

**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.
(Cosmetic Technology)**

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

(Syllabus to be implemented from w. e. f. June 2023)

**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. 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 50 marks out of which 40 marks will be for Term End examination (University Examination) and 10 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 10 marks and external evaluation (University Examination) of 40 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:

Q. No.1) Multiple choice questions (08)

- 1)
- a) b) c) d)
- 2)
- 3)
- 4)
- 5)
- 6)
- 7)
- 8)

Q.No.2) Answer any four of the following (08)

- i)
- ii)
- iii)
- iv)
- v)
- vi)

Q.No.3 Write notes on any two of the following (08)

- i)
- ii)
- iii)

Q. No.4) Answer any Two of the following (08)

- i)
- ii)
- iii)

Q.No.5) Answer any one of the following (08)

- i)
- ii)

II) Nature of Practical question paper: Practical examination will be of 2 hours duration carrying 40 marks. VIVA & record book will be of 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 st	2 nd	3 rd	4 th	5 th									
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 (SEM VIII)	
							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 2023

Fourth Year syllabus (according to the Semester Pattern Examination) to be effective from the Academic Year 2023-24

Semester	Code	Title of the Paper	Semester Examination			L	T	P	Credits
			Theory (UA)	CA	Total				
Sem-VII		Hard Core							
	HCT7.1	Perfumes & Colours	40	10	50	4	--	--	4
	HCT7.2	Cosmetic Technology- V	40	10	50	4	--	--	4
	HCT 7.3	Quality Assurance Techniques	40	10	50	4	--	--	4
	HCT 7.4	Herbal Cosmetics-I	40	10	50	4	--	--	4
		Soft Core (Any one)							
	SCT 7.1	Organization & Management of Industries	40	10	50	4	--	--	4
	SCT 7.2	Material Management & Inventory Control	40	10	50	4	--	--	4
	HCP 7.1	Practical-I(HCT 7.1 &HCT 7.2)	40	10	50	--	--	04	4
	HCP 7.2	Practical-II (HCT 7.3 &HCT 7.4)	40	10	50	--	--	04	4
	Total for Semester- VII	280	70	350	--	--	--	28	
Sem-VIII		Hard Core							
	HCT 8.1	Colours in Cosmetics	40	10	50	4	--	--	4
	HCT 8.2	Cosmetic Technology- VI	40	10	50	4	--	--	4
	HCT 8.3	Cosmeceuticals Microbiology	40	10	50	4	--	--	4
	HCT 8.4	Herbal Cosmetics-II	40	10	50	4	--	--	4
		Soft Core (Any one)							
	SCT 8.1	Management and Organizational Behavior	40	10	50	4	--	--	4
	SCT 8.2	Plant Design	40	10	50	4	--	--	4
		Dissertation	--	25	25	--	1	--	2
	HCP 8.1	Practical-III (HCT 8.1 &HCT 8.2)	40	10	50	--	--	04	4
	HCP 8.2	Practical-IV(HCT 8.3 &HCT 8.4)	40	10	50	--	--	04	4
		Total for Semester- VIII	280	95	375	--	1	--	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.
- 1) Specially perfumed products – formulation and processing of:
 - a. Alcoholic fragrance solution
 - b. Emulsified and solid fragrances.
 - c. Solubilized perfumes. **(10 L)**
 - 2) Synthetic substances used to formulate different perfumes, their sources, properties and composition of lavender, Rose, Jasmine, violet, Orris, Cypre, Amber, carnation, Muguet, Lilac, Acacia, Cassie, narcissus, Kewda, Mineral water essences. **(10 L)**
 - 3) Adaptation and incorporation of perfumes in skin care cosmetic products like creams, lotions, powders, soaps. **(10 L)**
 - 4) A) Adaptation and incorporation of perfumes in Hair care cosmetic products like shampoo, hair oils, conditioners, hair colorants and dyes.

B) Incorporation of perfume/ color/ flavor in eye preparations. Nail preparations, Lip and other preparations, tooth paste and baby preparations. **(10 L)**

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

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, Aerosol shampoos, Acid balanced Shampoos, safety of shampoos.

(10L)

2) Hair setting lotions, sprays and dressings:

Use and purpose of hair dressings, women hair dressings, setting lotions, heated curlers and blow drying, hair sprays, Men's hair dressing – formulation brilliantines, non oily fixatives, aerosols, emulsion gels.

(10 L)

3) A) Hair Tonics & Conditioners: Introduction – formulation of medicated hair tonics, conditioners, evaluation of conditioning, hair thickeners, rinses.

