COSMECEUTICS (MCC): M. PHARM IST SEM

MODERN PHARMACEUTICAL ANALYSIS (MPA101T)

Scope

This subject deals with various advanced analytical instrumental techniques for identification, characterization and quantification of drugs. Instruments dealt are NMR, Mass spectrometer, IR, HPLC, GC etc.

Objectives

After completion of course student is able to know,

- The analysis of various drugs in single and combination dosage forms
- Theoretical and practical skills of the instruments

THEORY

1. UV-Visible spectroscopy: Introduction, Theory, Laws, Instrumentation associated with UV-Visible spectroscopy, Choice of solvents and solvent effect and Applications of UV-Visible spectroscopy.

IR spectroscopy: Theory, Modes of Molecular vibrations, Sample handling, Instrumentation of Dispersive and Fourier - Transform IR Spectrometer, Factors affecting vibrational frequencies and Applications of IR spectroscopy

Spectroflourimetry: Theory of Fluorescence, Factors affecting fluorescence, Quenchers, Instrumentation and Applications of fluorescence spectrophotometer.

Flame emission spectroscopy and Atomic absorption spectroscopy:
Principle, Instrumentation, Interferences and Applications.

2.NMR spectroscopy: Quantum numbers and their role in NMR, Principle, Instrumentation, Solvent requirement in NMR, Relaxation process, NMR signals in various compounds, Chemical shift, Factors influencing chemical shift, Spin-Spin coupling, Coupling constant, Nuclear magnetic double resonance, Brief outline of principles of FT-NMR and 13C NMR. Applications of NMR spectroscopy.

3 Mass Spectroscopy: Principle, Theory, Instrumentation of Mass Spectroscopy, Different types of ionization like electron impact, chemical, field, FAB and MALDI, APCI, ESI, APPI Analyzers of Quadrupole and Time of Flight, Mass fragmentation and its rules, Meta stable ions, Isotopic peaks and Applications of Mass spectroscopy

4 Chromatography: Principle, apparatus, instrumentation, chromatographic parameters, factors affecting resolution and applications of the following:

a) Paper chromatography b) Thin Layer chromatography

c) Ion exchange chromatography d) Column chromatography

e) Gas chromatography f) High Performance Liquid chromatography

g) Affinity chromatography

5 Electrophoresis: Principle, Instrumentation, Working conditions, factors affecting separation and applications of the following:

a) Paper electrophoresis b) Gel electrophoresis c) Capillary electrophoresis

d) Zone electrophoresis e) Moving boundary electrophoresis f) Iso electric focusing

X ray Crystallography: Production of X rays, Different X ray methods, Bragg's law, Rotating crystal technique, X ray powder technique, Types of crystals and applications of X-ray diffraction.

6. Immunological Assays: Radioimmunology assay (RIA), ELISA (Theory

REFERENCES

1. Spectrometric Identification of Organic compounds - Robert M Silverstein, Sixth edition, John Wiley & Sons, 2004.

2. Principles of Instrumental Analysis - Doglas A Skoog, F. James Holler, Timothy A. Nieman, 5th edition, Eastern press, Bangalore, 1998.

3. Instrumental methods of analysis – Willards, 7th edition, CBS publishers.

4. Practical Pharmaceutical Chemistry – Beckett and Stenlake, Vol II, 4th edition, CBS Publishers, New Delhi, 1997.

5. Organic Spectroscopy - William Kemp, 3rd edition, ELBS, 1991.

6. Quantitative Analysis of Drugs in Pharmaceutical formulation - P D Sethi, 3rd Edition, CBS Publishers, New Delhi, 1997.

7. Pharmaceutical Analysis- Modern methods – Part B - J W Munson, Volume 11, Marcel Dekker Series

COSMECEUTICALS-BIOLOGY (MCC102T)

Scope:

To impart knowledge on the biological aspects of – skin and hair, nails, eyes.

To understand basic problems associated with skin and hair.

To understand the mechanism of Skin irritation, allergy and allergic reactions that are major causes for skin problems.

Objectives:

 To have stronger scientific basis in developing cosmeceutical products.

Theory

1. Skin

- Structure and functions of skin, baby's skin and problems unique to baby's skin, Age associated morphological and histological changes in human skin. Difference between baby's skin and adult skin, Ethnic and gender differences in skin properties. Etiology and current treatment for psoriasis and wound healing process.
- General concepts of skin irritancy: Principles and molecular mechanisms of skin irritation, evaluation, factors predisposing to cutaneous irritation. Cosmetic and occupational Irritants.
- Cosmetic safety testing as per BIS (Bureau of Indian Standards), alternate safety testing methods: Cell line techniques for safety studies (including mutagenecity studies) and toxicity studies, toxicity studies models.

