

COURSE TITLE: Cosmetics

COURSE NUMBER: 1130-521

YEAR / SEMESTER: 5/ 1

PRE-REQUISITE(S): 1120-317

COURSE COORDINATOR: A.H. Nada

<u>STATUS</u>	THEORETICAL	<input checked="" type="checkbox"/>	THEORETICAL & PRACTICAL	<input type="checkbox"/>
	PRACTICAL	<input type="checkbox"/>		
	COMPULSORY	<input type="checkbox"/>	ELECTIVE	<input checked="" type="checkbox"/>
	CREDIT HOURS	<input type="text" value="3"/>	COURSE HOURS PER WEEK	<input type="text" value="3"/>
	LECTURES (H)	<input type="text" value="35"/>	PRACTICALS (H)	<input type="text"/>

TEACHING METHODS

DIADACTIC LECTURES	<input checked="" type="checkbox"/>	PRACTICALS	<input type="checkbox"/>
ASSIGNMENTS	<input checked="" type="checkbox"/>	STUDENT PRESENTATIONS	<input type="checkbox"/>
TUTORIALS	<input checked="" type="checkbox"/>	OTHER	<input type="checkbox"/>

EVALUATION (%)

MID-SEMESTER THEORY EXAM	<input type="text" value="30"/>	FINAL THEORY EXAM	<input type="text" value="50"/>
QUIZZES	<input type="text" value="10"/>	ASSIGNMENTS	<input type="text" value="10"/>
STUDENT PRESENTATIONS	<input type="text"/>	PROJECT REPORTS	<input type="text"/>
MID-SEMESTER LAB EXAM	<input type="text"/>	FINAL LAB EXAM	<input type="text"/>
OTHER	<input type="text"/>		

BRIEF COURSE DESCRIPTION

Topics will cover structure and functions of skin and hair, disorders of skin and hair, formulation and manufacture of cosmetic preparations, evaluation and testing of cosmetic products. This information is important for the better understanding and patient counseling about choice and limitations of cosmetics.

1. Introduction to the course, course activities, assessment and marking scheme.
2. Functions and uses of cosmetics for different beautifying and personal care purposes.
3. Morphology and structure of skin (epidermis, dermis and subcutaneous layer) and the problem associated with disorders involving its normal physiologic functions; aged skin, dry skin, sensitive skin, acne, pigmentation disorders .
4. Structure and properties of hair fibers (hair follicle, dermal papillae). Hair problems including hair loss, manageability problems, excess unwanted hair, split ends as well as shine and luster disorders.
5. Application of polymers in cosmetic industry; polymer structure-properties relationships, types of polymers used and underlying principle of applications in the different applications, e.g. fixatives and film formers, rheology control, emulsions stabilizers, conditioning agents for hair and skin care.
6. Formulation, manufacture, and evaluation of skin care products; sunscreens, moisturizing agents, depigmenting (bleaching) agents, and topical antioxidants.
7. Formulation, manufacture, and evaluation of cosmetics for the different body parts; moisturizing creams, bath and shower preparations, hand and body lotions, barrier creams, and deodorant-antiperspirant preparations.
8. Formulation, manufacture, and evaluation of face cosmetics; cleansing preparations, aftershave, anti-acne products, and tooth and mouth care preparations.
9. Formulation, manufacture, and evaluation of hair cosmetics; shampoo, after shampoo hair conditioners, hair colorants, hair styling, hair waving, depilatory agents, and hair growth promotion.
10. Nail cosmetic preparations; formulation, precautions during use and storage of different products (lacquer, lacquer removers, hardener and cuticle softeners).
11. Unwanted side effects of topically applied drugs and cosmetics; local side effects (contact dermatitis, allergic contact dermatitis, contact urticaria syndrome,..), systemic side effects of some components (Benzocaine, gentamicin, resorcinol, boric acid, salicylic acid,...), and patch testing of cosmetic preparations.

