GLA
UNIVERSITY
MATHURA
Established vide U.P. Act 21 of 2010.

D. PHARM.
COURSE CURRICULUM

INSTITUTE OF
PHARMACEUTICAL RESEARCH

COURSE STRUCTURE

D.PHARM

Course Structure Diploma in Phrmacy (D.Pharm.)

First Year

S. NO.	CODE	SUBJECT	L-T-P	CREDITS
1.	DPH1001	Pharmaceutics-I	3-0-0	3
2.	DPH1002	Pharmaceutical Chemistry-I	3-0-0	3
3.	DPH1003	Pharmacognosy	3-0-0	3
4.	DPH1004	Biochemistry & Clinical Pathology	2-0-0	2
5.	DPH1005	Human Anatomy & Physiology	3-0-0	3
6.	DPH1006	Health Education & Community Pharmacy	2-0-0	2
PRACTICALS				
7.	DPH1081	Pharmaceutics-I	0-0-4	2
8.	DPH1082	Pharmaceutical Chemistry-I	0-0-3	2
9.	DPH1083	Pharmacognosy	0-0-3	2
10.	DPH1084	Biochemistry & Clinical Pathology	0-0-3	2
11	DPH1085	Human Anatomy & Physiology	0-0-2	1
		TOTAL		

Second Year

S. NO.	CODE	SUBJECT	L-T-P	CREDITS
1.	DPH2001	Pharmaceutics-II	3-0-0	3
2.	DPH2002	Pharmaceutical Chemistry-II	4-0-0	4
3.	DPH2003	Pharmacology & Toxicology	3-0-0	3
4.	DPH2004	Pharmaceutical Jurisprudence	2-0-0	2
5.	DPH2005	Drug Store and Business Management	3-0-0	3
6.	DPH2006	Hospital and Clinical Pharmacy	3-0-0	3
PRACTICALS				
7.	DPH2081	Pharmaceutics-II	0-0-4	2
8.	DPH2082	Pharmaceutical Chemistry-II	0-0-3	2
9.	DPH2083	Pharmacology & Toxicology	0-0-2	1
10.	DPH2084	Hospital and Clinical Pharmacy	0-0-2	1
		TOTAL		

DPH 1001: PHARMACEUTICS-I

Credits: 03 **1st Year** **L- T -P: 3-0-0**

OBJECTIVE: *The objective of the course is to familiarize students with different aspects of pharmaceutics which include different dosage form and their classification, manufacturing process and uses. Further, it includes the packing of pharmaceuticals and their size reduction, size separation, mixing, drying, filtration, extraction, distillation and sterilization processes. Moreover, the syllabus provides a depth understanding on ayurvedic formulations and immunological products.*

Module No.	Content	Teaching Hours
I	1. Introduction of different dosage forms. Their classification with examples-their relative applications. Familiarisation with new drug delivery systems. 2. Introduction to Pharmacopoeias with special reference to the Indian Pharmacopoeia. 3. Metrology- Systems of weights and measures. Calculations including conversion from one to another system. Percentage calculations and adjustments of products. Use of alligation method in calculations, Isotonic solutions. 4. Size reduction Objectives, and factors affecting size reduction, methods of size reductionStudy of Hammer mill, Ball mill, Fluid Enegy Mill and Disintegrator.	18
I I	5. Packing of PharmaceuticalsDesirable features of a container, types of containers. Study of glass and plastics as materials for containers and rubber as material for closures-their merits and demerits. Introduction to aerosol packaging. 6. Size separation-Size separation by sifting. Official Standard for powders. Sedimentation methods of size separation. Construction and working of cyclone separator. 7. Mixing and Homogenisation- Liquid mixing and powder mixing, Mixing of semisolids, Study of Silverson MixerHomogeniser, Planetary Mixer; Agitated powder mixer; Triple Roller Mill; Propeller Mixer, Colloid Mill and Hand Homogeniser. Double cone mixer. 8. Clarification and Filtration-Theory of filtration, Filter media; Filter aids and selection of filters. Study of the following filtration equipments, Filter Press, Sintered Filters, Filter Candles, Metafilter	19
I I I	9. Extraction and Galenicals- (a) Study of percolation and maceration and their modification, continuous hot extractionApplications in the preparation of tinctures and extracts. (b) Introduction to Ayurvedic dosage forms. 10. Heat processes Evaporation- Definition Factors affecting evaporation-Study of evaporating still and Evaporating Pan. 11. Distillation- Simple distillation and Fractional distillation; Steam distillation and vacuum distillation. Study of vacuum still, preparation of Purified Water I.P. and water for injection I.P. Construction and working of the still used for the same. 12. Introduction to drying processesStudy of Tray Dryers: Fluidized Bed Dryer, Vacuum Dryer and Freeze Dryer.	19
IV	13. Sterilization- Concept of sterilization and its differences from disinfection-Thermal resistance of microorganisms. Detailed study of the following sterilization process. (i) Sterilization with moist heat, (ii) Dry heat sterilization, (iii) Sterilization by radiation, (iv) Sterilization by filtration and (v) Gaseous sterilization. Aseptic techniques. Application of sterilization processes in hospitals particularly with reference to surgical dressings and intravenous fluids. Precautions for safe and effective handling of sterilization equipment. 14. Processing of Tablets-Definition; Different types of compressed tablets and their properties. Processes involved in the production of tablets; Tablets excipients; Defects in tablets. Evaluation of Tablets; Physical Standards including Disintegration and	19

	Dissolution. Tablet coatingsugar coating; film coating, enteric coating and microencapsulation (Tablet coating may be dealt in an elementary manner.) 15. Processing of Capsules- Hard and soft gelatin capsules; different sizes capsules; filling of capsules; handling and storage of capsules, Special applications of capsules. 16. Study of immunological products like sera vaccines, toxoids & their preparations.	

OUTCOME: By the end of this course, the students will be able to understand about various dosage forms, their uses, different ayurvedic formulations, immunological products. In addition, they will gain a deep knowledge regarding various systems of weight measurement, percentage calculation, importance of packing, various aseptic technique used for pharmaceutical preparation and importance of pharmaceutics in the field of pharmacy.

DPH 1081: PHARMACEUTICS-I

PRACTICAL

Credits: 02 **1st Year** **L- T -P: 0-0-4**

OBJECTIVE: *The objective of the course is to prepare different dosage forms like aromatic waters, solutions, spritis, tinctures, extracts, creams, capsules and tablets. Also make them familiar regarding packaging and labeling of the same.*

Module No.	Content	Teaching Hours
I-IV	Preparation (minimum number stated against each) of the following categories illustrating different techniques involved. 1. Aromatic waters 3 2. Solutions 4 3. Spirits 2 4. Tinctures 4 5. Extracts 2 6. Creams 2 7. Cosmetic preparations 3 8. Capsules 2 9. Tablets 2 10. Preparations involving sterilization 2 11. Ophthalmic preparations 2 12. Preparations involving aseptic techniques 2	100

OUTCOME: By the end of this course, the students will be able to understand about various dosage forms, their formulation design, uses, packaging and labeling.