2. Immunology

Types of skin allergic reaction, immunological mechanism of skin allergy. Terminologies used: Contact dermatitis, Irritant Contact Dermatitis, allergic Contact dermatitis, photo-irritant contact dermatitis, phototoxicity, contact urticaria syndrome

3. Irritation study models

Artificial skin modeling – Human reconstituted epidermis and skin, Skin organ culture models and other new types of skin equivalents

4. Nail :

Anatomy of nail. Common problems associated with nail- Brittleness striations, splitting, pitting and fungal infections.

5. Hair:

The Structure and Properties of Hair, hair growth cycle. Hair-fall aetiology and current treatment. Racial differences in hair structure.

Microbiology:

Pharmacopeial methods of evaluation of preservative efficacy.

REFERENCES

1. Harry's Cosmeticology. 8th edition
2. Poucher's perfume cosmetics and Soaps, 10th edition
3. Cosmetics - Formulation, manufacture and quality control PP.Sharma, 4th edition
4. Handbook of cosmetic science and Technology A.O.Barel, M.Paye and H.I.Maibach. 3rdedition
5. Cosmetic and Toiletries recent suppliers catalogue.
6. CTFA directory.
7. British Pharmacoepia

COSMETICS – FORMULATION SCIENCE (MCC103T)

SCOPE:

 To impart knowledge on the fundamental principles of cosmetic product development.

 To understand k e y ingredients used in cosmetics and cosmeceuticals

 To understand the building blocks in the formulation of cosmetic products.

OBJECTIVES:

 Upon completion of the course, the students will be able to:

 Know various key ingredients used to develop cosmetics.

 Combine the ingredients together to develop cosmetics with desired sensory.

THEORY

1. Formulation Principles:

a. Definition of Cosmetics as per EU and Indian Guidelines

b. Cleansing and care needs for face, eye lids, lips, hands, feet, nail, scalp, neck, body and underarms. Examples of marketed product.

c. Formulation requirements for ethnic needs.

d. Cosmetic product development process

2. Formulation Building blocks:

Building blocks for different product formulations of cosmetics/cosmeceuticals:

e. Surfactants- Classification and application.

f. Emollients and rheological additives: classification and application.

g. An t i m i c r o b i a l u s e d a s preservatives, their merits and demerits. Factors affecting microbial preservative efficacy.

h. Perfumes; Classification of perfumes. Perfume ingredients listed as allergens.

i. Application of various product forms in cosmetics: Solution, creams, lotion, ointment, paste, gels, stick, tablets, capsules, powders and aerosol. Examples from marketed product.

3. Skin cleansing and care

Dry skin, skin moisturisation,

Skin Cleansing: Building blocks and formulation of Soap, syndet bars, face wash, body wash, face mask. Their relative advantages and disadvantages

Skin Care: Classification, requirement of an Ideal skin cream. Building blocks and formulation of cold cream, vanishing cream, moisturizing cream, moisturizing gel, body lotion, petroleum Jelly.

4. Hair

Hair Care**:** Ideal requirements of a shampoo. Formulation of shampoos, Hair conditioners, Hair oil , hair cream. and hair styling gels

Chemistry and formulation of Parapheylene diamine based Hair dyes.

5. Oral care, color cosmetics, deodorants and baby care

Oral Care: Ideal requirement of a toothpaste. Building blocks and formulation of tooth paste and mouth wash. Color Cosmetics**:** Building blocks and formulation of Lipstick, Mascara, nail polish and Face Powder. Deodorants and antiperspirants: Ingredients and mechanism of action Baby Care: Approach to baby care formulations.

REFERENCES:

1. Harry's Cosmeticology. 8th edition
2. Poucher's perfume cosmetics and Soaps, 10th edition
3. Cosmetics - Formulation, manufacture and quality control PP.Sharma, 4th edition
4. Handbook of cosmetic science and Technology A.O.Barel, M.Paye and
H.I.Maibach. 3rdedition
5. Cosmetic and Toiletries recent suppliers catalogue.
6. CTFA directory.

PRODUCTION TECHNOLOGY & QUALITY ASSURANCE (MCC104T)

SCOPE:

This course deals with the various quality assurance aspects of pharmaceutical industries. It covers the important aspects like cGMP, documentation, to understand about validation types, methodology application and how it can be applied to industry and thus to improve the quality of the products. Impart fundamental knowledge about quality management System. This knowledge can be applied in QA of cosmetics.