COURSE OBJECTIVES / EXPECTED OUTCOMES

Students can expect to emerge from this course with a knowledge of cosmetic products regarding their nature as well as formulations, indications and unwanted effects. This information is of particular interest for conveying proper counselling to consumers looking for Pharmacist's consultation as a drug expert. Further, the study of the ingredients involved in the different cosmetic preparations and their method of production will be implemented in the field of industrial pharmacy for manufacture of these products.

RECOMMENDED READING

1. Harry's Cosmeticology, Martin M. Rieger (Editor). Publisher: Chemical Publishing Company; 8th edition (May 2000) ISBN: 0820603724
2. The Chemistry and Manufacture of Cosmetics, M. Schlossman (Editor), Allured's Publishing Corp., USA, Vols. 1 (2001); ISBN 0931710758, Vol. 2 (2001); 0931719766, and Vol. 3 (2003); 0931710774 .
3. Cosmetics and Personal Care, R. Schueller and P. Romamowski (Editor), Allured's Publishing Corp., USA (1999). ISBN 0931710685.
4. Cosmetics: Science and Technology, M. S. Balsam and Edward Sagarin (Editors), Krieger Publishing Company, Malabar, Florida, USA, 2 nd Ed., Vols. 1-3 (1992), ISBN 0-89464-525-0, 0-89464-526-9, 0-89464-527-7.

COURSE OUTLINE (CONTENT OF EACH LECTURE)

1. Introduction to cosmetics and health care products

Relevance of this course to pharmacists, general overview of course contents, expected outcomes. Topics covered; structure and functions of skin and hair, disorders of skin and hair, formulation and manufacture of cosmetic preparations, evaluation and testing of cosmetic products. Course activities and assessment system.

Morphology and structure of skin and hair (4 lectures)

2. Skin structure and function

Brief description of human skin and function of the different layers; epidermis, dermis and subcutaneous layer.

3. Skin disorders

Disorders and diseases of skin; dry skin, aging, sensitive skin, pigmentation and acne.

4. Hair structure and function

Structure and properties of hair fibers (hair follicle, dermal papillae). Hair problems including hair loss, manageability problems, excess unwanted hair, split ends as well as shine and luster disorders.

5. Hair problems and disorders

Hair problems including hair loss, manageability problems, excess unwanted hair, split ends as well as shine and luster disorders.

Role of polymers in cosmetic preparations (2 lectures)

6-7 Polymer structure-function relationship

Structure and related properties of some selected polymers in general use for cosmetics; polyethylene glycols, polyacrylic acid derivatives, cellulose derivatives, gums, as well as surfactants. Effect of polymer chemical nature and degree of polymerization on the intended application for particular products. Possible applications of polymers include: fixatives and film formers, rheology control, emulsions stabilizers, conditioning agents for hair and skin care.

Skin and body care products (12 lectures)

Topics covered under this part address the following: Formulation, manufacture, and evaluation of cosmetic care products for skin and different body parts; sunscreens, moisturizing agents, depigmenting (bleaching) agents, and topical antioxidants, antiperspirants & deodorants and skin cleansing preparations.

8. Formulation approaches and requirements

Philosophy and objectives of cosmetic products development. Requirements for successful formulations. Basis for choosing the presentation forms. Steps involved in product development.

9 Regulatory aspects

Regulatory status of cosmetics. Regulations connected to manufacturing products. importance of labelling of cosmetic preparations. current concerns about safety of cosmetics. manufacturer response to safety of cosmetics.

10-11 Skin care products

Outline of the skin function and factors affecting the barrier function of the skin; environmental factors, applied topical preparations and its lipid content, ions and pH as well as moisture balance and occlusion. Basic requirements governing cosmetic care products, compared to local pharmaceuticals, factors affecting skin absorption. Classes of cosmetic care products according to type/function. Ingredients for skin care products; humectants and moisture balance, oily ingredients, and miscellaneous ingredients, e.g. vitamins, antimicrobials as well as botanical extracts.