Books Recommended

1.Remington's Pharmaceutical Sciences.

2.The Extra Pharmacopoeia-Martindale.

DPH1002: PHARMACEUTICAL CHEMISTRY -I

Credits: 02 **1st Year** **L- T -P: 3-0-0**

OBJECTIVES: *The objective of the course is to help students attain a basic proficiency in the area of Inorganic Chemistry, which includes: Acid and basis, Antioxidants, Gastrointestinal agents, Topical agents, Dental products, Inhalants, Respiratory stimulants, Expectorants and Emetics, Antidotes, Inorganic official compounds, Major intra- and extracellular electrolytes. Further, they will learn about Radiopharmaceutical and contrast media, Quality control of drugs and pharmaceuticals and Identification tests and Limit tests used to detect impurities in pharmaceutical substance as per Indian Pharmacopoeia.*

Module No.	Content	Teaching Hours
I	1.General discussion on the following inorganic compounds including important physical and chemical properties, medicinal and Pharmaceutical uses, storage conditions and chemical incompatibility. (A) Acids, bases and buffers Boric acid*, Hydrochloric acid, strong ammonium hydroxide, Calcium hydroxide, Sodium hydroxide and official buffers. (B) Antioxidants-Hypophosphorous acid, Sulphur dioxide, Sodium bisulphite, Sodium metabisulphite, Sodium thiosulphate, Nitrogen and Sodium Nitrite. (C) Gastrointestinal agents-- (i) Acidifying agents Dilute hydrochloric acid. (ii) Antacids-Sodium bicarbonate, Aluminium hydroxide gel, Aluminium Phosphate, Calcium carbonate, Magnesium carbonate, Magnesium trisilicate, Magnesium oxide, Combinations of antacid preparations. (iii) Protectives and Adsorbents-Bismuth subcarbonate and Kaolin. (iv) Saline Cathartics-Sodium potassium tartrate and Magnesium sulphate.	18
II	(D) Topical Agents- (i) Protectives-Talc, Zinc Oxide, Calamine, Zinc stearate, Titanium dioxide, Silicone polymers. (ii) Antimicrobials and Astringents-Hydrogen peroxide*, Potassium permanganate, Chlorinated lime, Iodine, Solutions of Iodine, Povidone-iodine, Boric acid, Borax. Silver nitrate, Mild silver protein, Mercury, Yellow mercuric oxide, Ammoniated mercury. (iii) Sulphur and its compounds-Sublimed sulphur precipitated sulphur, selenium sulphide. (iv) Astringents:-Alum and Zinc Sulphate. (E) Dental Products-Sodium Fluride, Stannous Flouride, Calcium carbonate, Sodium metaphosphate, Dicalcium phosphate, Strontium chloride, Zinc chloride.	19
III	(F) Inhalants-Oxygen, Carbon dioxide, Nitrous oxide. (G) Respiratory stimulants-Ammonium Carbonate. (H) Expectorants and Emetics-Ammonium chloride , *Potassium iodide, Antimony potassium tartrate. (I) Antidotes-Sodium nitrate. 2. Major Intra and Extracellular electrolytes- (A) Electrolytes used for replacement therapy-Sodium chloride and its preparations, Potassium chloride and its preparations. (B) Physiological acid-base balance and electrolytes used-Sodium acetate, Potassium acetate, Sodium bicarbonate injection, Sodium citrate, Potassium citrate, Sodium lactate injection, Ammonium chloride and its injection. (C) Combination of oral electrolyte powders and solutions. 3. Inorganic Official compounds of Iron, Iodine, and, Calcium Ferrous Sulfate and Calcium gluconate.	19
IV	4.Radio pharmaceuticals and Contrast media-Radio activity-Alpha, Beta and Gamma Radiations, Biological effects of radiations, Measurement of radio activity, G. M. Counter Radio isotopes their uses, storage and precautions with special reference to the official preparations.	19

	Radio opaque Contrast mediaBarium sulfate. 5.Quality control of Drugs and Pharmaceuticals-Importance of quality control, significant errors, methods used for quality control, sources of impurities in Pharmaceuticals, Limit tests for Arsenic, chloride, sulphate, Iron and Heavy metals. 6.Identification tests for cations and anions as per Indian Pharmacopoeia.	

Outcome: After completion of the course, student will be able to understand different reactions of inorganic compounds, importance of physiological balance and the cations and anions which are used to regulate them, importance of radiopharmaceuticals, different methods which are used to control the quality of dosage forms, impurities in pharmaceuticals and limit tests.

DPH1082: PHARMACEUTICAL CHEMISTRY –I

PRACTICAL

Credits: 02 **1st Year** **L- T -P: 0-0-3**

OBJECTIVES: *The objective of the course is to identify various inorganic compounds and pharmaceuticals, apply limit test for various heavy metals and assay of inorganic pharmaceuticals either by acid base titrations, redox titrations, precipitation titrations or complexometric titrations.*

Module No.	Content	Teaching Hours
I-IV	1. Identification tests for inorganic compounds particularly drugs and pharmaceuticals. 2. Limit test for u, sulfate, Arsenic, Iron and Heavy metals. 3. Assay of inorganic Pharmaceuticals involving each of the following methods of compounds marked with (*) under theory. a. Acid-Base titrations (at least 3) b. Redox titrations (One each of Permanganometry and iodimetry) c. Precipitation titrations (at least 2) d. Complexometric titrations (Calcium and Magnesium)	75

OUTCOME: By this the students are able to identify various inorganic compounds and apply limit test for sulphate, arsenic, iron and heavy metals.

Book recommended (Latest editions)

Indian Pharmacopoeia.

DPH1003: PHARMACOGNOSY

Credits: 02 **1st Year** **L- T -P: 3-0-0**

Objective: *The basic objective of the course is to provide an opportunity to understand the cultivation and utilization aspects of drugs. Further, the students will be able to identify some drugs available in the healthcare system that are obtained or sourced from natural products. Moreover, the students will have depth knowledge on the techniques of extraction, identification, separation of natural compounds and their identification through morphological characters, physical and chemical tests.*

