OBE DOCUMENT

School of Pharmacy
Diploma in Pharmacy

Program Code: SOP0102

2024-2026

School:		SOP
Program:		D. Pharm
Branch:		
1	Course Code	ER 20-11T
2	Course Title	Pharmaceutics – Theory
3	Credits	4
4	Contact Hours (L-T-P)	3-1-0
	Course Type	Compulsory
5	Course Objective	Upon completion of this course the student should be able to 1. Understanding the requirements for manufacturing and processing of pharmaceutical products. 2. Understanding the pharmacopoeial standards for the evaluation of different pharmaceutical products 3. Understanding the requirements for packaging and labeling
6	Course Outcomes	CO1: Understand different pharmacopeia guidelines for therapeutic substances and pharmaceutical calculations. CO2: Utilize the packaging requirements for pharmaceutical products and different techniques for size reduction and size separation CO3: Develop a thorough understanding of the procedures involved in mixing, filtration, and extraction. CO4: Acquire knowledge about the methodologies used for distillation and sterilization across various materials and products. CO5: Obtain a comprehensive understanding of the manufacturing and assessment procedures involved in producing tablets, capsules, and immunological products. CO6: Acknowledge about how to design and use different advanced medical devices and technologies
7	Course Description	This subject is designed to understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations
8	Outline syllabus	
	1	UNIT-I History of the profession of Pharmacy in India in relation to Pharmacy education, industry, pharmacy practice, and various professional associations. Pharmacy as a career, Introduction to Pharmacopoeias with special reference to the Indian Pharmacopoeia, Introduction to IP, BP, USP, NF and Extra Pharmacopoeia. Salient features of Indian Pharmacopoeia.

	2	Unit II: Packaging materials of pharmaceuticals and Pharmaceutical aids Types, selection criteria, advantages and disadvantages of glass, plastic, metal, rubber as packaging materials Pharmaceutical aids: Organoleptic (Colouring, flavoring, and sweetening) agents Preservatives: Definition, types with examples and uses
	3	UNIT-III Unit operations: **A.** Definition, objectives/ applications, principles, construction, and workings of: **B.** Size reduction: hammer mill and ball mill **C.** Size separation: Classification of powders according to IP, Cyclone separator, Sieves and standards of sieves **D.** Mixing: Double cone blender, Turbine mixer, Triple roller mill and Silverson mixer homogenizer **E.** Filtration: Theory of filtration, membrane filter and sintered glass filter **F.** Drying: working of fluidized bed dryer and process of freeze drying **G.** Extraction: Definition, Classification, method, and Applications
	4	UNIT-IV: Introduction to different dosage forms Tablets – coated and uncoated, various modified tablets (sustained release, extended-release, fast dissolving, multi- layered, etc.) Capsules - hard and soft gelatine capsules, Hard and soft gelatin capsules; different sizes of capsules; filling of capsules; handling and storage of capsules. Special applications of capsules. Liquid oral preparations - solution, syrup, elixir, emulsion, suspension, dry powder for reconstitution Topical preparations - ointments, creams, pastes, gels, liniments and lotions, suppositories, and pessaries Nasal preparations, Ear preparations Powders and granules - Insufflations, dusting powders, effervescent powders, and effervescent granules Sterile formulations – Injectables, eye drops and eye ointments Immunological products: Sera, vaccines, toxoids, and their manufacturing methods.

	5	UNIT-V Basic structure, layout, sections, and activities of pharmaceutical manufacturing plants Quality control and quality assurance: Definition and concepts of quality control and quality assurance, current good manufacturing practice (cGMP), Introduction to the concept of calibration and validation Novel drug delivery systems: Introduction, Classification with examples, advantages, and challenges	
	Mode of examination	Theory	
	Weightage Distribution	Sessional Exam	ESE
		20	80
	Text book/s*	**1.** Lachman L, Liberman H.A and Kanig J.L., "Theory and Practice of Industrial Pharmacy", Lea and Febiger **2.** Remington – "The science and practice of pharmacy" Vol. I & II. Mack Publishing Co., Pennsylvania **3.** Pharmacopoeia of India, the Controller of Publications, Delhi **4.** S.B. Gokhale, M. S. Tare, Advanced drug delivery system, Nirali prakashan **5.** Jorge Coelho, Drug delivery system: Advanced technology potentially applicable in personalized treatment, EPMR publisher(Springer)	
	OtherReferences		