12-13 Sunscreen preparations and skin bleaches

Function of sunscreens, sunscreen agents: aminobenzoic acid, avobenzone, titanium dioxide, zinc oxide. Regulatory aspects of sunscreen products regarding labeling, contents, efficacy, stability testing and packaging. Formulation of sunscreen products: choice of presentation form; emulsion, cream, lotion, gel, aerosol. Examples of some prototype formulations illustrating the underlying formulating principles. Function and mechanisms of action of bleaching agents. Regulatory status of such products; statement of identity, indications, directions and side effects.

14-15 Color cosmetics

Function of color cosmetics. Types of foundation/skin colorants; coverage, finish, pigments and fillers, colored pigments. Formulation of foundation/skin care products; emulsified foundation, powder foundation and anhydrous foundation; examples for such types of products and method of preparation and application. Lipsticks; definition and characteristics; ingredients for lipsticks including coloring agents, filler pigment, lipid-base materials, solvents for colorants. Additional additives for lipstick formulations; antioxidants, antimicrobial, perfumed. Examples for prototype lipstick formulation and manufacture methods.

16-17 Skin cleansing preparations and antiperspirants & deodorants

Use of soaps as cleansing agents and the associated problems; dryness, irritation and roughness. Synthetic mild surfactants as substitutes for soaps. Formulations for skin cleansing; liquids, gels, and solid products. Choice of ingredients for such preparations based on testing and product attributes (foam, cleansing efficiency, rinsability, skin conditioning and biodegradability).

Definitions and basic requirements for antiperspirants and deodorants. Approaches to achieve control of underarm malodor. Perspiration physiology and mode of action of deodorants and antiperspirants. Regulatory aspects governing the use of such products. Testing of antiperspirant efficiency.

18-19 Antiwrinkle preparations and vanishing & emollient creams

Changes of skin associated with this type of disorder, classes, effective antiwrinkling agents, formulation examples, and treatment by cosmetic surgery.

Function and formulation examples for vanishing and emollient preparations, requirements for involved ingredients, and method of their preparation.

Face cosmetics (5 lectures)**20 shave preparations**

Wet and dry shaving preparations, general formulations. Aftershave preparations; after-shave lotions, after-shave gels, after-shave balms and after-shave powders, typical formulation examples and methods for preparation.

21-22 anti-acne products

Etiology and symptoms, concerns about comedogenicity of cosmetic ingredients. Oily skin and treatment; cleansing preparations, absorbents and liquid foundations.

Ingredients for treatment of acne; benzoyl peroxide, salicylic acid, sulfur. Adjunctive therapies like antimicrobials, tretinoin, vit A esters, and alpha-hydroxy acids.

23-24

Mouth and**oral care problems & products**

Fundamental of oral anatomy, physiology and microbiology. Consumer needs and approaches to fulfill these needs. The teeth, the gum, saliva. Dental problems: dental pellicle, dental plaque, dental calculus (tartar), dental caries, periodontal diseases, dental stains, and oral malodor. Oral care products: dentifrices; ingredients and function, parameters, formulation of powder and paste dentifrices. Dentifrice testing: consumer testing, performance testing. Denture cleaners: composition and function. Mouthwashes: essential & miscellaneous ingredients, formulation examples, manufacture and testing.

Hair cosmetics (7 lectures)**25-26 Shampoos and after shampoo conditioners**

Function and requirements. Surfactants function in shampoos, examples, mechanism of hair cleaning, normal possible soils and residues from other cosmetics. Effects of shampoos on hair: direct & indirect damage, damage to chemically treated hair.

Additional ingredients in shampoos: viscosity modifiers, opacifying and clarifying agents, antioxidants/sequesterants/ UV-Absorbers, and fragrance. Formulation examples: cleaning, mild (baby) shampoo, conditioning and antidandruff shampoos. Criteria for evaluation of shampoos: ease of use, lather, rinsability, softness, manageability and ease of hair combing.