Module No.	Content	Teaching Hours
I	1. Definition, history and scope of Pharmacognosy including indigenous system of medicine. 2. Various systems of classification of drugs of natural origin. 3. Adulteration and drug evaluation; significance of Pharmacopoeial standards. 4. Brief outline of occurrence, distribution, outline of isolation, identification tests, therapeutic effects and pharmaceutical applications of alkaloids, terpenoids, glycosides, volatile oils, tannins and resins. 5. Occurrence, distribution, organoleptic evaluation, chemical constituents including tests wherever applicable and therapeutic efficacy of following categories of drugs. (a) Laxatives: Aloes, Rhuburb, Castor oil, Ispaghula, Senna. (b) Cardiotonics-Digitalis, Arjuna.	18
II	(c) Carminatives & G.I. regulators-Umbelliferous fruits, Coriander, Fennel, Ajowan, Cardamom, Ginger, Black pepper, Asafoetida, Nutmeg, Cinnamon, Clove. (d) AstringentsCatechu. (e) Drugs acting on nervous system-Hyoscyamus, Belladonna, Aconite, Ashwagandha, Ephedra, Opium, Cannabis, Nux vomica. (f) Antihypertensives-Rauwolfia. (g) Antitussives-Vasaka, Tolu balsam, Tulsi. (h) Antirheumatics-Guggul, Colchicum. (i) Antitumour-Vinca. (j) Antileprotics-Chaulmoogra Oil. (k) Antidiabetics -Pterocarpus, Gymnema, Sylvestro.	19
III	(l) Diuretics-Gokhru, Punarrnava. (m) Antidysentrics-Ipecacuanha (n) Antiseptics and disinfectants Benzoin, Myrrh. Nim, curcuma. (o) AntimalarialsCinchona. (p) Oxytocics-Ergot. (q) Vitamines-Shark liver Oil and Amla. (r) Enzymes-Papaya, Diastase, Yeast. (s) Perfumes and flavouring agents-Peppermint Oil, Lemon Oil, Orange Oil, Lemon grass Oil, Sandalwood. (t) Miscellaneous-Liquorice, Garlic, Picrorhiza, Dioscorea, Linseed, Shatavari, Shankhapusphi, Pyrethrum, Tobacco.	19
IV	(u) Pharmaceutical aids-Honey, Arachis Oil, Starch, Kaolin, Pectin, Olive oil, Lanolin, Beeswax, Acacia, Tragacanth, Sodium alginate, Agar, Guar gum, Gelatin. 6. Collection and preparation of crude drug for the market as exemplified by Ergot, opium, Rauwolfia, Digitalis, Senna. 7. Study of source, preparation and identification of fibres used in sutures and surgical dressings, cotton, silk, wool and regenerated fibre. 8. Gross anatomical studies of Senna, Datura, Cinnamon, Cinchona, Fennel, Clove, Ginger, Nux vomica & Ipecacuanha.	19

Outcome: The students will be able to explain the role of natural products as the source of many drugs and pharmaceutical ingredients, their common adulterations and quality control parameters.

DPH1083: PHARMACOGNOSY

Credits: 02 **1st Year** **L- T -P: 0-0-3**

Objective: *The basic objective is to identify various drugs by morphological characters, perform their physical and chemical tests and do their gross anatomical studies.*

Module No.	Content	Teaching Hours
I-IV	**1.**Identification of drug by morphological characters. **2.**Physical and chemical tests for evaluation of drugs wherever applicable. **3.**Gross anatomical studies (t.s) of the following drugs: Senna, Datura, Cinnamon, Cinchona, Coriander, Fennel, Clove, Ginger, Nuxvomica, Ipecacuanha. **4.**Identification of fibres and surgical dressings.	75

Outcome: The students will be able to study various drugs morphological characters, and perform physical and chemical test evaluation.

DPH1004: BIOCHEMISTRY AND CLINICAL PATHOLOGY

Credits: 01 **1st Year** **L- T -P: 2-0-0**

Objectives: *The course provides a better understanding in the fundamental chemical principles of the complex biological systems. The objective of the course is to provide integrated knowledge and understanding of the basics of biochemistry. Further, it provides information about sources, chemical structures, metabolism and biological functions of biomolecules. The course content also provides basic idea about pathological changes and their outcome which results during pathology some basic diseases. This course aims to develop the key transferable skills required in clinical pathology. By the end of the course, the students should be able to demonstrate knowledge and understanding of basic biomolicules and able to understand the pathological variations of some diseases. The objective of the clinical pathology includes the evaluation of clinical diagnoses, detection and diagnosis of unsuspected disease, study of the cause, nature, development of disease and clinical significance.*

Module No.	Content	Teaching Hours
I	1. Introduction to biochemistry. 2. Brief chemistry and role of proteins, polypeptides and amino acids, classification, Qualitative tests, Biological value, Deficiency diseases. 3. Brief chemistry and role of Carbohydrates, Classification, qualitative tests, Diseases related to carbohydrate metabolism.	13
II	4. Brief chemistry and role of Lipids, Classification, qualitative tests. Diseases related to lipids metabolism. 5. Brief chemistry and role of Vitamins and Coenzymes.	12
III	6. Role of minerals and water in life processes. 7. Enzymes : Brief concept of enzymic action. Factors affecting it. Therapeutic and pharmaceutical importance.	12
IV	8. Brief concept of normal and abnormal metabolism of proteins, carbohydrates and lipids. 9. Introduction to pathology of blood and urine. (a) Lymphocytes and Platelets, their role in health and disease. (b) Erythrocytes Abnormal cells and their significance. (c) Abnormal constituents of urine and their significance in diseases.	13

Outcome: Upon completion of this course, students will be able to recognize how fundamental chemical principles and reactions are utilized in biochemical processes and must be able to write and speak clearly on chemical and biochemical topics. They should recognize how biochemical reactions are not special, but follow fundamental chemical principles to achieve viability. Students should be able to judge whether a proposed or hypothetical reaction is consistent with the general framework of catabolic and anabolic metabolism. After completion of course, students should generate ability to work with clinicians, to determine the role of the laboratory in specific situations to optimize patient safety.

DPH1084: BIOCHEMISTRY AND CLINICAL PATHOLOGY PRACTICAL

Credits: 02 **1st Year** **L- T -P: 0-0-3**

Objectives: *The course provides various methods for detection and identification of proteins, carbohydrates, lipids and analysis of various normal and abnormal constituents of blood and urine.It provides a platform for students to equip with techniques to give I.M, I.V and S.C route.*

Module No.	Content	Teaching Hours
I-IV	1. Detection and identification of Proteins, Amino acids, Carbohydrates and lipids. 2. Analysis of normal and abnormal constituents of Blood and Urine (Glucose, Urea, Creatine, creatinine, cholesterol, alkaline phosphatase, acid phosphatase, Bilirubin, SGPT, SGOT, Calcium,Diastase, Lipase). 3. Examination of sputum and faeces (microscopic and staining). 4. Practice in injecting drugs by intramuscular, subcutaneous and intravenous routes. Withdrawal of blood samples.	75

Outcome: By this students are able to do various laboratory diagnostic characterisations of blood and urine samples. They are able to give injections through various routes. After completion of course, students should generate ability to work with clinicians, to determine the role of the laboratory in specific situations to optimize patient safety.