B) Hair strengtheners: Introduction, hot comb method, caustic preparations, chemical hair reducing preparations.

(10 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.

(10 L)

Books recommended:

1. Text Book of Cosmetology 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 trouble shooting 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:

I) Concept: Quality Assurance, Good Manufacturing Practice and Quality Control.

II) Documentation: BMR, Validation and its types, Process Validation, Qualification, SOP, Change Control, Deviation (10L)

2) Theoretical aspects, basic instrumentation and application of following Technique:

I) Separation Technique: Gel Filtration, HPLC, HPTLC and GC.

II) Spectroscopy Technique: IR, NMR, Mass.

III) Light scattering method: Nephelometry and Turbidimetry. (10L)

3) Stability Testing –Role of stability testing, Stability testing guidelines, stability testing under different climatic zones and condition and determination of shelf life. (10L)

4) Evaluation of finished products e.g. Shampoos, Tooth pastes, Sun screen preparation, lipsticks, Soaps, Skin creams, face wash. (10L)

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. Classification of cosmetic raw materials and adjuncts IS 3958 of Indian Standard
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.
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- 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:
Aloe, Babhool, Bawchi, chandan, cucumber, Haldi, Ambahaldi, Jeshthamadh, lodra, Neem **(10 L)**
 - 2) Study of following herbs used in- Hair care cosmetic formulations with reference to their biological and geographical sources, chemical constituents, cosmetic or cosmeceuticals uses of following:
Brahmi, Jatamanasi, mehandi, Nagarmotha, ritha, shikekai, kapurkachari. **(10 L)**
 - 3) Study of storage of herbal actives in cosmetics and store house. **(10 L)**
 - 4) A) Preparation of herbal actives in cosmetics for commercial market.
B) Future scope of Herbal ingredients in Cosmetic Industry **(10 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- 7.1 Organization & Management of Industries

Learning Objectives:

1. To understand the concept of marketing research and marketing management.
2. To learn about basic requirement for setting up new plant.
3. To help students to develop cognizance of the importance of managements principles.

Learning Outcomes:

1. Students will know about marketing process for different cosmetics.
2. Students will able to analyze and understand the environment of an organization

1) Marketing Management:

Sales forecasting – Objects, Methods, Budget Preparation, marketing Research, Consumer & Product research. **(10 L)**

2) Marketing Management: Distribution Techniques – Information system, Distribution budgeting and control system. Consumer research methodology execution and interpretation difference between consumer research and marketing of product, expert promotion, International & Global multi Advertising.Evaluation of salesman’s performance. Practical experience – Case studies on related aspects. **(10 L)**

3) Plant Location and Layout considerations with special reference to:

Material Procurement and utilization, production, planning and control, requirement and effectiveutilization of manpower. **(10 L)**

4) A) Fundamental of Business Organization & Management – Industrial safety.

B) Small scale industries and cottage industries with emphasis on soaps, Detergents and Other Cosmetic Industries. Role of small scale industries in economy development of India. Problems and prospectsof small scale Industries and Industrial safety. **(10 L)**

Books recommended:

1. Fundamental of Business Organization & Management – .Y. K. Bhushan.
2. Industrial Management –I. K. Chopda and A. M. Sheikh,
3. Industrial organization and Management SherlekarandSherlekar
4. Industrial Management – R. K. jain,
5. Business Organization and Management – Shukla M. S.
6. Management of Small Scale Industries – Vasant Desai
7. Principles of Management – T. ramaswamy
8. A Text Book of Industrial Organization and Management – S. A. Sherlekar and MallikarjunRao.
9. Entrepreneurial development – C. B. Gupta and N. P. Shrinivasan.
10. Micro & Macro Economic Analysis – C. K. Dewett& Singh
11. Principles of Management – M. L. Seth.
12. Principles of Management – I. C. Dhingra.

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. **(10 L)**

2] A) Purchase Management and Purchase Procedures:

Objectives, Purchase system- Centralised, Decentralised, Local purchase. Legal aspects of purchasing. Purchase Procedures: Selection of Suppliers, Tendering procedures, Analysing 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. **(10 L)**

3] Store Management:

Organisation & layout, Functions of Store Manager, Materials handling, Flow of goods/FIFO. Computerisation of inventory transactions, Disposal of scrap/unserviceable materials, Sub-stores in various departments, Physical stock taking. **(10 L)**

4] Inventory Control:

Aims & objectives, Scope of Inventory Control, Lead-time, Buffer stock, Reorder level, Two Bin System, EOQ. Techniques of Inventory Control- ABC, VED, Others. **(10 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. Gopalkrishnan –Sultanhand& Co., New Delhi.