Objectives:

At the completion of this subject it is expected that the student will be able to know:

- The cGMP aspects in a pharmaceutical industry
- To appreciate the importance of documentation.
- Explain the aspect of validation
- Apply the knowledge of validation to manufacturing, instruments and equipments
- To understand the quality evaluation of products
- Need of Quality management system in Industry
- This knowledge can be used to evolve stringent QA systems for cosmeceuticals

THEORY

1. Introduction to Quality

Definition - Quality assurance and Quality control, concept of TQM, GMP, ICH, Brief study of ICH common technical documents – Q1-Q11, Quality by design, six sigma concept, ISO 9000 & 14000.

Document maintenance in pharmaceutical industry: Batch Formula Record, Master Formula Record, Quality audit reports and documents, quality reports, distribution records, Common Technical Document and Drug Master Files, Medical Devices, Electronic Common Technical Documentation, complaints and evaluation of complaints, Handling of return goods, recalling and waste disposal.

2. cGMP of Pharmaceutical manufacturing:

Evolution and Principles of cGMP, Schedule-M, WHO-GMP requirements, European Union (EU) and United States Food and Drug Administration (USFDA) guidelines on Pharmaceutical manufacturing. URS, FAT, DQ, SAT, IQ, OQ, PQ of machines and equipment.Clean room standards for different countries and names.

3. Introduction to Pharmaceutical Validation:

Definition, Manufacturing Process Model, scope of Validation, Advantage of Validation, Organization for Validation, Validation Master plan, Types of validation, Design Qualification, Installation Qualification, Operational Qualification & Performance Qualification of facilities. A Review of Prospective, Concurrent, Retrospective Validation & Revalidation including the use of Statistical Process Control (SPC).

4. Quality Management System :

Quality risk management**:** Introduction, risk assessment, risk control, risk review, risk Management tools, HACCP, risk ranking and filtering. Change Control, Deviation-(planned and unplanned), Corrective Action and Preventive Action (CAPA), Handling of nonconformance, Vendor evaluation process, Out of specification (OOS), Annual Product Review, batch reconciliation and finishedgoods release, Market recalls & Market complaints.

5. Quality Control Process

In process quality control and finished products quality control for following formulation in pharma industry: Liquids – Suspension, Emulsion, solutions, Ointments, creams, Jelly's, Parenterals , ophthalmic. Quality control test for containers, closures and secondary packing materials.

REFERENCES

1. Quality Assurance of Pharmaceuticals- A compedium of Guide lines and Related materials Vol I & II, 2nd edition, WHO Publications, 1999.
2. The International Pharmacopoeia – vol I, II, III, IV & V - General Methods of Analysis and Quality specification for Pharmaceutical Substances, Excepients and Dosage forms, 3rd edition, WHO, Geneva, 2005.
3. Good laboratory Practice Regulations – Allen F. Hirsch, Volume 38, Marcel Dekker Series, 1989.
4. ICH guidelines
5. ISO 9000 and total quality management
6. The drugs and cosmetics act 1940 – Deshpande, Nilesh Gandhi, 4th edition, Susmit Publishers, 2006.
7. Validation Standard Operating Procedures: A Step by Step Guide for Achieving Compliance in the Pharmaceutical, Medical Device, and Biotech Industries, Syed Imtiaz Haider
8. B. T. Loftus & R. A. Nash, "Pharmaceutical Process Validation", Drugs and Pharm Sci. Series, Vol. 129, 3rd Ed., Marcel Dekker Inc., N.Y.

9. The Theory & Practice of Industrial Pharmacy, 3rd edition, Leon Lachman, Herbert A. Lieberman, Joseph. L. Karig, Varghese Publishing House, Bombay.
10. Michael Levin, Pharmaceutical Process Scale-Up", Drugs and Pharm. Sci. Series, Vol. 157,2nd Ed., Marcel Dekker Inc., N.Y.
11. Pharmaceutical Equipment Validation: The Ultimate Qualification Handbook, Phillip A. Cloud, Interpharm Press
12. Lachman L Liberman Theory and practice of industrial pharmacy by 3 rd edition
13. Sidney H Willing, Murray M, Tuckerman. Williams Hitchings IV, Good manufacturing of pharmaceuticals (A Plan for total quality control) 3rd Edition. Bhalani publishing house Mumbai.