School:		SOP
Program:		D. Pharm
Branch:		1st Year
1	Course Code	ER20-12T
2	Course Title	Pharmaceutical Chemistry– Theory
3	Credits	4
4	Contact Hours (L-T-P)	3-1-0
	Course Type	Compulsory
5	Course Objective	This course will discuss the following aspects of the chemical substances used as drugs and pharmaceuticals for various disease conditions **1.** Chemical classification, chemical name, chemical structure **2.** Pharmacological uses, doses, stability, and storage conditions **3.** Different types of formulations / dosage form available and their brand names **4.** Impurity testing and basic quality control tests.
6	Course Outcomes	Upon successful completion of this course, the students will be able to: CO1: Utilize knowledge of chemical class, structure, and chemical name to differentiate between various drugs and pharmaceuticals. CO2: Apply knowledge of pharmacological information to determine appropriate dosage regimens and storage conditions for different drugs. CO3: Interpret the role of pharmaceutical chemistry, quantitative and qualitative analysis, and impurity testing in ensuring the quality and safety of chemical substances. CO4: Recall the dosage forms and brand names of drugs and pharmaceuticals popular in the marketplace CO5: Classify and describe gastrointestinal agents, topical agents, dental products, inhalants, antidotes etc. CO6: Assign IUPAC nomenclature to organic, heterocyclic compounds & pharmaceutical organic compounds.
7	Course Description	This course is designed to impart basic knowledge on the chemical structure, storage conditions and medicinal uses of organic and inorganic chemical substances used as drugs and pharmaceuticals. Also, this course discusses the impurities, quality control aspects of chemical substances used in pharmaceuticals.
8	Outline syllabus	

	1	UNIT-I **A.** Introduction to Pharmaceutical chemistry: Scope and objectives **B.** Sources and types of errors: Accuracy, precision, significant figures **C.** Impurities in Pharmaceuticals: Source and effect of impurities in Pharmacopoeial substances, importance of limit test, Principle and procedures of Limit tests for chlorides, sulphates, iron, heavy metals and arsenic. **D.** Analysis ● Volumetric analysis: Fundamentals of volumetric analysis, Acid-base titration, non-aqueous titration, precipitation titration, complexometric titration, redox titration ● Gravimetric analysis: Principle and method.
	2	UNIT-II **A.** Inorganic Pharmaceuticals: Pharmaceutical formulations, market preparations, storage conditions and uses of ● Haematinics: Ferrous sulphate, Ferrous fumarate, Ferric ammonium citrate, Ferrous ascorbate, Carbonyl iron ● Gastro-intestinal Agents: Antacids :Aluminium hydroxide gel, Magnesium hydroxide, Magaldrate, Sodium bicarbonate, Calcium Carbonate, Acidifying agents, Adsorbents, Protectives, Cathartics ● Topical agents: Silver Nitrate, Ionic Silver, Chlorhexidine Gluconate, Hydrogen peroxide, Boric acid, Bleaching powder, Potassium permanganate ● Dental products: Calcium carbonate, Sodium fluoride, Denture cleaners, Denture adhesives, Mouth washes ● Medicinal gases: Carbon dioxide, nitrous oxide, oxygen **B.** Introduction to nomenclature of organic chemical systems with particular reference to heterocyclic compounds containing up to Three rings

