I. Consideration of physical and chemical problems inherent in the formulation and development of cosmetic preparations.
   a) Physical properties: Physical forms, practical size, solubility, wetting of solids and flow, cohesiveness and organolaptic properties.
   b) Chemical properties and stability of ingredients and additives.

II. Formulation Additives:
    Antioxidants and preservatives, perfumes, colouring and diluting agents, emulsifying and suspending agents, basic materials for creams/ointment bases, solvents and miscellaneous additives.


IV. Establishing pilot plant, studies, scale-up the manufacture of product to intermediate and large scale production.
    Requirements & Methods for maintenance of sterile area.

RECOMMENDED BOOKS:

2. Harry’s Cosmeticology
3. Industrial Pharmacy by Leon Lachman
4. Perfume: History & chemistre By D.D. Wasule
5. New Cosmetic Science
6. Indian Herbs by Chopra
7. Wealth of India, published by CSIR
1. Quality assurance management - Good manufacturing practices (GMP)
   Introduction
   Quality & related terms - Basic concepts
   Quality - quality functions, quality control, quality policy, quality objectives, quality assurance, quality management.
   Inspection and Test
   Inspection & Inspection planning, Inspection manual, Product acceptance inspection, Inspector errors.
   Sampling - Sampling plans, procedures
   Parameters of quality analysis - stability indicating methods
   Laboratory safety planning and management, biosafety, emergency procedures.
   GLP - General provisions, organization and personnel facilities, equipment, testing facilities operation test and control articles, protocol for and conduct of a nonclinical laboratory study, records and reports.
   ISO 9000

2. Intellectual Property Right Act, its significance and importance with reference to cosmetics.

3. Analysis of raw materials and Evaluation of finished products giving emphasis on -
   Physicochemical properties, chemical analysis, identification, instrumental analysis, biological toxicological testing, Raw Materials- Waxes, fatty acids/ alcohols/ esters dispersing agents, colors, perfumes, preservatives antioxidants. Sweetening agents. Cosmetic or therapeutic agents, adsorbents etc.
   Products - Emulsions (liquid, cream), suspension (lotion), powders (talcum, baby, compact) Lipsticks, Maskara, kajal, hair care products (shampoo, colorants) tooth pastes, tooth powders, men’s toiletories, antiperspirants deodorants, nail lacquers, aerosols etc.

4. Quality assessment of packaging materials, containers, closures etc.

RECOMMENDED BOOKS:

5. Calorimetric methods of Analysis by Z.D. Snell and C.T. –
Emulsions:
Electrical theories of stabilization of emulsions, assessment and prediction of emulsion shelf life, equations, involved in emulsion stability stress conditions and physical parameters employed to evaluate emulsion stability, prevention of interaction between preservatives and emulsion ingredients like surface active agents hydrophilic polymers, suspended particles packaging materials etc. Predication of preservative's efficiency.
Production, equipments, Industrial processing and large-scale manufacture.

Suspensions:
Theory, Production, equipments, industrial processing and large-scale manufacturing.

Interfacial Phenomena:
Liquid – Liquid interface: Insoluble monalyers, surface pressure, surface potential, surface rheology and their measurement, structure and state of monolayers, mixed monolayers, Macromolecular films, Biological membranes, Liquid-solid interface, detailed study of wetting, detergency and water repellency.

Concept of Solubilization
Surface Active agents, Micelle formation, factors affecting micelle formation and physical methods of investigation of micellar solutions. Theory and mechanism of solubilization.

RECOMMENDED BOOKS:

2) Mortin A.N. “Physical Pharmacy “.
3) Lachman et. Al “The Theory and Practical of Industrial Pharmacy”.
4) “Remington, Phar maceutical Practics”.
5) Badger W.L. & Banche “Introduction of Chemical Engineering”.
6) Chemical Engineering by Richardson & Crudson.
1. Study of physical and chemical properties of ingredients used in Cosmetics
2. Development of following cosmetic products and incorporation of additives like color, perfumes and study of effect of ingredients on the formulation of following products.

   I. Dispersions (emulsions & suspensions)
   II. Talcum powder & compact powders
   III. Lipsticks
   IV. Shampoos
   V. Colorants
   VI. Tooth paste & powder
   VII. Nail lacquers
   VIII. Aerosol
   IX. Shaving cream
   X. Aftershave lotions
   XI. Soaps

A) Carry out identification, physicochemical properties, chemical analysis, instrumental analysis, biological – toxicological testing for

Raw Materials:
Waxes, fatty acids/ Alcohols/ esters, dispersing agents, colors, perfumes, preservatives, antioxidants, sweetening agents, cosmetic or therapeutic agents, adsorbents etc.