27-28 hair colorant/styling

Categories of hair colorants: temporary, semipermanent and permanent coloring. Characteristics of ideal colorants: stability, compatibility, affinity for hair keratin. Types of commercial temporary products and their formulation. Types of commercial semipermanent products and their formulation. Permanent hair coloring constituents and mechanism, formulation examples and method of application. Hair setting (styling): mechanism of hair styling, effect of styling products, formulations and role of ingredients. Types of products according to viscosity; gels & cream gels, ringing gels, pomades & styling sticks: liquids & lotions, Glazes & sculpting lotions. Examples for typical formulae. Evaluation of performance.

30-31 hair waving/ straighteners/depilatories

Chemistry of hair waving: reduction and reoxidation steps. Methods of hair waving: heat waving and permanent waving solutions, cold waving, formulation for cold waving. Evaluation methods of permanent waving. Hair straighteners: hot comb, caustic preparations and chemical reducing agents. Formulation examples. Depilatory agents: epilation, electrolysis and chemical depilation. Formulation and evaluation of depilatory agents.

32 Nail cosmetic preparations

Nail polish: requirements and formulations. Production and controls, hazards associated with flammable solvents. Other nail care products: nail strengthener, nail bleach, cuticle softener, and cuticle removers. Formulation examples of the different products.

33-34 Testing of cosmetics for side effects

Wanted and unwanted effects of cosmetics and cosmeceuticals: the concept of cosmetics and cosmeceuticals, effects of commonly used agents on skin, hairs, nails and skin glands. Management of untoward effects of cosmetics and cosmeceuticals. Diagnosis of contact dermatitis: open patch test, closed patch test and prick test. Preuse testing of cosmetics: animal testing, testing on human volunteers, invitro testing on epidermal equivalents, and evaluation of preuse testing.

LEARNING OBJECTIVES (EACH LECTURE)

Lecture 1 Introductory lecture

1. Introduction about the objectives, requirements and relevance of the course.
2. Distribution of lectures, quizzes, assignments and exams as well as grading system.

Lecture 2 Human skin structure and function

1. Describe the structure of human skin and the importance and functions of each layer.
2. Explain the barrier role of skin with reference to the water and lipid content.
3. Describe the blood supply to the different layers of the skin.
4. Describe the function of sweat glands in maintaining healthy skin.
5. Types of skin as regards skin color types.

Lecture 3 Skin diseases and disorders

1. Explain what is skin atrophy? And how we avoid this problem?
2. Describe sensitive skin and its implication regarding the use of cosmetics.
3. Explain what is meant by aging to skin? what is manifestations and treatment?
4. Describe what is meant by acne, its etiology and precautions.
5. Explain the role of melanin in the process of pigmentation of skin
6. Explain the problem of dry skin and its complication and treatment.
7. Describe the effect of environmental conditions on human skin.
8. Describe the effect of chemical agents on human skin; cumulative insult irritant contact dermatitis, allergic contact dermatitis, contact urticaria and contact urticaria syndrome.

Lecture 4 Hair structure and function

1. Describe the structure of the hair follicle including the proteinaceous (cuticle, cell membrane, cortex, medulla) and the non-proteinaceous (lipids and inorganic) components.
2. Describe the physical properties of the skin; tensile properties, sorption and swelling, bending, wettability, luster.
3. Explain the hormonal influences on hair growth and function
4. Describe the normal rate growth of hair and explain the effect of age and sex.

Lecture 5 Hair problems and disorders

1. Describe the symptoms, causes and factors affecting different hair problems including:
 - a. hair loss.
 - b. manageability problems.
 - c. excess unwanted hair.
 - d. split ends.
 - e. shine and luster disorders.
2. Describe the general approaches for the cosmetic care of hair appendages.

