

R25 M. PHARMACY- OPEN ELECTIVES**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****M.Pharm II Year I Sem****PHARMACEUTICAL ADMINISTRATION (Open Elective)**

Course Objective: This subject will provide principles of pharmaceutical industrial management, forms of business organization, plant location and layout. It will teach the students on workman safety, export and import of drugs and pharmaceuticals and briefly on industrial accounting.

Course Outcome: Upon completion of the course, the student shall be able to,

- Explain the Indian pharmaceutical industry development, knowledge about Pharmaxil and its involvement
- Explain the books of accounting, journals, ledger, cashbook and balance sheet.

UNIT I

Pharmaceutical Industrial administration: Principles of Pharmaceutical Industrial Management in relation to the Introduction to forms of Business Organization. Manufacturing Management: Plant location, factory building lay-out, production management goals and organization, operating problems, production policy, initiation of production, purchasing and inventory control, works lay-out and plant management.

UNIT II

Workman Safety: measures to health hazards and prevention of environmental pollution. Organization of Distribution and Marketing: Factors in distributions, Sales organization and sales promotions. General principles of medical detailing. Export and Import trade. GATT, WTO - New product development.

UNIT III

Indian pharmaceutical industry: Pharmaceutical industry in India, milestones in the development of pharmaceutical industry, current status and its role in national economy and national health. Structure of the industry, organized sector, small sector, manufacture of pharmaceuticals in public sector. Progress in the manufacture of basic drugs – synthetic and drugs of vegetable origin.

UNIT IV

Export and import of drugs and pharmaceuticals –knowledge of PHARMEXIL. Various types of insurances including marine insurance. Pharmaceutical associations and societies, statutory councils governing the profession. Principle of Drug store and community pharmacy administration: Drug store management: Drug store planning and lay – out, sales promotion and salesmanship in drug store. Accounting records in drug stores.

UNIT V

Elements of industrial accountancy: Elements of double entry, books of accounts, journal, ledger and cashbook. The balance sheet, profit and loss account. Principles of costing and estimating.

TEXT BOOKS/REFERENCES:

1. Essentials of management by Dr. Herold Koontz and Heinz Weitnrich, published by McGraw Hill publishing company.
2. Managing productivity in organizations by Kopelman, by McGraw Hill publishing company.
3. Pharmacy Administration by G. Vidya Sagar
4. Effective supervision: A practical approach by Hodgetts, by McGraw Hill publishing company.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**M.Pharm II Year I Sem****ENTREPRENEURSHIP MANAGEMENT (Open Elective)**

Course Objectives: This course is designed to impart knowledge and skills necessary to train the students on entrepreneurship management.

Course Outcomes: On completion of this course it is expected that students will be able to;

- The Role of enterprise in national and global economy
- Dynamics of motivation and concepts of entrepreneurship
- Demands and challenges of Growth Strategies and Networking

UNIT I

Conceptual Frame Work: Concept need and process in entrepreneurship development. Role of enterprise in national and global economy. Types of enterprise – Merits and Demerits. Government policies and schemes for enterprise development. Institutional support in enterprise development and management.

UNIT II

Entrepreneur: Entrepreneurial motivation – dynamics of motivation. Entrepreneurial competency – Concepts. Developing Entrepreneurial competencies - requirements and understanding the process of entrepreneurship development, self-awareness, interpersonal skills, creativity, assertiveness, achievement, factors affecting entrepreneur role.

UNIT III

Launching and Organizing an Enterprise: Environment scanning – Information, sources, schemes of assistance, problems. Enterprise selection, market assessment, enterprise feasibility study, SWOT Analysis. Resource mobilization -finance, technology, raw material, site and manpower. Costing and marketing management and quality control. Feedback, monitoring and evaluation.

UNIT IV

Growth Strategies and Networking: Performance appraisal and assessment. Profitability and control measures, demands and challenges. Need for diversification. Future Growth – Techniques of expansion and diversification, vision strategies. Concept and dynamics. Methods, Joint venture, co-ordination and feasibility study.

UNIT V

Preparing Project Proposal to Start on New Enterprise Project work – Feasibility report; Planning, resource mobilization and implementation.