Finished Products:
Emulsion, suspensions, powders (Talcum, baby and compacts). Lipsticks, mascara, Kajal, Hair care products (Shampoo, colorants), toothpaste, toothpowder’s, antiperspirant and deodorants, nail lacquers, aerosols, men’s
toiletries (Shaving cream, after shave lotions, eue-de – colongne), soaps, perfumes.,

B) Evaluation (determination and detection) of the following –
Color
Perfumes
Flavours

**MASTER OF COSMETIC TECHNOLOGY  Semester I**

**MCT 1-P3  SEMINAR / ASSIGNMENTS / JOURNAL CLUB**

Max. Marks – 50
Sessional – 50

The students are expected to review the Journals, recent references and trends in the field of cosmetics formulation, quality assessment and advances. The students will deliver the seminar on recent trends. Review of journal and completing assignments will be the part of curriculum.

**MASTER OF COSMETIC TECHNOLOGY  Semester II**

**MCT 2- T1  FORMULATION AND DEVELOPMENT- II(FD II)**

Max. Marks – 100
Paper – 80
Sessional – 20

I. Formulation and Development of -
Emulsion, suspensions, powders (Talcum baby and compacts). Lipsticks, mascara, Kajal, toothpaste, toothpowders, antiperspirant and deodorants, nail lacquers,

II. Formulation and Development of-
Hair care products like Shampoo, colorants, Hair Removers, Hair gel, Hair oils etc.

III. Formulation & Development of men’s toiletries (Shaving cream, after shave lotions, eue-de – colongne), soaps, aerosols & perfumes.

RECOMMENDED BOOKS:

2. Harry’s Cosmeticology
3. Industrial Pharmacy by Leon Lachman
4. Perfume: History & chemistre By D.D.Wasule
5. New Cosmetic Science
6. Indian Herbs by Chopra
7. Wealth of India, published by CSIR

MASTER OF COSMETIC TECHNOLOGY Semester II
MCT 2 – T2 ADVANCED COSMETIC TECHNOLOGY – II (ACT II)

Max. Marks – 100
Paper - 80
Sessional - 20

1) Solubilization and its applications:
Some factors in the formulation of Cosmeticeuticals containing solubilized materials like choice of surface active agents, effect on the nature of the solubility, effect of cosolubilizing agents on the solubilizing action of surface active agents, effect of temperature on the solubilization, phase equilibria in systems containing surfactants, applications of solubilization, solubilization of phenolic disinfectants, Idophors, vitamin preparations, hormones solutions, steroids, flavors and perfumes etc.

2) Theories of dispersion techniques:
General basic physical considerations, adsorption and interfacial energetics and study of relevant equations, adsorption on solid surfaces, electrical phenomena at interfaces, Particle-particle interactions, influence of polymer adsorption on particle, vehicle interaction, flocculation kinetics, controlled flocculation. Application of dispersion techniques in formulation of emulsion and suspensions.

3) Rheology:
Theoretical considerations, Thixotropy, spurs and bulges in the hystorisis loop, continuous shear reheometry of semisolids, viscoelasticity, the creep test study including principle of operation and applications of Concecplate, Stormer, Mac Michael, Brook-field viscometers. Chemical and Physical factors effecting rheological properties, Rheology and product design, Rheology and cosmaceutical processing, Rheology and biological applications.

4) Micromeritics:
Adsorption, air permeability techniques and determination of surface area and size of particles. Classification and evaluation of some basic properties of powders, flow properties of various powder systems.
RECOMMENDED BOOKS:

2. Mortin A.N. “Physical Pharmacy “.
3. Lachman et. Al “The Theory and Practical of Industrial Pharmacy”.
5. Badger W.L. & Banche “Introduction of Chemical Engineering”.
6. Chemical Engineering by Richardson & Crudson.

MASTER OF COSMETIC TECHNOLOGY  Semester II

MCT 2- T3

NATURAL PRODUCTS (NP)

Max. Marks – 100
Paper - 80
Sessional - 20


II. Extraction and isolation of compounds from herbs- Compounds, structures and properties. Methods of extraction of compounds- Solvents, distillation, Supercritical fluid extraction.

III. Standardization and quality control of herbal extracts & products. Standardization QA, AC & GMP, SOP, Qualitative & quantitative analysis of herbal extracts and products. New technologies and other bioassays for screening and mechanism study. Key to functional mechanism study of Herbal medicines.