DPH1005: HUMAN ANATOMY AND PHYSIOLOGY

Credits: 02 **1st Year** **L- T -P: 3-0-0**

Objective: *The course focuses to develop a vocabulary of appropriate terminology to effectively communicate information related to anatomy and physiology. It also provides a better understanding on the fact to recognize the anatomical structures and explain the physiological functions of body systems (Respiratory, Cardiovascular, Digestive, Urinary system including all sense organs). It also includes recognizing and explaining the principle of homeostasis and the use of feedback loops to control physiological systems in the human body. Further, it helps to use the anatomical knowledge to predict physiological consequence, and use knowledge of function to predict the features of anatomical structures (Skeletal system). Moreover, it also helps to recognize and explain the characteristics, components and functions of the central, peripheral, autonomic nervous system, cell, tissues, blood and different endocrine hormones.*

Module No.	Content	Teaching Hours
I	1. Scope of Anatomy and Physiology. Definition of various terms used in Anatomy 2. Structure of cell, function of its components with special reference to mitochondria and microsomes. 3. Elementary tissues of the body. i.e epithelial tissue, muscular tissue, connective tissue and nervous tissue. 4. Name and functions of lymph glands.	19
II	5. Structure and function of skeleton. Classification of joints and their function, Joint disorder. 6. Composition of blood, functions of blood elements. Blood group and coagulation of blood. Brief information regarding disorders of blood. 7. Structure and functions of various parts of the heart. Arterial and venous systems with special reference to the names and positions of main arteries and veins. Blood pressure and its recording. Brief information about cardiovascular disorders. 8. Various parts of respiratory system and their functions. Physiology of respiration.	18
III	9. Digestive system; names of the various parts of digestive system and their functions. Structure and functions of liver, physiology of digestion and absorption. 10. Elementary knowledge of structure and functions of the organs of taste, smell, ear, eye and skin. Physiology of pain. 11. Various parts of central nervous system, brain and its parts, functions and reflex action. Anatomy and Physiology of autonomic nervous system.	19
IV	12. Various parts of urinary system and their functions, structure and functions of kidney. Physiology of Urine formation. Pathophysiology of renal diseases and oedema. 13. Structure of skeletal muscle. Physiology of muscle contraction, Names, position, attachments and functions of various skeletal muscles. Physiology of neuromuscular junction. 14. Endocrine glands and Hormones. Locations of the glands, their hormones and functions. Pituitary, thyroid, Adrenal and Pancreas. 15. Reproductive system -Physiology and Anatomy of Reproductive system.	19

Outcomes:

- Students can recognize and define a variety to terms specific to the human body.
- Students can analyze and describe the structures and functions of human anatomy and physiology from a regional perspective for the following regions: head and neck, thoracic, abdominopelvic, and upper and lower extremities.
- From a regional viewpoint, demonstrate competency in identifying the major skeletal muscles, their actions, origins, insertions, and peripheral nerves.
- Demonstrate competency in identifying the major structures and function of the gross anatomy of the central nervous system and plexuses.
- Students can discuss in depth about the anatomy and physiology of the nervous, musculoskeletal, respiratory, digestive, urinary and cardiovascular systems.
- Students can describe briefly about the basic components and functions of the cell, tissues blood and endocrine systems.

DPH 1085: HUMAN ANATOMY AND PHYSIOLOGY PRACTICAL

Credits: 01 **1st Year** **L- T -P: 0-0-2**

Objective: *The course focuses on study of human skeleton and studies various physiological systems of human body with the help of charts. Also it focuses on physiological examination like recording body temperature, pulse rate detection etc.*

Module No.	Content	Teaching Hours
I-IV	1. Study of the human skeleton. 2. Study with the help of charts and models of the following systems and organs: (a) Digestive system. (b) Respiratory system. (c) Cardiovascular system. (d) Urinary system. (e) Reproductive system. (f) Nervous system. (g) Eye. (h) Ear. 3. Microscopic examination of epithelial tissue, cardiac muscle, smooth muscle, skeletal muscle. Connective tissue and nervous tissues. 4. Examination of blood films for TLC, DLC and malarial parasite. 5. Determination of clotting time of blood, erythrocyte sedimentation rate and Hemoglobin value. 6. Recording of body temperature, pulse, heart rate, blood pressure and ECG.	50

Outcomes: Students are able to understand body physiological systems, examining blood films for various blood counts and analyse various paramaters of body system. Students will be able to determine blood clotting time, erythrocyte sedimentation rate and haemaoglobin value.

DPH1006: HEALTH EDUCATION AND COMMUNITY PHARMACY

Credits: 02 **1st Year** **L- T -P: 2-0-0**

Objective: *The course is designed to provide basic understanding on concepts of health, nutritional values, first aids and family plannings. Further, the course will make understand the basic principles of diagnosis and management of several communicable and non-communicable diseases.*

Module No.	Content	Teaching Hours
I	1. Concept of health -Definition of physical health, mental health, social health, spiritual health determinants of health, indicators of health, concept of disease, natural history of diseases, the disease agents, concept of prevention of diseases. 2. Nutrition and health-Classification of foods requirements, disease induced due to deficiency of proteins, Vitamins and minerals-treatment and prevention. 3. First aid-Emergency treatment in shock, snake-bite, burns poisoning, heart disease, fractures and resuscitation methods. Elements of minor surgery and dressings.	12
II	4. Demography and family planning-Demography cycle, fertility, family planning, contraceptive methods, behavioural methods, natural family planning method, chemical method, mechanical methods, hormonal contraceptives, population problem of India. 5. Environment and health-Sources of water supply, water pollution, purification of water, health and air, noise light-solid waste disposal and control-medical entomology, arthropod borne diseases and their control, rodents, animals and diseases. 6. Fundamental principles of microbiology classification of microbes, isolation, staining techniques of organisms of common diseases.	13
III	7. Communicable diseases -Causative agents, modes of transmission and prevention. (a) Respiratory infections-Chicken pox, measles. Influenza, diphtheria, whooping cough and tuberculosis. (b) Intestinal infections: Poliomyelitis. Hepatitis. Cholera. Typhoid, Food poisoning, Hookworm infection. (c) Arthropod borne infections-plague, Malaria, Filariasis. (d) Surface infections-Rabies, Trachoma, Tetanus, Leprosy. (e) Sexually transmitted diseases ---Syphilis. Gonorrhoea. AIDS.	12
IV	8. Non-communicable diseases-Causative agents, prevention, care and control; Cancer, Diabetes, Blindness, Cardiovascular diseases. 9. Epidemiology Its scope, methods, uses, dynamics of disease transmission, immunity and immunization: Immunological products and their dose schedule. Principles of disease control and prevention, hospital acquired infection, prevention and control. Disinfection, types of disinfection, disinfection procedures, for faeces, urine, sputum, room linen, dead-bodies, instruments.	13

Outcome: The students will be able to:

- Understand the concepts of health, nutritional values, first aids and family plannings.
- Understand the basic principles of diagnosis and management of several communicable and non-communicable diseases.