TEXT BOOKS/ REFERENCES:

1. Akhauri, M. M. P.(1990): Entrepreneurship for Women in India, NIESBUD, New Delhi.
2. Hisrich, R. D & Brush, C.G. (1996) The Women Entrepreneurs, D.C. Health& Co., Toronto.
3. Hisrich, R.D. and Peters, M.P. (1995): Entrepreneurship – Starting Developing and Managing a New Enterprise, Richard D., Inwin, INC, USA.
4. Meredith, G.G. etal (1982): Practice of Entrepreneurship, ILO, Geneva.
5. Patel, V.C. (1987): Women Entrepreneurship – Developing New Entrepreneurs, Ahmedabad EDII
6. Arya kumar.(2012): Entrepreneurship- Creating and Leading an Entrepreneurial Organization, Pearson

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**M.Pharm II Year I Sem****COSMETIC SCIENCE (Open Elective)**

Course Objectives: These topics are designed impart a specialized knowledge to know various cosmetics, their preparation, properties, MOA, uses etc. The understanding of properties and evaluation of these cosmetics by analytical methods.

Course Outcomes: The students should describe the properties and uses of various cosmetics on various parts of the body. The students should be able to suggest the proper usage of cosmetics.

UNIT I**Classification of cosmetics and cosmeceutical products.**

Definition of cosmetics as per Indian and EU regulations, Evolution of cosmeceuticals from cosmetics, cosmetics as quasi and OTC drugs.

Cosmetic excipients: Surfactants, rheology modifiers, humectants, emollients, preservatives, classification and application.

Skin: Basic structure and function of skin.

Hair: Basic structure of hair, hair growth cycle.

Oral Cavity: Common problem associated with teeth and gums.

UNIT II

Principles of formulation and building blocks of skin care products: Face cream, Moisturizing cream, Cold cream, Vanishing cream and their advantages and disadvantages. Application of these products in formulation of cosmeceuticals.

Anti perspirants and Deodorants: Actives and MOA.

Principles of formulation and building blocks of hair care products: Conditioning shampoo, hair conditioner, anti – dandruff shampoos, hair oils.

Chemistry and formulation of Para-phenylene di amine-based hair dye.

Principles of formulation and building blocks of oral care products: Tooth paste for bleeding gums, sensitive teeth, teeth whitening, mouth wash.

UNIT III

Sun protection, classification of sunscreens and SPF.

Role of herbs in cosmetics:

Skin care – Aloe and turmeric Hair care – Henna and amla Oral care – Clove and neem

Analytical Cosmetics: BIS specification and analytical method for shampoo, skin cream and tooth paste.

UNIT IV

Principle of cosmetic evaluation – Principle of sebumeter, corneometer. Measurement of tawl, skin color, hair tensile strength, hair combing properties. Soaps and Syndet bars, evaluation and skin benefits.

UNIT V

Oily and dry skin, causes leading to dry skin, skin moisturization. Basic understanding of the terms comedogenic, dermatitis.

Cosmetic problems associated with hair and scalp: Dandruff, hair fall causes.

Cosmetic problems associated with skin: Blemishes, wrinkles, acne, prickly heat and body odor.

Anti-perspirants and deodorants – Actives and MOA

TEXT BOOKS/ REFERENCES:

1. Harry's cosmeticology, Wilkinson, Moore, 7th edition, George Godwin.
2. Cosmetics – Formulation, Manufacturing and Quality control, P.P. Sharma, 4th edition, Vandana Publications Pvt. Ltd. Delhi.
3. Text book of cosmeticology by Sanju Nanda &Roop K. Khar, Tata Publishers.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**M.Pharm II Year I Sem****ENVIRONMENTAL AND HEALTH SAFETY (Open Elective)**

Course Objectives: To develop a multidisciplinary understanding of environmental issues and natural resource management. To understand types of environmental and industrial hazards including air, water, chemical, fire, and explosion hazards. To equip students with knowledge of safety protocols, hazard prevention and mitigation strategies. To understand risk assessment, risk management, effluent treatment, and regulatory compliance.

Course Outcomes: After successful completion of the course, students will be able to:

1. Understand the importance and scope of environmental studies and natural resources.
2. Identify and classify various environmental hazards and understand their impacts on health and safety.
3. Evaluate chemical, fire, and explosion hazards and apply relevant safety measures.
4. Apply knowledge of hazard management tools and legal frameworks like ICH and Factory Act.
5. Perform physicochemical assessment of effluents and understand effluent treatment procedures.

Unit I: Multidisciplinary Nature of Environmental Studies

Introduction to Environmental Studies: Definition, scope, and importance. Natural Resources: Renewable and non-renewable resources; problems associated with resource exploitation. Forest resources, Water resources, Mineral resources, Energy resources and Land resources.

Ecosystem: Concept, structure, and function.

Environmental Hazards: Hazards based on air, water, soil, and radioisotopes.

Human health and safety measures.