Lectures 6-7 Polymers' structure and function in cosmetics

1. List the different types of polymers and the different methods of classification.
2. Explain the role of polymeric materials in cosmetic preparations, e.g. shampoos, cleansing products, emulsions, hair setting preparations, oral care products in relation to its physicochemical properties.
3. Summarize the commonly used surfactants and main applications in cosmetic products.
4. Describe the role of polymers used as viscosity modifiers and the rationale behind its use.
5. Describe the polymers used in hair setting preparations and basic requirements for such type of polymers.
6. List the polymers suitable as nail care products and their basic properties

Lecture 8 Formulation approaches and requirements

1. Describe the philosophy and objectives of cosmetic products development.
2. Identify the basic requirements for successful formula; marketing objectives, product functionality, stability, safety, regulatory considerations, cost and operation/manufacturing considerations.
3. Discuss the basis for choice of product forms; solutions, creams, lotions, ointments, suspensions, gels, sticks, etc.
4. Describe the numerous steps involved in product development process; define the product, select the active ingredients, etc.

Lecture 9 Regulatory requirements for cosmetics

1. Define the items involved in the legal assessment; cosmetic definition & intended use, adulteration, FDA's responsibility (inspections, safety, prohibited and hazardous substances, cosmetic color additives, etc.).
2. Describe the regulations connected to manufacturing products outside USA.
3. Explain the role of manufacturer response to safety of cosmetics.
4. Explain the importance of labelling of cosmetic preparations.
5. Compare between cosmetics & drug.
6. OTC drugs; labeling, inspection of drug facilities.

7. What are the current concerns about safety of cosmetics.

Lecture 10-11 Skin care products

1. Describe the basic requirements governing cosmetic care products, compared to local pharmaceuticals
2. Describe the effect of temperature, hydration and occlusion on skin properties and water balance.
3. Review the types of skin care products and classification.
4. Discuss the commonly used ingredients for skin care products; humectants and moisture balance, oily ingredients, and miscellaneous ingredients, e.g. vitamins, antimicrobials as well as botanical extracts.
5. Summarize the various factors affecting the barrier function of the skin:
 - a. Effect of externally applied lipids.
 - b. Effect of ions and pH.
 - c. Effect of occlusion.
 - d. Moisture balance.

Lectures 12-13 Sunscreen products and *skin bleaches*

1. Differentiate between sunscreen, suntan and skin bleaching products.
2. List the Sunscreens belonging to the UV radiation absorbents and the mechanism of action. Discuss the factors affecting their action
3. List the Sunscreens belonging to the physical sunscreen group and the mechanism of action. Discuss its main disadvantages.
4. Discuss the formulation of sunscreen products (creams, lotions, emulsions, gels, sticks).
5. Discuss the regulations pertinent to the sunscreen products.
6. Describe the quality control tests required for these products; stability testing, Efficacy testing, safety.
7. Define the skin bleaching agent and the regulatory status governing its use.
8. Summarize the components of skin bleaching and their mechanism of bleaching.
9. Suggestions for formulations of skin bleaching agents.

Lectures 14-15 Color cosmetics

1. Define and explain the function of color cosmetics as foundation/skin colorants.
2. Explain the role of essential components of colored cosmetics: coverage, finish, pigments and fillers.
3. Describe the formulations intended as color cosmetics and the common presentations.
4. Describe the method of preparation of emulsified foundations and the ingredients commonly employed in the preparation.
5. Discuss the effect of skin type on choice of ingredients of such products.
6. Describe the formulation of powder foundations and method of productions.

7. Describe the functions and characteristics of lipsticks
8. Choice of lipstick ingredients; coloring materials (dyes and pigments) and the mechanism of coloring process, lipid-base materials, solvents, waxes, wetting agents, antioxidants and perfumes.
9. Describe the methods of manufacture of lipsticks.
10. Differentiate between lipsticks and lip balms regarding function and composition.