HCP 7.1: Practical I

Perfumes & Colours

- 1) Preparation of Emulsified fragrances—
Cream - Formulation, Method & Quantity with ingredients 30/40 gms.
Lotion - Formulation, Method & Quantity with ingredients 30/40 gms.
- 2) 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 Soln – 2 products
- 5) Colognes – citrus oil
- 5) Toilet waters
- 6) Perfuming of hair oil
- 7) Perfuming of powders – min 2 products
- 8) Performance evaluation of perfume

Cosmetic Technology- V

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

HCP 7.2: Practical II

Quality Assurance Techniques

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 colour, 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 material as per BIS

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

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, Shikakai, 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.
-
- 1) Introduction: colour, chroma, light and colour, colour system, relation of colour and emotions, pigment, dye, lake and tonner, hue, value, bleed, tones, highdng power, certified colours. **(10 L)**
 - 2) Classification of colours .- Natural (sources, properties), Synthetic based on chemical structures, inorganic colours. **(10 L)**
 - 3) Preparation of colour solutions and incorporation of colours in skin care and hair care products including soaps. **(10 L)**
 - 4) Determination of colours and Colour matching of marketed products. **(10 L)**

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 by 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

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.

(10 L)

2) Sunscreen, Sun tan and Antisunburn Preparations:

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

Sunscreen and suntan preparations – Introduction.Sunscreen agents and their formulation. (10 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, chilblainpreparations, 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. (10 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.

(10 L)

Books recommended:

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

HCT- 8.3 Cosmeceuticals Microbiology

Learning Objectives:

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

Learning Outcomes:

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

1) A) Introduction:

- 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

(10L)

2) Microbial Control:

- 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

(10L)

3) A) Nutritional requirement for microbes: 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. (10L)

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.

(10L)

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. Booklet: Pharmaceutical Analysis.
6. A.H. Backett& J. B. Stanlake: Practical Pharmaceutical Chemistry.
7. Garret : Text Book & Pharmaceutical Analysis
8. A. L. Vogel :Quantative 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
- 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:
Raktachandan, Tulsi, Majistha, Papaya, Lemon, Carrot, Orangepeel, Grapefruit (citrus paradise),
Kesar, Lotus, ficusgolmerata (umber), *Akarkara, Beetroot, Palash* (10L)
 - 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:
Hibiscuss (Jaswand), *Bhringaraj, Curry leaves, Neem, Arnica, Seetaphal* (Plant and seeds) and
Pomegranate (*Punica granatum*) (10 L)
 - 3) Various methods of extraction employed for herbal constituents. (10 L)
 - 4) I) Formulating appropriate cosmetic products by incorporating herbal actives in skin care products:
Creams, powder, lotion
II) Formulating appropriate cosmetic products by incorporating herbal actives in hair care products:
Hair oil, shampoo, hair tonics (10 L)

Books recommended:

1. Treas&Erans : Text Book of Pharmacognosy.
2. Claus &Tyler :Pharmacognosy.
3. Nadkarni :MeterialMedica
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 students 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. Basic concepts of Management: **(10L)**

- Evolution of Management Thought
- Functions of Management
- F.W. Taylor and Henry Fayol's contribution.
- Theories of Group Formation
- Formal Organization & Informal Groups & their interaction
- Importance of teams
- Formation of teams
- Team Work

02. Planning and Organizing: **(10 L)**

- Management by Objectives
- Steps and Hierarchy of Plans.
- Departmentation
- Line and Staff Authority –
- Decentralization – Centralization
- Authority and Responsibility
- Accountability and Power.

03. Controlling and Coordinating **(10 L)**

- Process of Controlling
- PERT
- CPM
- Work Study
- Operations Research
- Quality Circles
- Kaizen

04. Motivation **(10L)**

- 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

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
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- 1) Process hazards & safety measure in equipment design: Introduction, Hazards in process Industries, analysis of hazards, Safety Measures, Safety measure in equipment designs. **(10L)**
 - 2) Reaction vessel : Material of construction, agitation, classification of reaction vessels, heating systems, design, consideration. **(10 L)**
 - 3) Agitators : Introduction, types, power requirement, Design of agitation system components, Drive for Agitators. **(10 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. **(10 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: Practical- III

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.

Cosmetic Technology - VI

- 1) Shaving preparations
- 2) Foot preparations
- 3) Sunscreening preparations
- 4) Manicure Preparations
- 5) Tooth preparations
- 6) Mouth wash

HCP 8.2 Practical- IV

Cosmeceuticals Microbiology

- 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.

Herbal Cosmetics-II

- 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)*