Preparation of Emulsified fragrances—
   Cream - Formulation, Method & Quantity with ingredients 30/40 gms.
   Lotion - Formulation, Method & Quantity with ingredients 30/40 gms.
2) Preparation of Solid fragrances – 2 Nos (stick)
   Formulation with ingredients, Method, quantity.
3) Perfume creation and matching; Simple floral fragrance (six)
   Formulation, ingredient & quantities
4) Alcoholic fragrance Solutions – 2 products
5) Preparation of Colognes – citrus oil
6) Preparation of Toilet waters
7) Perfuming of hair oil
8) Perfuming of powders – min 2 products
9) Performance evaluation of perfume

HCP 7.2: Cosmetic Technology- V

1) Shampoos at least two preparations
2) Hair setting preparations (Men & Women both)
3) Hair tonics
4) Hair conditioners
5) Hair colour preparations
6) Hair waving preparations

HCP 7.3: Quality Assurance Techniques Practical

A) To perform the evaluation of the following cosmetic products like:

i) Shampoos – Synthetic, Herbal, Antidandruff (Evaluation Parameters-Viscosity Determination, pH Determination, Foam stability, Dirt dispersion, Surface tension Measurement, Determination of % of solid content, wetting time)

ii) Hair Dye (Evaluation parameters- pH Determination, Determination of Dye content)

iii) Creams (Evaluation parameters- Determination of pH, Rheological property, Spreadability, Determination of type of emulsion: i) Dilution test & ii) Dye solubility test, Saponification value)

iv) Face Powders (Evaluation parameters- pH Determination of aqueous suspension, Test for solubility of color, Determination of fineness, Determination of moisture and volatile matter)

v) Tooth Paste (Evaluation parameters-pH Determination, Determination of Particle Size, Determination of Foaming Character, Viscosity Determination, Determination of sharp and edge abrasive particles, Determination of moisture and volatile matter)

vi) Tooth Powders (Evaluation parameters-pH Determination, Determination of Particle Size, Determination of Foaming Character, Flow properties, Determination of moisture and volatile matter.)

B) Raw material analysis of the following raw materials per BIS

i) Stearic Acid
ii) Zinc Oxide
iii) Sodium Lauryl Sulphate
iv) Calcium carbonate
v) Talc

HCP 7.4: Herbal Cosmetics-I

1) Practical based on- morphological characters, extraction by appropriate method, identification of chemical Constituent, and incorporation of extract in suitable formulation of any three herbal ingredients from each (i) and (ii) of following:

i) Aloe, Babhool, Bawchi, Chandan, Cucumber, Haldi, Jeshthamadh, lodra, Neem.

ii) Brahmi, Jatamanasi, Mehandi, Nagarmotha, Ritha, Shikekai, Kapurkachari

HCT- 8.1 Colours in Cosmetics

Learning Objectives:

1. To impart knowledge regarding approved colours used in cosmetics.
2. To make aware students regarding different sources of colours.
3. To provide knowledge of incorporation of colours in cosmetic preparation.

Learning Outcomes:

1. Students will learn to recognize colours from natural resources.
2. Students will learn to use suitable colours in their preparation.

Unit 1: **(15 L)**

a) Introduction: - Definition of colours, like dye & pigment colour, croma, light and colour, colour system, relation of colour and emotions, pigment,dye, lake and tonner, hue, value, bleed, tones, highding power, certified colours

b) Theory of color formation at molecules level including studies, rule of multiplicity.

Unit 2: **(15 L)**

a) Classification of colours: - Detailed classification should be emphasised including color obtained from natural sources like plant animal and mineral sources. Based on chemical structures, inorganic colours.

b) Details classification of synthetic colors, dyes & pigments & FDA classification

Unit 3: **(15L)**

1) Methods of preparations and manufacture of dyes, pigments, lakes including raw material, flow sheets of selected dyes like indigo, azo dye & phenyline diamine.

2) Preparation of colour solutions and incorporation of colours in skin care and hair care products including soaps.

Unit 4: **(15 L)**

a) Determination of colours and Colour matching of marketed products.

b) Various physicochemical properties of dyes and colours and analysis of color and dye pigments using instrumental and chromatographic methods.

c) Safety use in colours cosmetics.

Books Recommended:

1. Manufacture of perfumes, cosmetics and detergents by Giriraj Prasad.3 Perfumes: History & Chemistry Vol-I by Dr. D.D.Wasule
2. Cosmetic: Science & Technology by Sagarin.5
3. New cosmetic science by T Mitsui
4. colours and cosmetics colour material – New cosmetic science mitsui.
5. The cosmetics industry – edited by Norman scientific and regulatory foundations.
6. Scientific and regulatory foundations.
7. Cosmetics safety
8. A Prime for cosmetics scientist.