Unit II: Air-Based Hazards and Safety

Air-based Hazards: Sources and types. Industrial Air Circulation: Maintenance in sterile and non-sterile areas. Preliminary Hazard Analysis (PHA), Fire Protection Systems: Fire prevention strategies, Types of fire extinguishers, Critical hazard management systems.

Unit III: Chemical-Based Hazards and Controls

Sources and types of chemical hazards, Hazards of organic synthesis and sulphonation, Organic solvent hazards and control measures.

Management of: Combustible gases, Toxic gases, Oxygen-displacing gases. Regulations for chemical hazards. Over-exposure management and TLV (Threshold Limit Value) concept.

Unit IV: Fire and Explosion Hazards

Introduction to fire and explosion hazards, Industrial processes and their hazard potentials, Types of hazards: Mechanical, electrical, thermal, and process. Fire protection and explosion prevention: Fire prevention and extinguishers, Chemical/mechanical explosions, Multiphase reactions and transport effects

Preventive systems: Passivation, ventilation, sprinklers. Protective systems: Relief valves, flares, scrubbers.

Unit V: Hazard and Risk Management

Self-protective measures and workplace safety. Risk management: Hazard management processes, ICH guidelines on risk assessment, Risk management tools and methods, Environmental Safety.

TEXT BOOKS/REFERENCES:

1. Environmental Studies – Erach Bharucha, UGC Publication.

2. Industrial Safety and Environment – K.U. Mistry, Nirali Prakashan.
3. Environmental Engineering and Safety – B.K. Sharma.
4. Handbook of Environmental Health and Safety – Herman Koren.
5. ICH Q9: Quality Risk Management Guidelines – International Council for Harmonisation

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**M.Pharm II Year I Sem****VACCINES AND BIOLOGICALS (Open Elective)****Course Objectives:**

- To provide knowledge about the types, production, and evaluation of vaccines and biological products.
- To understand the immunological basis of vaccine action.
- To explore the regulatory guidelines and quality control aspects of biologics.
- To introduce modern trends including recombinant and mRNA vaccines.

Course Outcomes: At the end of the course, the student will be able to:

- Explain the basic principles of immunization and the classification of vaccines.
- Describe the production, purification, and storage of various biological products.
- Understand the quality assurance, safety testing, and regulatory aspects of vaccines and biologics.
- Discuss the role of biotechnology in the development of recombinant vaccines and therapeutic proteins.
- Evaluate the emerging trends and challenges in vaccine development, including COVID-19 vaccines.

UNIT I: Introduction to Vaccines and Immunology

History and development of vaccines, Immunology basics: Antigens, antibodies, immune response (active and passive), Classification of vaccines: Live attenuated vaccines, Inactivated/killed vaccines, Toxoids, Subunit and conjugate vaccines, Mechanism of action and schedule of immunization

UNIT II: Vaccine Production and Quality Control

Sources and cultivation of microorganisms (bacteria, viruses) for vaccine production, Downstream processing: Separation, purification, and inactivation, Formulation of vaccines: Stabilizers, adjuvants, preservatives, Quality control tests: Sterility, safety, potency, pyrogen, abnormal toxicity, Storage and transport (cold chain management)

UNIT III: Biotechnology in Biologicals

Recombinant DNA technology for vaccine development, Monoclonal antibodies: Production and applications, Recombinant protein therapeutics: Insulin, growth hormones, erythropoietin DNA and mRNA vaccines: Mechanism, examples (e.g., COVID-19 mRNA vaccines), Genetically engineered vaccines and edible vaccines

UNIT IV: Biological Products and Regulations

Overview of biological products: Antisera, immunoglobulins, interferons, cytokines, Blood products: Plasma, albumin, clotting factors, Allergen products, anti-venoms, antitoxins, WHO, ICMR, DCGI guidelines, ICH and WHO prequalification process

UNIT V: Current Trends and Global Perspectives

National Immunization Programs and Universal Immunization Program (UIP), COVID-19 vaccines: Development strategies, challenges, and emergency use authorization, Vaccine hesitancy and pharmacovigilance, Biopharmaceutical industries and pipeline biologics, Future perspectives: Personalized vaccines, cancer vaccines, nanotechnology in vaccines

TEXT BOOKS/REFERENCES:

1. Textbook of Microbiology – Ananthanarayan & Paniker
2. Biopharmaceuticals – Gary Walsh

3. Immunology – Kuby
4. Vaccines – Stanley A. Plotkin et al.
5. WHO Guidelines on Vaccine Quality Control
6. ICMR and CDSCO publications on Biologicals