PRACTICALS (MCC105P)

A) Visit to dermatology and dental wards. Submitting case report on common skin and oral cavity problems observed.

B) Analysis in detail selecting a specific skin or oral cavity problem.

Lab Practicals

1) Cytotoxicity studies using cell lines,

2) Preservative efficacy test

3) *In vitro* assay for antibacterial efficacy.

Design and Development of following products:

4) Moisturizing cream

5) Tooth Paste

6) Shampoo

7) Hair oil

8) Lip Balm

9) Petroleum jelly

10) Isolation and identification of DNA from various sources (Bacteria, Cauliflower, onion, Goat liver).

11) Isolation of RNA from yeast

12) Estimation of RNA/DNA by UV Spectroscopy

13) Gene amplification by PCR.

14) Enzyme based *in-vitro* assays (MPO, AChEs, α amylase, α glucosidase).

15) Cell viability assays (MTT/Trypan blue/SRB).

16) DNA damage study by Comet assay.

M. PHARM IIND SEM

COSMECEUTICALS (MCC201T)

SCOPE:

 To impart knowledge on the fundamental principles of cosmeceuticals product development.

 To understand the building blocks in the formulation of cosmeceutical products.

 To develop knowledge in design and development of cosmeceuticals- focusing on safety, stability, sensory and delivery of actives.

OBJECTIVES:

Upon completion of the course, the students will be able to Know

 Various key ingredients used to develop cosmeceuticals.

 Combine the ingredients together to develop cosmeceuticals with desired sensory and efficacy.

THEORY

1. Sun protection, pigmentation and wrinkles

- Sun Protection: Solar spectrum, UV A and UV B rays of the sun. Skin damages caused by over exposure to sunlight, organic and in-organic sunscreens, SPF and Tan protection. Challenges in developing sunscreen formulations. Global regulatory aspects of sunscreen products. Case study on sunscreen products in the market.
- Skin Pigmentation and Wrinkles: Melanogenesis and ethnic differences. Ways to control skin pigmentation. Actives and mechanism of action. Building blocks and formulation of a skin anti-blemish cream. Skin bleaches and skin lightening.
- Case study on skin lightening products in the market.
- Skin wrinkles: Factors that leads to skin wrinkles. Role of anti-oxidants in reducing skin wrinkles. Building block and formulation of an anti-wrinkle product. Case study on antiaging/ antiwrinkle product in the market.

2. Acne, Prickly heat, Dandruff and oral care

Causes for acne, prickly heat and dandruff and current treatment.

Building blocks and formulation of products for treatment of acne, prickly heat and dandruff.

Case study of marketed products.

Oral care:

Basic understating of the cause of Bleeding gums, sensitive teeth, plague, halitosis.

Role of antimicrobial agents, anti oxidants and astringents for oral care.

Denture cleansers. Building blocks and formulation of anti-cavity, tooth sensitivity relief and teeth-whitening tooth paste. Case study on the marketed products

3. Herbal Cosmetics

Herbal ingredients used in Hair care, skin care and oral care and nail. Guidelines for herbal cosmetics by private bodies like cosmos with respect to preservatives, emollients, foaming agents, emulsifiers and rheology modifiers.Formulation and development of herbal cosmetics.

4. Dermal Drug Delivery

Factors affecting dermal drug delivery. Role of penetration enhancers in dermal delivery. Dermal drug delivery systems: Nano particles, Liposomes, patches, Ionotophoresis, sonophoresis, electroporation, micro-needles.

5. To be identified

REFERNECES

1. Harry's Cosmeticology. 8th edition.
2. Poucher's perfume cosmetics and Soaps, 10th edition
3. Cosmetics - Formulation, manufacture and quality control PP.Sharma, 4th edition
4. Handbook of cosmetic science and Technology A.O.Barel, M.Paye and
H.I.Maibach. 3rdedition
5. S.P.Vyas and Roop K.Khar Controlled Drug Delivery system, Concepts and Advances
6. Cosmetic and Toiletries recent suppliers catalogue.
7. CTFA directory.

COSMETIC ANALYSIS & EVALUATION (MCC202T)

SCOPE

This course is designed to impart knowledge on analysis of cosmetic raw materials and finished products. Performance evaluation of cosmetic products is included for the better understanding of the equipments used in cosmetic industries for the purpose.

OBJECTIVES

At completion of this course student shall be able to understand

- Determination of physical constants of cosmetic raw materials
- Cosmetic raw materials, additives and their analysis
- Analysis of finished cosmetic products
- Principles of performance evaluation of cosmetic products.