HCT- 8.2 Cosmetic Technology- VI

Learning Objectives:

1. To familiar with specific actives used in cosmetic formulations, their technical aspects and evaluation methods.
2. To will know common natural raw materials, especially the basic functional group involved, their physical and chemical properties and their applications in skin care products.

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 skin care preparation and foot care products e.g.: Shaving preparation, sun protective preparation.
2. Able to select safer sunscreen and foot care cosmetics.

1) Shaving preparation:

Wet shaving preparation, Introduction, Beard softening cream, Lather shaving creams, lather shaving sticks, Aerosoles of shaving foams, Brushless or non-lathering creams, Brushless shaving stick, Novel compositions for wet shaving dry – shaving preparation: Introduction pre-electric – shave lotion, collapsible foam pre-electric shave lotion, pre-electric shave gel stick. Pre-electric shave powder. **(15 L)**

2) Sunscreen, Sun tan and Anti sun burn Preparations:

Sunlight and the human body – Introduction, tanning – beneficial and adverse effects of sunlight, Solar radiation and its effect on skin Protective mechanism of the skin.

Sunscreen and suntan preparations – Introduction. Sunscreen agents and their formulation. **(15 L)**

3) **A)** Foot care preparations:

Introduction: Influence of foot wear, foot ailments, foot infections, foot care and hygiene, Bathing the feet. Foot powders, foot sprays, foot creams, corn and cullus preparations, chilblain preparations, Athlete's foot preparations, other developments.

B) Manicure Preparations:

Cuticle remover, nail bleach, nail cream, Nail strengtheners, Nail white, Nail polish, Nail lacquer –Introduction, Ingredients of Nail lacquer, formulation, manufacture of nail lacquer, Base coats and top coats, Enamel remover, Nail drier, plastic finger nails and elongators, Nail mending compositions. **(15 L)**

4) **A)** Dentifrices:

Basic requirement of a dentifrice. Tooth – paste, Basic structure ingredients, formulation of toothpaste, manufacture of toothpaste, powders, manufacture of toothpowders, solid dentifrices, performance tests Abrasive action, lustre, the toothbrush and tooth brushing, Denture cleansers.

B) Mouthwashes:

Introduction: Choice of antibacterial agents, flavouring of mouthwashes, Aerosol mouth freshener.

(15 L)

Books recommended:

1. Text Book of Cosmeticology by Harry
2. Cosmetic Science and technology by Sagari

HCT- 8.3 Cosmeceuticals Microbiology

Learning Objectives:

To know the anatomy, identification and growth factors of microorganism.
To know various microbial analysis techniques used in cosmetics/ cosmeceuticals.
To know the various methods to control microbial count.

Learning Outcomes:

Students will gain the knowledge of morphology of microorganism which will be useful for identification microorganism.
Students will come to know microbial analysis technique.
Helpful in understanding methods to control microbial count

1) A) Introduction: (15L)

i. Classification & morphology of Bacterial and General characteristics occurrence and morphology of yeast, Moulds, protozoa & algae.
ii. Microbial Analysis: Stains & staining techniques in microbiology.

B) Isolation & maintenance of pure culture:

i. Streak plate & pour plate method of isolation.
ii. Enrichment culture techniques.
iii. Serial dilution, Techniques.
iv. Isolation of identification of gram + ve & -ve organisms (15L)

2) Microbial Control: (15L)

a. Definitions: Sterilization, Disinfections, Antiseptic, Sanitizer, Germicides, Microbiostasis, Antimicrobials, Preservatives.
b. Factors influencing antimicrobial activity.
c. Factors related to the killing agent, intensity, concentration, time of action & temperature.
d. Factors related to the organism being killed: Total no. of organisms being killed, kind of organism, physiological state of organism & environmental conditions.
e. Mechanism of cell injury.
f. Physical control
g. Chemical Control

3) A) Nutritional requirement for microbes: **(15L)**

Nutritional classification of bacteria photographs, chetrops
Types of media: Synthetic media, Non-synthetic media.
B) Principle methods of analysis to enumerate various types of organisms e.g. APC.

4) A) Introduction to fungi and virus:

General properties of fungi, fungal classification, general properties of virus and its life cycle.
B) Efficacy testing of preservative.