IV. Functional evaluation & herbal actives- significance of research, characteristics of pharmacological research, design of pharmacological study on herbal medicines.

RECOMMENDED BOOKS:

1) Fractional Herbal Medicine Research Methods edited by willow L. H. Liu.
2) Pharmacognosy by C. K. Kokate, A.P. Purohit, S. B. Gokhale.
3) Pharmacognosy by Trease and Wallis
4) Benttey’s Text book of Pharmaceutics.
5) Remingtons ‘The Science and Practical of Pharmacy’ 21st edition
1. Extraction & Isolation of active principles from important medicinal herbs.

2. Incorporation of active herbal principals in various cosmetic products. (at least two products from each category – solid, semi solid, and liquid)

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1. Evaluation of stability of Emulsions through different methods.
   a. Accelerated stability study.
   b. Particle size analysis
   c. Other Parameters

2. Evaluation of stability of suspensions through different methods.
   a. Accelerated stability study
   b. Particle size analysis
   c. Other parameters.

3. To measure Zeta potential of emulsion and to co-relate with stability.

4. To measure Zeta potential of suspensions and to co-relate with stability.

5. To determine the cmc of surfactants by stalagmometer
   (Anionic, Cationic, Nonionic, Ampholytic)

6. To determine the cmc of surfactants by capillary rise method.

7. To study the effect of salts on cmc of surfactant.

8. Determination of amount of surfactants with respect to phase-volume ratio.
   Antioxidants, emulsifying agents.

9. To study the thixotropic behaviours of some creams.
   a. Viscosity
   b. Sedimentation.
10. To demonstrate the effect of air-entrapment on rheology of creams.
11. Interaction between the preservatives, antioxidants, emulsifying agents.
12. Interaction of above mentioned additives on the different packaging material.
13. To study the effect of pH on partition co-efficient of weak acids.
14. To study the effect of solvents on partition co-efficient of weak acids.
15. To study the flow properties of powders.
   a. Effect of particle size (b) Moisture content  On angle of Repose
   c. Other additives like glidants & lubricants

**MASTER OF COSMETIC TECHNOLOGY  Semester II**

**MCT 2-P3  SEMINAR / ASSIGNMENTS / JOURNAL CLUB**

Max. Marks – 50  
Sessional - 50

The students are expected to review the Journals, recent references and trends in the field of cosmetics formulation, quality assessment and advances. The students will deliver the seminar on recent trends. Review of journal and completing assignments will be the part of curriculum.

**MASTER OF COSMETIC TECHNOLOGY  Semester III**

**MCT 3-T1  RESEARCH METHODOLOGY [R M]**

Max. Marks – 100  
Paper- 80
Sessional - 20


2. Frequency distribution, histogram, frequency, polygons, Oliver.
   a. Binomial distribution
   b. Normal distribution – use of normal probability tables
   c. Parametric and non-parametric tests.

3. Testing of hypothesis. Type I and Type II errors. Levels of significance
   a. Chi-square test. Goodness of fit. Independence of attributes 2x2 and r x c contingency tables.
   b. Application of student ‘t’ test for small samples. Difference in proportion for means and difference in means.
   Correlation, coefficient of correlation, rank correlation.

4. Regression and prediction.
b. Analysis of variance – one way and two-way classification.
c. Definition and identification of research problem
c. Selection of research problem
d. Justification
e. Theory, hypothesis, basic assumptions, limitations and delimitations of the problem.

Recommended Books:

4. SPSS / PC for the IBM PC / XT, SPSS Inc.

**MASTER OF COSMETIC TECHNOLOGY Semester III**

**MCT 3- T2 QUALITY ASSURANCE TECHNIQUES II (QAT II)**

Max. Marks – 100
Paper - 80
Sessional - 20

1. Compliance of Drug & Cosmetic Act 1940 with reference to provisions for packaging and labelling (Rule 150 A, schedule S), permitted colors, flavors etc.

2. Microorganisms in raw materials, Risk assessment
   Microorganisms in manufacturing environment, current GMP, concept of HACCP,
   Microbial contamination in cosmetic products.
   Microbial considerations in product formulation.
   Total microbial count, Isolation and identification of microorganisms specified in BIS guidelines from cosmetic products and raw materials.