THEORY

1. Determination of acid value, ester value, Saponification value, iodine value, peroxide value, rancidity, moisture, ash, volatile matter, heavy metals, fineness of powders, density, viscosity of cosmetics raw materials.
2. Study on the quality of raw materials and general methods of analysis of raw material used in cosmetic manufacture as per BIS.
3. Indian standard specifications laid down for sampling and testing of various cosmetics in finished forms such as baby care powders, skin care products, dental products, personal hygiene preparations, lips sticks, hair products and skin creams by the Bureau Indian Standards.
4. Principles of equipment used to measure product performance of skin and hair care products - Sebumeter, corneometer, trans-epidermal water loss, Skin color, hair tensile properties, hair combing properties. Performance evaluation of shampoos, antiperspirants, deodorants, sunscreens, foam baths and abrasiveness of dentifrices.
5. Study of specialized additives- quality parameters and analysis of rheology modifiers, preservatives, emollients, hair conditioners and fragrances

REFERENCES:

1. Cosmetics – Formulation, Manufacturing and Quality Control, P.P. Sharma, 4th edition, Vandana Publications Pvt. Ltd., Delhi
2. Indian Standard specification, for raw materials, BIS, New Delhi.
3. Indian Standard specification for 28 finished cosmetics BIS, New Delhi
4. Harry's Cosmeticology 8th edition
5. Suppliers catalogue on specialized cosmetic excipients

6. Wilkinson, Moore, seventh edition, George Godwin. Poucher’s Perfumes, Cosmetics and Soaps
7. Hilda Butler, 10th Edition, Kluwer Academic Publishers. Handbook of Cosmetic Science and Technology, 3rd Edition,
8. Dry skin syndrome: Taylor and Francis

COSMETICS- INDUSTRY AND REGULATORY (MCC203T)

SCOPE:

 To impart knowledge on the basic regulatory aspects relating to cosmetics

 To understand the manufacturing equipments and GMP as per regulatory guidelines

 To understand the aspects of technology transfer from R&D to manufacturing.

Objectives: Upon completion of the course, the students will be able to:

 Effectively design products and documentation that meets regulatory requirements

 Implement smooth transfer of technology from design stage to factory production.

Theory

1. Indian Regulations

Indian Regulation for cosmetics: Regulatory provisions relating to import and manufacturing of cosmetics – conditions for obtaining license, prohibition of manufacture and sale of certain cosmetics, loan license, offences and penalties. Misbranded and spurious cosmetics.

Indian regulatory requirement for factory premises, location and surrounding, designing of plant layout, building, light, ventilation, water supply, disposal of waste, first aid, packaging facilities, sanitation in manufacturing premises and health clothing and sanitary requirement of staff.

2. Manufacturing & ASEAN standards

Equipments used in the manufacturing of creams, shampoo and toothpaste. GMP guidelines as per ASEAN standards for cosmetics

3. European Union Guidelines

Summary of features of EU guidelines for cosmetics: Ingredients, safety assessment, labeling, the product information package, GMP, animal testing and efficacy testing. Cosmeceuticals as OTC and quasi drugs.

4. Technology transfer

Significance of pilot plant scale up studies. Stability studies: Change in parameter to be observed, Photostability, accelerated stability testing- Temperature humidity, freest thaw and stress test. Aerosol product stability studies. Technology transfer of formulations from R&D to factory- Documentations.

5. Private Regulatory bodies:

a)Enviornmental and safety concerns of certain cosmetic ingredients that are debated and discussed. – Nano sized sunscreens, triclosan, formaldehyde liberators, Polythene beads, Sodium and ammonium laureth sulfates, phthalates.

b) Study of salient features of cosmetic safety data base developed by private body, and International Nomenclature of Cosmetic Ingredients (INCI).

c)Principles of cosmetovigilance.

d)Product claim development and advertisement; Role of ASCI.

REFERENCES

7. Harry's Cosmeticology. 8th edition

8. Cosmetics - Formulation, manufacture and quality control PP.Sharma, 4th edition

9. ASEAN definition of Cosmetics and illustrative list by category of Cosmetic products.

10. EU regulation (EC) no. 1223/2009 of the European parliament and of the council of 30th November 2009, on cosmetic products.

11. Theory and Practice of Industrial Pharmacy by Lachmann and Libermann

COSMACEUTICAL MARKETING AND BRAND MANAGEMENT : (MCC204T):

Credits: 4

1. Consumer Behaviour in Cosmaceutical Marketing

Scope and importance of CB in cosmaceutical marketing: key influencers of consumer behaviour in cosmaceutical; motive and its categories; perception and process of selectivity; impact on advertising decisions; Five steps of buyer's decision making process, cognitive dissonance.