Lecture 16-17 Skin cleansing products/ Antiperspirants and deodorants

1. Explain the function of skin cleansing products (wipe-off and wash-off).
2. Describe the different types of wipe-off creams; e.g. cold creams, with the common formulations and main ingredients
3. Describe the advantages of wash-off and two-way cleansing creams; formulation ingredients and method of preparation.
4. Outline the causes of underarm malodor, with reference to perspiration physiology.
5. Compare between antiperspirants and deodorants.
6. What are the concerns about antiperspirants?
7. Describe the methods used for testing deodorant and antiperspirant functions.
8. List the criteria required for successful formulations and give examples.

Lectures 18-19 Anti-wrinkle preparations/ Vanishing and emollient creams

1. Explain the cause and mechanism of wrinkle development in relation to the change of skin functions and structure with age.
2. Define the different types of wrinkles
3. Discuss the effect of light on development of wrinkles.
4. Discuss the treatment of wrinkle by cosmetic surgery.
5. Suggest a cream formula for treatment of wrinkles, discussing the role of ingredients and method of preparation
6. Outline applications of the vanishing and emollient creams.
7. Describe the basic ingredients involved in its preparation and role of each.
8. Explain the role of emulsifiers in preparation of vanishing and emollient creams.
9. Describe materials having emollient properties (natural & synthetic).
10. Comment on the formulations, regarding ingredients and method of preparation.

Lectures 20-24 Face cosmetics

Lecture 20 Shave preparations

1. Describe the function of wet shaving products.
2. Outline the lather shaving creams regarding chemical compositions of soaps and the other ingredients required for these products, e.g. humectants, emollients, surfactants, etc..
3. Describe the lather shaving sticks and aerosol shave foams, compositions and additional ingredients required for production (surfactants, humectants, propellants, etc.)..
4. Discuss the function and formulation of post-foaming gels.
5. Outline the requirements for dry shaving and the role of cosmetic products in this process.
6. Discuss the need for after-shave preparations and the common ingredients of each; lotions, gels, balms, and powders.

Lectures 21-22 *anti-acne products*

1. Explain what is acne? and what are symptoms and etiology?.
2. Outline comedogenicity of cosmetic products, giving examples.
3. Outline the problem of oily skin and its effect on development of acne, methods to treat oily skin (Frequent thorough washing, skin cleansers, etc).
4. Discuss the different treatments of acne and give examples for drugs employed; keratolytics, peeling agents, cleansing products and antimicrobials.
5. Explain the need for adjunctive therapies; e.g. tretinoin.
6. Give examples of formulations commonly used and comment on the role of ingredients and method of preparation.

Lectures 23-24 *Mouth and oral care problems & products*

1. Outline the general problems and concerns about mouth and oral cavity and, the underlying causes, and functional solutions.
2. Outline the anatomy /composition of teeth, gum, saliva, dental deposits, dental pellicle, dental plaque, and dental calculus.
3. Discuss the different treatments of oral problems; plaque, calculus, caries and methods to control such problems
4. Explain the causes and treatments for periodontal diseases (gingivitis & periodontitis).
5. Discuss the causes for dental hypersensitivity and treatments/preventive methods.
6. What are the major causes for dental stains and the professional/personal self-applied products.
7. Discuss the basic reasons for malodor (intrinsic and extrinsic factors). Outline the various means of removing oral malodor.
8. Outline the problems of dry mouth (xerostomia) and aphthous ulcers, referring to the main causes and treatment methods.

Lectures 25-26 *Shampoos and after shampoo conditioners*

1. Outline the function and basic requirements for shampoos.
2. Discuss the role of surfactants in shampoo formulations, classes of surfactants used, give examples for each group (anionics, non-ionics and amphoteric). Comment on the limited use of cationics in shampoos.
3. Discuss the different mechanisms of hair cleaning (solid particles, oily soil, sebum, quaternary ammonium compounds, polymeric residues)
4. Explain the negative effects of shampoos on hair; direct damage, indirect damage, damage to chemically treated hair.
5. Discuss the additional shampoo ingredients which provide additional properties to shampoos; viscosity modifiers, opacifying & clarifying agents, antioxidants, etc.
6. Outline the basic formulations for different types of shampoos; cleaning shampoos, mild or baby shampoos, conditioning shampoos, antidandruff shampoos, referring to the role of each.
7. List the laboratory tests for evaluation of shampoo attributes; ease of application, lather, rinsing, ease of combing, softness.
8. What are the important hair attributes, and the methods of evaluation; luster/shine, body, manageability.
9. Outline the stability testing methods of shampoos.