3. Skin testing – patch testing, methods of determination of Moisture, Sebum, and Conductivity of skin.

RECOMMENDED BOOKS:

8. Practical Cosmetic Microbiology by Kulkarni, Meghare Denett publications.
9. How to practice G.M.P.S. by P.P. Sharma
11. How to practice GLP by P.P. Sharma

MASTER OF COSMETIC TECHNOLOGY Semester III
MCT 3-T3 ADVANCED COSMETIC TECHNOLOGY – III (ACT III)  
Max. Marks – 100  
Paper- 80  
Sessional - 20

1. Microencapsulation: Techniques of manufacturing- physical, physiochemical, chemical methods, Release methods and pattern, safety aspects and applications.


3. Liposomes: Classification, Techniques of manufacturing, safety aspects and applications.


MASTER OF COSMETIC TECHNOLOGY Semester III
MCT 3-P1 RESEARCH METHODOLOGY [RM]  
Max. Marks – 100  
Main-- 80  
Sessional-- 20

1. Literature search through chemical abstract, internet, books, journals.

2. Research data collection & presentation.
3. The candidate shall deliver seminar during the session, on selected topics of current research interest as reported in the research journals in the field of cosmetology.

4. The students will be delivering at least two seminars during the session. The seminars based on research reviews will be evaluated by the panel of experts consisting of minimum three teachers including Head of the Department.

**MASTER OF COSMETIC TECHNOLOGY  Semester III**

**MCT 3- P2 QUALITY ASSURANCE TECHNIQUES II [QAT -II]**

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Microbiological testing

1. Evaluation of total microbial count of raw material and finished products.

2. Isolation and identification of aerobic microorganisms of raw materials and finished products as specified in BIS and CTFA guidelines.


4. Evaluation of antimicrobial activity and determination of minimum MIC of synthetic compounds and herbal extracts.

5. Determination of preservative efficacy in finished products.

**MASTER OF COSMETIC TECHNOLOGY  Semester III**

**MCT 3-P3 SEMINAR / ASSIGNMENTS / JOURNAL CLUB**

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The students are expected to review the Journals, recent references and trends in the field of cosmetics formulation, quality assessment and advances. The students will deliver the seminar on recent trends. Review of journal and completing assignments will be the part of curriculum.
Unit 1: Production Management: Objectives & Policies, Types of production, Plant Location, decision Plant Layout, Types of Layouts.

Unit 2: Production planning and control, Industrial quality control, statistical quality control methods, TQM m ISO systems Job evaluation.

Unit 3: Materials Management, Scientific Purchasing, Inventory control, EOG model, inventory classification, ABC analysis, cost elements inventory Selection of vendors and vendor rating.

Unit 4: Maintenance Management, Material handling systems, sanitation and plant utilities, stores management.

RECOMMENDED BOOKS:

3. Ammer D.S. “Manufacturing Management and Control”
5. Griffin M.C. “Drug and Cosmetic Packaging”
6. Journals:
   i. Manufacturing Chemist and Aerosal News.
   ii. Drug and Cosmetic Industry.
   iii. Journal of Association of Cosmetic Chemists.
7. Marketing Management by Dr. Philip Kotlev – PHI
8. Marketing Management by Stanton
9. Marketing Management by Rajan Saksena , TMH
11. Marketing Management by Puffa
MASTER OF COSMETIC TECHNOLOGY Semester IV

MCT 4-T2 MARKETING MANAGEMENT (MM)

Max. Marks – 100
Paper - 80
Sessional - 20

Unit 1: Marketing: Meaning, Philosophies of marketing functions scope and evolution. Different demand states and formal marketing tasks, Marketing environment,

Unit 2: concept of product, product line and mix. New products, development and launch. Pricing - different methods, under different market conditions. Distribution, different channels of distribution - factor affecting channels choice, direct marketing multilevel marketing, telemarketing.

Unit 3: Promotion – Different elements of promotion, personal selling, advertising, sales promotion and public relations. Supply chain management, customer relationship management.


Market Segmentation - Different methods of segmenting market.

RECOMMENDED BOOKS:

3. Ammer D.S. “Manufacturing Management and Control”
5. Griffin M.C. “Drug and Cosmetic Packaging”
6. Journals:
   v. Drug and Cosmetic Industry.
7. Marketing Management by Dr. Philip Kotlev – PHI
8. Marketing Management by Stanton
9. Marketing Management by Rajan Saksena, TMH
11. Marketing Management by Puffa
Every student for the degree of Master of Cosmetic Technology shall be required to undertake project work involving methodical research and submit three copies of the report of the project work, duly certified by the supervisor / Guide to the Head of the Department.

Internal Assessment marks should be allotted on the basis of at least three seminar/reviews during Project work.