DPH 2001: PHARMACEUTICS-II

Credits: 03 **2nd Year** **L–T–P: 3–0–0**

OBJECTIVE: *The objective of the course is to make student know about compounding and dispensing of pharmaceutical formulations which help them in attaining basics about dispensing pharmacy and dispensed medications of solid, liquid, semisolid, dental, cosmetic and sterile dosage forms.*

<table>
<tr><th>Module No.</th><th>Content</th><th>Teaching Hours</th></tr>
<tr><td>I</td><td>Dispensing Pharmacy: Prescriptions –Reading and understanding of prescription; Latin terms commonly used (Detailed study is not necessary), Modern methods of prescribing, adoption of metric system. Calculations involved in dispensing.
• Incompatibilities in Prescriptions –Study of various types of incompatibilities –physical, chemical and therapeutic.
• Posology—Dose and Dosage of drugs, Factors influencing dose, Calculations of doses on the basis of age, sex and surface area. Veterinary doses.</td><td>19</td></tr>
<tr><td>II</td><td>Dispensed Medications:
(Note: A detailed study of the following dispensed medication is necessary. Methods of preparation with theoretical and practical aspects, use of appropriate containers and closures. Special labelling requirements and storage conditions should be high –lighted).
Powders –Types of powders , Advantages and disadvantages of powders, Granules, Cachets and Tablet triturates. Preparation of different types of powders encountered in prescriptions. Weighing methods, possible errors in weighing, minimum weighable amounts and weighing of material below the minimum weighable amount, geometric dilution and proper usage and care of dispensing balance.
• Liquid Oral Dosage Forms:
• Monophasic–Theoretical aspects including commonly used vehicles, essential adjuvant like stabilizers, colourants and flavours, with examples. Review of the following monophasic liquids with details of formulation and practical methods.
<table>
<tr><td>Liquids for internal administration</td><td>Liquids for external administration or used on mucus membranes</td></tr>
<tr><td>Mixtures and concentrates</td><td>Gargles</td></tr>
<tr><td>Syrups</td><td>Mouth washes Throat –paints Douches</td></tr>
<tr><td>Elixirs</td><td>Ear Drops Nasal drops & Sprays Liniments Lotions</td></tr>
</table></td><td>19</td></tr>
<tr><td>III</td><td>Biphasic Liquid Dosage Forms:
Suspension (elementary study) - Suspensions containing diffusible solids and liquids and their preparations. Study of the adjuvants used like thickening agents, wetting agents, their necessity and quantity to be incorporated. Suspensions of precipitate forming liquids like, tinctures, their preparations and stability. Suspensions produced by chemical reaction. An introduction to flocculated, non-flocculated suspension system.
• Emulsions –Types of emulsions, identification of emulsion system, formulation of emulsions, selection of emulsifying agents. Instabilities in emulsions. Preservation of emulsions.
• Semi –Solid Dosage Forms:
▪ Ointments–Types of ointments, classification and selection of dermatological vehicles. Preparation and stability of ointments by the following processes: (i) Trituration (ii) Fusion (iii) Chemical reaction (iv) Emulsification.</td><td>19</td></tr>
</table>

	▪ **Pastes -** Difference between ointments and pastes, bases of pastes. Preparation of pastes and their preservation. ▪ **Jellies** –An introduction to the different types of jellies and their preparation. ▪ **Poultices** - An elementary study of poultice. ▪ **Suppositories and pessaries** –Their relative merits and demerits, types of suppositories, suppository bases, classification, properties, Preparation and packing of suppositories. Use of suppositories for drug absorption.	
IV	• **Dental and Cosmetic Preparations:** Introduction to Dentrifices, Facial cosmetics, Deodorants, Antiperspirants, Shampoos, Hair dressing and Hair removers. • **Sterile Dosage Forms:** • **Parenteral dosage forms—**Definitions, General requirements for parenteral dosage forms. Types of parenteral formulations, vehicles, adjuvants, processing, personnel, facilities and Quality control. Preparation of Intravenous fluids and admixtures –Total parenteral nutrition, Dialysis fluids. • Sterility testing, Particulate matter monitoring –Faulty seal packaging. • **Ophthalmic Products –** Study of essential characteristics of different ophthalmic preparations. Formulation additives, special precautions in handling and storage of ophthalmic products.	18

OUTCOME: After completion of modules student will be able to understand about compounding and dispensing of different pharmaceutical formulations based on different dosage form, about dispensing pharmacy, prescription, parts and handling of prescription, types of incompatibility in prescription, posology, factors which effects dose of drugs and different methods which are used to control the quality of different dosage forms.

DPH2081: PHARMACEUTICS-II

PRACTICAL

Credits: 02 **2nd Year** **L- T -P: 0-0-4**

OBJECTIVE: *The objective of the course is to acquaint the students regarding compounding and dispensing of atleast 100 pharmaceutical formulations like mixtures, emulsions, lotions linimemnts etc.*

Module No.	Content	Teaching Hours
I-IV	Dispensing of at least 100 products covering a wide range of preparations such as mixtures, emulsions, lotions, liniments, E.N.T, preparations, ointments, suppositories, powders, incompatible prescriptions etc.	100

OUTCOME: After completion of modules student will be able to understand various dosage forms, their formulation design, their packaging, labeling.

Books recommended :(Latest editions)

1. Indian Pharmacopoeia.
2. British Pharmacopoeia.
3. National Formularies (N.F.I, B.N.F)
4. Remington's Pharmaceutical Sciences.
5. Martindale Extra Pharmacopoeia.

DPH 2002: PHARMACEUTICAL CHEMISTRY-II

Credits: 04 **2nd Year** **L–T–P: 4–0–0**

Objective: *The objective of course is to provide knowledge of the chemistry relevant to the study of pharmaceutical drugs. Students will be able to obtain a working knowledge of chemical structures and nomenclature of medicinal drugs. It will broad set of knowledge concerning the fundamentals in the basic areas of the discipline (physical, physicochemical, official preparation, and pharmacological property) of some important medicinal drugs described in IP. It also provides storage and distribution of medications in pharmacies open to the public and hospital pharmacies.*