Lectures 27-28 *hair colorants*

1. Outline the hair colorants systems; temporary, semipermanent and permanent coloring. Discuss the requirements of ideal hair colorant: safety, stability, compatibility, absence of selectivity, affinity to keratin.
2. Describe the different steps of hair coloring process.
3. Outline the temporary hair dyes, method of application.
4. Discuss the classes of colorants used as semi-permanent colorants. Give examples for formulations and method of application.
5. Outline the basic ingredients for permanent hair coloring and the mechanism of coloring, steps of color development, and toxicity concerns.
6. List the types and formulation examples of permanent hair dyes.
7. What are the hair dye removers and bleaching/lightening products?

Lectures 29 *hair setting/styling products*

1. Outline the reasons for hair styling and the mechanism involved.
2. Discuss the requirements for components employed in the styling process; solvents, polymer, modifier, preservative, color, fragrance and solubilizer.
3. Describe the different products for setting/shaping of hair by wet methods; liquids, lotions, sprays, glazes, sculpting lotions, gels and creams. Give formulation examples for this type.

4. Outline the products for hair styling on dry hair; pump sprays and spritzes. Discuss the advantages of these systems compared to regular spray systems.
5. Discuss the evaluation method for performance of hair setting products.

Lectures 30-31 *hair waving/ straighteners/depilatories*

1. Outline the reasons for hair waving and the chemical processes involved in this process; reduction step, and reoxidation step.
2. describe the processes involved in hot waving of hair.
3. Outline the general components required for permanent waving solutions and chemical heating methods. Give examples of such formulations
4. Describe the process of cold waving and formulation examples
5. Outline the methods of hair straightening; hot comb, caustic preparations, reducing agents, relaxers, neutralizers. Give an example representing such products.
6. Differentiate between depilatory and epilatory removal of hair fibers.
7. Outline the components and method of epilation.
8. Describe the chemical methods of depilation, advantages and precaution, requirements.
9. Give examples for chemical depilatory agents and method of application; Sulfides, stannites, thioglycolates.
10. Describe the methods for evaluation of depilatory efficiency.

Lectures 32 *Nail cosmetic preparations*

1. Outline the basic requirements for nail polishes; safety, wear, glossy color and appearance, dry-time, stability.
2. List the general components required for nail polish products; film formers, plasticizers, solvents, resins, pigments, additives. Explain the role of each and representative formulations.
3. Describe the materials suitable as cuticle softener and removers, giving formulation examples.
4. Outline the function and formulations for stain removers, nail creams, and nail strengthener.

Lectures 33-34 *Testing of cosmetics for adverse reactions*

1. Outline the basic tests for safety of cosmetics and common adverse reactions, with special reference to the more hazardous components in cosmetics and cosmeceuticals.
2. Describe the symptoms and changes resulting from the following conditions:
 - a. Irritant contact dermatitis.
 - b. Allergic contact dermatitis.
 - c. Contact urticaria.

- d. Phototoxic and photoallergic dermatitis.
3. Describe the mechanisms involved in skin sensitivity and the human variability in skin sensitivity.
 4. Outline the principle of product safety as a mandatory requirement in cosmetics.
 5. Describe the safety assessment methods required to predict the safety of ingredients and finished cosmetic preparation:
 - a. In-vitro testing; collagen swelling test, pH rise test and Zein test
 - b. Animal safety test; Draize test, eye irritancy and guinea pig maximizing test.
 - c. Human safety testing; Patch testing, modified soap chamber test.
 - d. Forearm controlled application technique.