Concept of consumer and customer in the cosmaceutical industry: delineating consumers and customers in different segments of the cosmaceutical branded formulations market and API market (B2B)

Importance of Physician's Prescription Behaviour: Key influencers of doctors' prescription behaviour; new product adoption process; impact of sales calls; Analysis of prescription behaviour of doctors using Prescription Audit Data (C-MARC); patient factors for prescription decisions, the AIDA principle.

2. Cosmaceutical Product Management

What is a Brand: Brand Name, Brand Image, Brand Value and Brand Awareness, Concept of Brand Equity, difference with brand valuation, Five dimensions of Brand Equity, key influencers of each dimension, prescription loyalty, prescriber coverage frequency, brand exposure through field-force promotion, Quality indicators, Promotional-mix, Benefits of building Brand Equity.

Brand Management as a strategic marketing function: role of a cosmaceutical Brand Manager, the 'Little CEO' concept, 'Science meets Commerce' concept; Essential differences between managing cosmaceutical Brands and Consumer Brands, types of cosmaceutical Brand Management organization structures, challenges of a Brand Manager; relation of Product Management Teams vis-à-vis Sales Force in cosmaceutical companies; Marketing Research

Fundamentals of cosmaceutical Marketing: the 4 'Ps' in a regulated cosmaceutical market, the Strategic Triangle; Market Segmentation in the cosmaceutical context, conceptual difference with consumer products market segmentation, Brand Positioning in the cosmaceutical context, conceptual difference with consumer brand positioning, PLC Management, reinforcing and revitalizing cosmaceutical brands, line-extensions.

Product-mix Optimization & Promotional-mix Optimization: Portfolio Analysis by factoring key determinants, BCG Matrix, brand building decisions; leveraging the Promotional-mix for Brand Building.

Designing Marketing Programs for New Product launch and Existing Brands: essential constituents, Brand Plans, purpose and benefits.

3. Product Management and Products coming under Global Strategic Businesses

(a) Face (b) Hair (c) Skin and body (d) Eye (e) Lipis (f) Primary Care

4. International Marketing

The Pharmaceutical Industry: India and Global Scenario: Essential differences between domestic Marketing in India and International Marketing; generic products dominated market vis-à-vis patented products dominated markets, role of cosmaceutical in dispensing products, role of mass media in product advertisements and social campaigns for market expansion; Structure and role of field management and product management, India Vs. Global

Factors governing International business environment

Demand estimation of cosmaceutical in International markets

Market-entry strategies

Market characterisitics and regulatory environment of major International Markets

3 Tiers of 15 Pharmerging Markets – Characteristics, Political, Economic & Regulatory Environment

5. Recent Developments in the Pharmaceuticals Business World (Project-based Learning)

Text and References:

1) Kotler, Philip, Marketing Management: Analysis, Planning, Implementation, and Control Latest Edition, Prentice Hall

2) Philip Kotler(2003). Marketing Management: Eleventh Edition, New Delhi: Pearson Education.

3) Harsh Verma . Brand Mnanagement, Second Edition, Excel Publication.

4) Aaker,D.; Managing Brand Equity. Ramanuj Majumdar (1999) Product Management in India. New Delhi: Prentice Hall.

PRACTICALS (MCC205P):

1. Design and formulate unique Cream, shampoo, toothpaste, moisturizing gel, and lip balm. Study private body guidelines for green/premium cosmetics of Ecocert/Cosmos, an suggest changes in the formulations.
2. Design and Development of cosmeceutical product for the treatment of dry skin, wrinkles, acne, blemishes, dandruff, and bleeding gums.
3. Case study report of products in the market- Sun-protection, aging, acne, pigmentation, prickly heat, dandruff, hair-fall, teeth cavities, bleeding gums, teeth whitening, Comparing labeled formulation ingredients.
4. Quantitative analysis of rancidity in hair oils and Lipsticks
5 .Determination of aryl amine content and Developer in hair dye
6. Determination of foam height and SLS content of Shampoo.
7. Determination of total fatty matter in creams (Soap, Skin and hair Creams)
9. Comparative Study of marketed cosmetic product claims
10. DoE Using Design Expert® Software
10.Formulation data analysis Using Design Expert® Software
11.Quality-by-Design in Pharmaceutical Development