Module No.	Content	Teaching Hours
I	1. Introduction to the nomenclature of organic chemical system with particular reference to hetero-cyclic system containing up to three rings. 2. The chemistry of following pharmaceutical organic compounds, covering their nomenclature, chemical structure, uses, important chemical and physical properties, storage condition, stability, and the different type of pharmaceutical formulation of these drugs and their popular brands names.(chemical structure of only those compounds marked with asterisk (*). 3. **Antiseptics and Disinfectants**: Proflavine*, Benzalkonium chloride, Cetrimide, phenol,chlorocresol*,chloroxylenol, Formaldehyde solution, Hexachlophene, Nitrofurantoin. 4. **Sulphonamides:**sulphadiazine*, sulphaguanidine*, phthalylsulphathiazole, Succinylsulphathiazole, sulphadimethoxine, sulphamethoxypyridazine, cotrimoxazole, sulphacetamide*. 5. **Antileprotic drugs:**clofazimine, thiambutosine, dapsone*, solapsone. 6. **Antitubercular drugs:** isoniazid*, PAS*, Steptomycin, rifampicin, Ethambutol*, thiacetazone, ethionamide, cycloserine, pyrazinamide*. 7. **Antiamoebic and Anthelmintic drugs:** emetine, metronidazole*, halogenated hydroxyquinolines, Diloxanidefuroate, paromomycin, piperazine*, mebendazole, D.E.C*. 8. **Antibiotics:** Benzyl penicillin*, phenoxy methyl penicillin*, Benzathine penicillin, ampicillin*, Cloxacillin, carbencicilin, gentamicin, neomycin, Erythromycin, tetracyclin, cephalexin, cephaloridine, Cephalothin, griseofulvin, chloramphenicol. 9. **Antifungal agents:**udecylenic acid, tolnaftate, nystatin, amphotericin, hamycin. 10. **Antimalarial drugs:** chloroquine*, amodiaquine,primaquine, Proguanil, Pyrimethamine*, quinine, trimethoprim	25
II	1- **Tranquilizers:** chlorpromazine*, prochlorperazine, trifluoperazine, Thiothexine, haloperidol*, triperidol, oxyperitine, Chlordiazepoxide, diazepam*, lorazepam, meprobamate. 2- **Hypnotics:**phenobarbitone*, butobarbitone, cyclobarbitone, nitrazepam, Glutethimide*, methiprylon, paraledehyde, trichlofosodium. 3- **General anaesthetics:** halothane*, cyclopropane*, diethyl ether*, Methohexital sodium, thiopecal sodium, trichloroethylene. 4- **Antidepressants drugs:** Amitriptyline, nortryptilyne, imperamine*, phepelzine, tranylcypromine. 5- **Analeptics:** theophylline, caffeine*, coramine*, dextro-amphetamine. 6- **Adrenergic drugs:** adrenaline*, noradrenaline, isoprenaline*, phenylephrine, Salbutamol, terbutaline, ephedrine*, pseudoephedrine. 7- **Adrenergic antagonist:** Tolazoline, propranolol*, practolol. 8- **Cholinergic drugs:**neostigamine*, pyridostigamine, Pralidoxime, pilocarpine, physostigamine*. 9- **Cholinergic Antagonist:** atropine*, hyoscine, homatropine, Propantheline*,	25

	benztropine, tropicamide, biperiden*.	
III	1. **Diuretic drugs:** furosemide*, chlorothiazide, hydrocholorothiazide*, Benzthiazide, urea*, mannito*, ethacrynic acid. 2. **Cardiovascular drugs:** ethylnitrite*, glyceryltrinitrate, alpha methyldopa, Guanethidine, clofibrate, quinidine. 3. **Hypoglycemic agents:** insulin, chlorpromamide*, tolbutamide, Glibenclamide, phenformin*, metformin. 4. **Coagulants and Anticoagulants:** heparin, thrombin, menadione*, bisphydroxy-coumarine, warfarin sodium. 5. **Local anaesthetics:** lignocaine*, procaine*, benzocaine. 6. **Histamine and anti-histaminic agents:** histamine, diphenhydramine*, promethazine, Cyprohepadine, mepyramine, pheniramine, chlorpheniramine*. 7. **Analgesics:** morphine, pethidine*, codeine, methadone 8. **Antipyretics:** aspirin*, paracetamol*, analgin, dextropropoxphene, pentazocine. **9. Non-steroidal anti-inflammatory agents:** 10. Indomethacine*, phenylbutazone*, Oxyphenbutazone, ibuprofen.	25
IV	1. **Thyroxine and antithyroids:**thyroxine*, methimazole, methyl thiouracil, propyl thiouracil. 2. **Diagnostic agents:**lopanoic acid, propyliodone, sulphobromopthalein-sodium, indigotindisulfonate, Indigo-carmine, evans-blue, congo-red,fluorescein sodium. **3. Anticonvulsants , Cardiac glycoside, Antiarrythmic agents, Antihypertensive agents, Vitamins.** 4. **Steroidal drugs:** betamethasone, cortisone, hydrocortisone, prednisolone, Progesterone, testosterone, oestradiol, nandrolone. 5. **Anti-neoplastic drugs:** actinomycin, azathioprine, busulphan, Chlorambucil, cisplatin, cyclophosphamide, Daunorubicin hydrochloride, fluorouracil, mercaptopurine,Methotrexate, mytomycin.	25

Outcome: Students will be able to name a medicinal drug according to IUPAC system. They will make a bridge between basic and more advanced pharmaceutical chemistry knowledge. It also makes connection from chemical principles to the structures and functions of biological molecules. They should recognize the medicinal on the basis of structure and official preparation. After completion of course, students should generate ability to speak and write about pharmacological property of medicinal drugs.

Books Recommended :(Latest editions)

1. Pharmocopoeia of India.
2. British Pharmaceutical Codex.
3. Martindale The Extra Pharmacopoeia.

DPH2082: PHARMACEUTICAL CHEMISTRY-II

PRACTICAL

Credits: 02 **2nd Year** **L- T -P: 0-0-3**

Objective: *The objective of course is to provide systematic qualitative testing knowledge of organic drugs which includes their melting point determination, detection of element and functional groups. Also deal with preparation of organic compounds.*

Module No.	Content	Teaching Hours
I-IV	1. Systematic qualitative testing of organic drugs involving Solubility determination, melting point and boiling point, detection of elements and functional groups (10 compounds). 2. Official identification test for certain groups of drugs included in the I.P like barbiturates, sulfonamides, phenothiazine, Antibiotic etc (8 compounds). 3. Preparation of three simple organic preparations.	75

Outcome: Students are able to prepare organic compounds and do elemental and functional group analysis by the help of various detection tests. They able to identify certain groups of drugs like barbiturates, sulfonamides, phenothaiziems etc. included in I.P with the help of official tests.

DPH 2003: PHARMACOLOGY & TOXICOLOGY

Credits: 03 **2nd Year** **L–T–P: 3–0–0**

Objective: *This subject is intiled for the student to have know how on-*

- *What is the meaning of pharmacology and toxicology and how this subject is beneficial to society or its role in society & its scope?*
- *Students must again the various routes of administration of drugs i.e. how the drug is delivered to the body and what happens to the drug when it enters the body (ADME).*
- *Must be through regarding use of drugs which used in various disease conditions-like pain, gent, an somnia mental ailments, epilepsy, glaucoma, respiratory troubles- asthma & cough, gastro intestinal disorders peptic ulcer, constipation, cardiac diseases, diabetes, hypertension, chemotherapy in infections of body like urinary tract infections, tubesulosis fungal and viral diseases.*
- *Student must be able to classify the drug based on its intended action as uses.*
- *Must be able to acquire knowledge about the mechanism of action of important classes of drugs i.e. where exactly the drug binds in the body & exert its action.*