Books recommended:

1. A.O.A.C.(Associationofofficialanalyticalcollaboration-International)
2. Badlsametal: Cosmetic Science & Technology Vol. I, II, III, Ed.: Wiley Itervcine.
3. W. A. Poucher: Perfumes, Cosmetics & Soaps Vol. I, II, III, Ed.: Chapman & Hall.
4. Indian Standard Institution Booklets.
5. Booklet: Pharmaceutical Analysis.
6. A. H. Backett & J. B. Stanlake: Practical Pharmaceutical Chemistry.
7. Garret: Text Book & Pharmaceutical Analysis
8. A. L. Vogel: Quantitative inorganic Analysis.
9. Ewing: Instrumental Method of Chemical Analysis
10. Connoers: Text Book of Pharmaceutical Analysis
11. Higuchi: Pharmaceutical Analysis.
12. Microbiology by Pelzer &Reed
13. Microbiology by Sally.

HCT- 8.4 Herbal Cosmetics-II

Learning Objectives:

1. To develop the knowledge base regarding source, chemical constituents and uses of herbs in various Cosmetic formulation.
2. To know various methods of extraction employed for herbal constituents.
3. To know the formulation of herbal cosmetics.

Learning Outcomes:

1. Students will know the source, chemical constituents and uses of the herbs in various cosmetic formulations.
2. Students will learn various extraction processes for extraction of herbal constituents present in various part of the herb, so that would be used in herbal preparation as well as in various cosmetic products

Unit-I Study of following herbs used in skin care cosmetic formulations with reference to their biological and Geographical sources, chemical constituents, cosmetic or cosmeceuticals uses of following: **(15 L)**

Anti-acne: Tulsi, Red sandalwood, Majistha
Skin lightening: Papaya, Lemon
Anti-aging: Carrot, Orange-peel
Skin pigmentation: Grapefruit (citrus paradise), Kesar
Emollients: Lotus, ficus golmerata (umber), Akarkara, Beetroot, Plash

Unit-II Study of following herbs used in Hair care cosmetic formulations with reference to their biological and geographical sources, chemical constituents, cosmetic or cosmeceutical uses of following**:** **(15 L)**

Hair growth promotors: Hibiscus (Jaswand), Bhringaraj, Curry leaves
Anti-dandruff: Neem, Arnica
Hair strengthens: Seetaphal (Plant and seeds and Pomegranate (Punica granatum)

Unit-III Various methods of extraction employed for herbal constituents. **(15 L)**

Maceration, Infusion, Decoction, Percolation, Steam Distillation, Cold Pressing, Supercritical Fluid Extraction (SFE), Ultrasound-Assisted Extraction (UAE), Solvent Extraction.

Unit-IV **(15 L)**

I) Formulating appropriate cosmetic products by incorporating herbal actives in skin care products: Creams, powder, lotion and ointments.

II) Formulating appropriate cosmetic products by incorporating herbal actives in hair care products: Hair oil, shampoo, conditioners, hair tonics, hair packs**.**

Books recommended:

1. Treas&Erans : Text Book of Pharmacognosy.
2. Claus &Tyler: Pharmacognosy.
3. Nadkarni: Meterial Medica
4. C.S.I.R.: Wealth of India
5. Pharmacognosy by C.K. Kokate, A.P. Purohit, S.B. Gokhale- Nirali Prakashan.

SCT 8.1 Management and Organizational Behavior:

Learning Objectives:

1. To help the student to develop cognizance of the importance of human behavior.
2. To provide the students to analyze specific strategic human resources demands for future action.
3. To know the student's basic management in industry.

Learning Outcomes:

1. Students will be able to analyze the complexities associated with management of the group behavior in the organization.
2. Students will be able to demonstrate how the organizational behavior can integrate in understanding in the motivation behind behavior of people in organization.

01. **A)** Basic concepts of Management: **(15L)**
    - Introduction, meaning objectives.
    - Difference between administration and management.
    - Kinds of managers.
    - Evolution of Management Thought
    - Functions of Management
    - F.W. Taylor and Henry Fayol's contribution.

    B) Groups in organization - Theories of Group Formation.
    - Formal Organization & Informal Groups & their interaction
    - Team – Meaning, Importance and advantages of teams.
    - Stages of team development.
    - Team Work / Team building.
    - Conflict Resolution in Groups and problem-solving Techniques.

02. Planning and Organizing: **(15 L)**
    - Types of Plans - Characteristics of a sound Plan.
    - Management by Objectives (MBO)
    - Principles of organizing – Organization Structure and Design
    - Types of power.
    - Delegation of Authority and factors affecting delegation.
    - Departmentation.
    - Line and Staff Authority
    - Decentralization – Centralization.
    - Authority and Responsibility
    - Decision Making - Types of decision - Decision Making Process - Rational Decision Making.

03. **A)** Concept of Organizational Behavior. **(18 L)**
    - Personality: meaning, factors affecting personality.
    - Big five model of personality.
    - Personality Theories - Extrovert & Introvert, Type-A & Type-B, Sigmund Freud's Psychoanalytic theory.
    - Perception: concept, factors affecting perception, process of perception, perceptual errors

    B) Concept of TQM, Quality Circles, Kaizen, Six sigma.

04. Motivation and job performance **(12L)**
    - Motives
    - Characteristics
    - Classification of Motives
    - Primary Motives, Secondary Motives
    - Morale
    - Definition & relationship with productivity
    - Morale Indicators: Theories of Work motivation

• Maslow's Theory of Need Hierarchy, Herzberg's Theory of Job Loading

Books Recommended:

01. Essentials of Management – By Harold Koontz & Heinz Weihrich – 7th Ed. – Tata McGraw Hill.
02. Essentials of Management by Joseph L. Massie – Prentice Hall India.
03. Management of Organisation Behaviour by Paul Hersey & Blanchard – Prentice Hall India.
04. Organisational Behaviour by John W. Newstrom – Tata McGraw Hill.
05. Organisational Behaviour – By Fred Luthans – McGraw Hill Intl.
06. Management Information System – By Dr. P.C. Pardeshi & Others.
07. Management: Tasks, Responsibilities & Practices – By Peter Drucker – Allied Publisher
08. Administrative Thinkers by D Ravindra Prasad, V S Prasad, P Sathyanarayana- Sterling Publishers Private Limited.
09. Organizational Behavior, by Robbins Stephen P and Judge T.A., Vohra, 16th Ed. Pearson.

SCT 8.2 Plant Design

Learning Objectives:

1. To help the students to know about industrial hazardous and safety measures.
2. To know the students about various equipments facility used in industry.

Learning Outcomes:

1. Students will understand safety measures to be taken industry.
2. Students will come to know material of construction used in the construction of various equipments

1) Process hazards & safety measure in equipment design: Introduction, Hazards in process Industries, analysis of hazards, Safety Measures, Safety measure in equipment designs. **(15 L)**

2) Reaction vessel : Material of construction, agitation, classification of reaction vessels, heating systems, design, consideration. **(15 L)**

3) Agitators : Introduction, types, power requirement, Design of agitation system components, Drive for Agitators. **(15 L)**

4) **A)** Storage Vessels : Storage Vessels for Fluids, Non-volatile fluids, Volatile liquids gases,design of tanks, nozzles and mountings.
B) Driers : Introduction, Types, design considerations. **(15 L)**

Books recommended:

1. Process Equipment Design: M. V. Joshi
2. Chemical Engineer's handbook: Mc-Graw Hill, Perry.
3. Process equipment design – Dr. S. D. Dawande

HCP- 8.1 Colours in Cosmetics

1) Preparation of colour solution - Water soluble colours, Oil soluble colours

2) Incorporation of colours (Quantity) and perfume (q. s.)
   i) Powders
   ii) Lipsticks
   iii) Eye Shadow
   iv) Rouge
   v) Compacts
   vi) Mascara
   vii) Nail lacquers
   viii) Shampoo (Emulsion / clear)
   ix) Hair oils / Hair gels
   x) Hair colorants
   xi) After shave lotions
   xii) Toothpaste
   xiii) Mouth wash
   xiv) Gels

3) Determination of colours and Colour matching of marketed products.

HCP- 8.2 Cosmetic Technology – VI Practical

1) Shaving preparations
2) Foot preparations
3) Sun screening preparations
4) Manicure Preparations
5) Tooth preparations
6) Mouth wash

HCP 8.3 Cosmeceuticals Microbiology Practical

1) Microbial Analysis

i. Staining techniques, preparation of media, isolation of culture.
ii. Aseptic transfer
iii. Determination of Rider Walker coefficient
iv. Antimicrobial assay
v. Estimation of total plate count in given cosmetic product.
vi. Identification & Isolation of gram –ve pathogenic organism
vii. Estimation of fungi in given cosmetic
viii. Challenge test for preservatives

2) Study of environmental isolates.
3) Microbiological testing of raw materials & finished products.

HCP 8.4 Herbal Cosmetics-II Practical

1) Practical based on- morphological characters, extraction by appropriate method, identification of chemical constituents, and incorporation of extract in suitable formulations of any three herbal ingredients from each (i) and (ii) of following,
   i) *Tulsi, Majistha, Papaya, Lemon, Carrot, Orange peel, Grapefruit*
   ii) (Citrus paradise), *Kesar, Lotus*.
   iii) *Hibiscuss* (Jaswand), *Bhringaraj, curry leaves, Neem, Arnica, Seetaphal* (Plant and seeds) Pomegranate (Punica granatum)