Module No.	Content	Teaching Hours
I	**Objective:** The basic objective of this course is to get familiar with the mechanism, therapeutic application and adverse effects of various classes of drugs. 1. Introduction to Pharmacology, scope of Pharmacology. 2. Routes of administration of drugs, their advantages and disadvantages. 3. Various processes of absorption of drugs and the factors affecting them, metabolism, distribution and excretion of drugs. 4. General mechanism of drugs action and the factors which modify drug action. 5. Pharmacological classification of drugs. The discussion of drugs should emphasise the following aspect: (i) Drugs acting on the Central Nervous System: (a) General anaesthetics, adjunction to anaesthesia, intra venuous anasesthetics. (b) Analgesic antipyretics and non-steroidal anti –inflammatory drugs, Narcotic analgesics, Antirheumatic and antigout remedies, Sedatives and Hypnotics, Psychopharmacological agents, anti convulsants, analeptics. (c) Centrally acting muscle relaxants and anti parkinsonism agents	19
II	(ii) Local anaesthetics. (iii) Drug acting on autonomic nervous system. (a) Cholinergic drug, Anticholinergic drugs, anti cholinesterase drugs. (b) Adrenergic drugs and adrenergic recepter blockers. (c) Neurones blockers and ganglion blockers. (d) Neuromuscular blockers, drugs used in myasthenia gravis. (iv) Drugs acting on eye, mydriatics, drugs used in glaucoma. (v) Drugs acting on respiratory system –Respiratory stimulants, Bronchodilators, Nasal decongestants, Expectorants and Antitussive agents. (vi) Antacids, Physiological role of histamine and serotonin, Histamine and Antihistamines, Prostaglandins.	19

III	(vii) Cardio Vascular drugs, Cardiotonics, Antiarrhythmic agents, Antianginal agents, Antihypertensive agents, Peripheral Vasodilators and drugs used in atherosclerosis. (viii) Drugs acting on the blood and blood forming organs. Haematinics, Coagulants and anti Coagulants, Haemostatics, Blood substitutes and plasma expanders. (ix) Drugs affecting renal function-Diuretics and antidiuretics. (x) Hormones and hormone antagonists –hypoglycemic agents, Antithyroid drugs, sex hormones and oral contraceptives, cortico-steroids. (xi) Drugs acting on digestive system-Carminatives, digestants Bitters, Antacids and drugs used in Peptic ulcer, purgatives, and laxatives, Antidiarrhoeals, Emetics, Antiemetics, Anti-spasmodics.	19
IV	(xii) Chemotherapy of microbial disease ;Urinary antiseptics, Sulphonamides, Penicillins, Streptomycin, Tetracylines and other antibiotics, Antitubercular agents, Antifungal agents, antiviral drugs, antileprotic drugs. 6. Chemotherapy of protozoal diseases Anthelmintic drugs. 7. Chemotherapy of cancer. 8. Disinfectants and antiseptics.	18

Outcomes:

- After acquiring knowledge the student must be able to tell which drug is used in what type of ailment and what are the side effects or unintentional actions of the drug. He also must be able to deal with the toxicity of drugs i.e. what should be done immediately if poisoning access.

DPH2083: PHARMACOLOGY & TOXICOLOGY

PRACTICAL

Credits: 02 **2nd Year** **L- T -P: 0-0-2**

OBJECTIVE: *The course is designed to understand the practical knowledge in the effects of drugs using animals in computer based softwares.*

Module No.	Content	Teaching Hours
I-IV	The first six of the following experiments will be done by the students while the remaining will be demonstrated by the teacher. 1. Effect of K+, Ca++, acetylcholine and adrenaline on frog's heart. 2. Effect of acetylcholine on rectus abdominis muscle of Frog and guinea pig ileum. 3. Effect on spasmogens and relaxants on rabbits intestine. 4. Effect of local anaesthetics on rabbit cornea. 5. Effect of mydriatics and miotics on rabbits eye. 6. To study the action of strychnine on frog. 7. Effect of digitalis on frog's heart. 8. Effect of hypnotics in mice. 9. Effect of convulsants and anticonvulsant in mice or rats. 10. Test for pyrogen. 11. Taming and hypnosis potentiating effect of chlorpromazine in mice/rats. 12. Effect of diphenhydramine in experimentally produced asthma in guinea pigs.	50

OUTCOME: Students will be able to:

- Evaluate the pharmacological effects of drugs using computer based softwares.
- Select suitable animals in the pharmacological experiments.

DPH 2004: PHARMACEUTICAL JURISPRUDENCE

Credits: 02 **2nd Year** **L–T–P: 2–0–0**

OBJECTIVE: *The objective of the course is to familiarize students with objective of pharmaceutical legislation, various Acts and Rules which were amended for the wellbeing of pharmacy profession, about Principles, Professional and Pharmaceutical Code and Ethics which include:*

Scope, Objectives and Origin of Pharmaceutical legislation in India, Code of pharmaceutical ethics, Pharmacy Act, 1948, The Drugs and Cosmetics Act, 1940, The Drug and Magic Remedies (Objectionable Advertisement) Act, 1945, Narcotic Drugs and Psychotropic Substances Act, 1985
Latest Drugs (Price Control) Order, Poisons Act 1919, Medicinal and Toilet Preparations (Excise Duties) Act, 1995, Medical Termination of Pregnancy Act, 1971.

Module No.	Content	Teaching Hours
I	• Origin and nature of Pharmaceutical legislation in India, its scope and objectives. Evolution of the "Concept of Pharmacy" as an integral part of the Health Care System. • Principles and significance of Professional Ethics. Critical study of the code of Pharmaceutical Ethics drafted by Pharmacy Council of India. • Pharmacy Act, 1948 –The General study of the Pharmacy Act with special reference to Education Regulations, working of State and Central Councils, constitution of these councils and functions, Registration procedures under the Act . www.bnpharma.org	12
II	• The Drugs and Cosmetics Act, 1940—General study of the Drugs and Cosmetics Act and the Rules thereunder. Definitions and salient features related to retail and wholesale distribution of drugs. The powers of Inspectors, the sampling procedures and the procedure and formalities in obtaining licences under the rule. Facilities to be provided for running a Pharmacy effectively. General study of the Schedules with special reference of schedules C, C1, F, G, J, H, P and X and salient features of labelling and storage condition of drugs.	13
III	• The Drug and Magic Remedies (Objectionable Advertisement) Act, 1945-General study of the Act Objectives, special reference to be laid on Advertisements. Magic remedies and objectionable and permitted advertisements – disease which cannot be claimed to be cured. • Narcotic Drugs and Psychotropic Substances Act, 1985-A brief study of the act with special reference to its objectives, offences and punishment.	13
IV	• Brief introduction to the study of the following acts. ▪ Latest Drugs (Price Control) Order in force. ▪ Poisons Act 1919 (as amended to date) ▪ Medicinal and Toilet Preparations (Excise Duties) Act, 1995 (as amended to date) ▪ Medical Termination of Pregnancy Act, 1971 (as amended to date)	12

OUTCOME: By the end of this course, the students will be able to understand pharmaceutical legislation in India; students may get deep knowledge about professional and pharmaceutical code and ethics, about pharmacist's oath, about constituent and functions pharmacy council of India and state pharmacy council, about general study of the Schedules according to drug and cosmetics act and also come to know about objectives, offences and penalties, functions of the drug and magic remedies (objectionable advertisement) act, narcotic drugs and psychotropic substances act, latest drugs (price control) order, poisons act, medicinal and toilet preparations (excise duties) act, medical termination of pregnancy act.

BOOKS RECOMMENDED (Latest edition)

Bare Acts of the said laws published by Government

DPH 2005: DRUG STORE AND BUSINESS MANAGEMENT

Credits: 03 **2nd Year** **L–T–P: 3–0–0**

Objective: *The course is designed to provide basic understanding on integration of different managerial functions, managing up and discuss strategies to facilitate the process of organization, different problems in starting a business or organization and strategies to increase the promotion and salesmanship in running organization.*

Module No.	Content	Teaching Hours
I	1. Introduction-Trade, Industry and Commerce, Functions and subdivision of Commerce, Introduction of Elements of Economics and Management. 2. Forms of Business Organizations. 3. Channels of Distribution. 4. Drug House Management-Selection of Site, Space Lay-out and legal requirements. Importance and objectives of Purchasing,	19
II	1. Selection of suppliers, credit information, tenders, contracts and price determination and legal requirements thereto. 2. Codification, handling of drug stores and other hospital supplies. 3. Inventory Control-objects and importance, modern techniques like ABC, VED analysis, the lead time, inventory carrying cost, safety stock, minimum and maximum stock levels, economic order quantity, scrap and surplus disposal. 4. Sales Promotion, Market Research, Salesmanship, qualities of a salesman, Advertising and Window Display.	19
III	1. Recruitment, training, evaluation and compensation of the pharmacist. 2. Banking: Service and functions of the bank, 3. Finance: Finance Planning and sources of finance. 4. Introduction to the accounting concepts and conventions, Double entry Book keeping, Different kinds of accounts.	19
IV	1. Cash Book, General Leger and Trial Balance. 2. Profit and Loss Account and Balance Sheet 3. Simple technique of analysing financial statements 4. Introduction to Budgetting	18

OUTCOME: Students will be able to:

- Increase the selling efforts and intensity by dealers as well as sales personnel.
- Call the attention to new products.
- Inform the buyers about the new brand and new packaging.
- Perform cost of reaching an audience.

Books Recommended (Latest edition)

Remington's Pharmaceutical Sciences.

DPH 2006: HOSPITAL AND CLINICAL PHARMACY

Credits: 03 **2nd Year** **L–T–P: 3–0–0**

OBJECTIVE: The objective of the course is to familiarize students with aspects, scopes and applications of Hospital pharmacy which include: Location and Layout of hospital and hospital pharmacy, Drug distribution system in hospital, Sterile and Non-sterile manufacturing in hospital pharmacy, Pharmacy and therapeutic committee, Drug information services, Surgical dressing, Application of computers for maintenance of records and for data storage, Disease manifestation and pathophysiology (Tuberculosis, Hepatitis, Rheumatoid Arthritis, Cardiovascular disease, Epilepsy, Diabetes, Peptic ulcer and Hypertension), Adverse drug reactions, Drugs used in clinical toxicity, Drug dependent and drug abuse and Bioavailability of drugs.

Module No.	Content	Teaching Hours
I	1- Hospital definition , function, classification based on various criteria, organization, management and health delivery system in India. 2- Hospital Pharmacy- a)Definition, b) Function and objective of hospital pharmaceuticals services. c) Location, layout, flow chart of material and men. d) Personnel and facilities requirement including equipment based on individual and basic needs. e) Requirement and abilities required for hospital pharmacists. 3- Drug distribution system in hospitals: a) Out patient services b) In-patient services- type of services, detailed discussion of unit dose system, floor ward stock system, satellite pharmacy services, central sterile services, Bed side pharmacy. 4- Manufacturing -a)Economical consideration, estimation of demand. b) Sterile manufacturing-large and small volume parenterals, facilities, requirement, layout production planning, man-power requirement. c) Non sterile manufacture-liquid orals, externals-bulk concentrates. d) Procurement of store and testing of raw materials. Nomenclature and used of surgical instruments and hospital equipments and health accessories.	19
II	1- P.T.C(Pharmacy therapeutic committee), hospital formulary system and their organization, functioning, composition. 2- drug information service and drug information bulletin. 3- surgical dressing like cotton, gauze, bandages and adhesive tapes including their pharmacopoeial tests for quality, other hospital supply e.g I.V sets B.G sets, ryals tubes, catheters, syringes etc. 4- Application of computer in maintenance of record, inventory control, medication monitoring, drug information and data storage and retrieval in hospital and retail pharmacy establishments.	19
III	1- Introduction to clinical pharmacy practice-definition, scope. 2- Modern dispensing aspects-pharmacists and patient counseling and advice for the use of common drug, medication history. 3- Common daily terminology used in practice of medicine. 4- Disease, manifestation and pathophysiology including sailent symptoms to understand the disease like tuberculosis, Hepatitis, Rheumatoid Arthritis, Cardiovascular disease, Epilepsy, Diabetes, Peptic Ulcer, Hypertension. 5- Physiological parameters with their significance.	19
IV	1- Drug interactions: a) Definition introduction b) mechanism of drug interaction. c) drug-drug interaction with reference to analgesics, diuretics, cardiovascular drugs, gastrointestinal agents, vitamins and hypoglycemic agents. d) drug-food interaction 2- Adverse drug reaction a) definition and significance. b) drug-induced disease and teratogenicity.	18

	3- Drug in clinical toxicity- introduction, general treatment of poisoning, systematic antidotes. Treatment of insecticide, heavy metal poisoning, heavy metal poison , narcotic drugs , barbiturate, organosphosphours poisons. 4- Drug dependence, drug abuse, addictive drugs and therir treatment , complication Bioavailability of drugs, including factor affecting it.	

OUTCOME: By the end of this course, the students will be able to understand about various function of hospital and hospital pharmacy, various in-patient and out-patients services, manufacturing within hospital and special precautions related to sterile manufacturing process, different surgical instrument and surgical dressing used in hospital, data collection data storage, various parts of prescription, drug interaction and adverse drug reactions, toxicity due to insecticides, heavy metals, poisons, narcotic drugs and barbiturates. In addition, they will gain a deep knowledge regarding to various diseases their causative agents, diseases cycle, laboratory protocols for detection and finally the methods of control and presentation of diseases.

Books recommended (Latest editions)

1. Remington's Pharmaceutical Sciences.
2. Martindale The Extra Pharmacopoeia

DPH2084: Hospital and Clinical Pharmacy

PRACTICAL

Credits: 01 **2nd Year** **L- T -P: 0-0-2**

OBJECTIVE: The Course focuses on preparation of transfusion fluids, testing of raw materials, evaluation of surgical dressings, sterilization of surgical instruments and glass wares.

Module No.	Content	Teaching Hours
I-IV	1. Preparation of transfusion fluids. 2. Testing of raw materials used in (1). 3. Evaluation of surgical dressings. 4. Sterilization of surgical instruments, glass ware and other hospital supplies. 5. Handling and use of data processing equipments.	50

OUTCOME: By this the students are able to prepare transfusion fluids, evaluation of surgical materials, and handling of data processing equipments.