	3	UNIT-III Study of the following category of medicinal compounds with respect to classification, chemical name, chemical structure (compounds marked with*) uses, stability and storage conditions, different types of formulations and their popular brand names **A.** Drugs Acting on Central Nervous System ● Anaesthetics: Thiopental Sodium*, Ketamine Hydrochloride*, Propofol ● Sedatives and Hypnotics: Diazepam*, Alprazolam*, Nitrazepam, Phenobarbital* ● Antipsychotics: Chlorpromazine Hydrochloride*, Haloperidol*, Risperidone*, Sulpiride*, Olanzapine, Quetiapine, Lurasidone ● Anticonvulsants: Phenytoin*, Carbamazepine*, Clonazepam, Valproic Acid*, Gabapentin*, Topiramate, Vigabatrin, Lamotrigine ● Anti-Depressants: Amitriptyline Hydrochloride*, Imipramine Hydrochloride*, Fluoxetine*, Venlafaxine, Duloxetine, Sertraline, Citalopram, Escitalopram, Fluvoxamine, Paroxetine **B.** Drugs Acting on Autonomic Nervous System ● Sympathomimetic Agents: Direct Acting: Nor-Epinephrine*, Epinephrine, Phenylephrine, Dopamine*, Terbutaline, Salbutamol (Albuterol), Naphazoline*, Tetrahydrozoline. Indirect Acting Agents: Hydroxy Amphetamine, Pseudoephedrine. Agents With Mixed Mechanism: Ephedrine, Metaraminol ● Adrenergic Antagonists: Alpha Adrenergic Blockers: Tolazoline, Phentolamine, Phenoxybenzamine, Prazosin. Beta Adrenergic Blockers: Propranolol*, Atenolol*, Carvedilol ● Cholinergic Drugs and Related Agents: Direct Acting Agents: Acetylcholine*, Carbachol, And Pilocarpine. Cholinesterase Inhibitors: Neostigmine*, Edrophonium Chloride, Tacrine Hydrochloride, Pralidoxime Chloride, Echothiopate Iodide ● Cholinergic Blocking Agents: Atropine Sulphate*, Ipratropium Bromide Synthetic Cholinergic Blocking Agents: Tropicamide, Cyclopentolate Hydrochloride, Clidinium Bromide, Dicyclomine Hydrochloride*

	4	UNIT-IV **A.** Drugs Acting on Cardiovascular System ● Anti-Arrhythmic Drugs: Quinidine Sulphate, Procainamide Hydrochloride, Verapamil, Phenytoin Sodium*, Lidocaine Hydrochloride, Lorcainide Hydrochloride, Amiodarone and Sotalol ● Anti-Hypertensive Agents: Propranolol*, Captopril*, Ramipril, Methyldopate Hydrochloride, Clonidine Hydrochloride, Hydralazine Hydrochloride, Nifedipine, ● Antianginal Agents: Isosorbide Dinitrate **B.** Diuretics: Acetazolamide, Frusemide*, Bumetanide, Chlorthalidone, Benzthiazide, Metolazone, Xipamide, Spironolactone **C.** Hypoglycemic Agents: Insulin and Its Preparations, Metformin*, Glibenclamide*, Glimepiride, Pioglitazone, Repaglinide, Gliflozins, Gliptins **D.** Analgesic And Anti-Inflammatory Agents: Morphine Analogues, Narcotic Antagonists; Nonsteroidal Anti-Inflammatory Agents (NSAIDs) - Aspirin*, Diclofenac, Ibuprofen*, Piroxicam, Celecoxib, Mefenamic Acid, Paracetamol*, Aceclofenac	
	5	UNIT-V **A.** Anti-Infective Agents ● Antifungal Agents: Amphotericin-B, Griseofulvin, Miconazole, Ketoconazole*, Itraconazole, Fluconazole*, Naftifine Hydrochloride ● Urinary Tract Anti-Infective Agents: Norfloxacin, Ciprofloxacin, Ofloxacin*, Moxifloxacin, ● Anti-Tubercular Agents: INH*, Ethambutol, Para Amino Salicylic Acid, Pyrazinamide, Rifampicin, Bedaquiline, Delamanid, Pretomanid* ● Antiviral Agents: Amantadine Hydrochloride, Idoxuridine, Acyclovir*, Foscarnet, Zidovudine, Ribavirin, Remdesivir, Favipiravir ● Antimalarials: Quinine Sulphate, Chloroquine Phosphate*, Primaquine Phosphate, Mefloquine*, Cycloguanil, Pyrimethamine, Artemisinin ● Sulfonamides: Sulfanilamide, Sulfadiazine, Sulfametho xazole, Sulfacetamide*, Mafenide Acetate, Cotrimoxazole, Dapsone* **B.** Antibiotics: Penicillin G, Amoxicillin*, Cloxacillin, Streptomycin, Tetracyclines: Doxycycline, Minocycline, Macrolides: Erythromycin, Azithromycin, Miscellaneous: Chloramphenicol* Clindamycin **C.** Antineoplastic Agents: Cyclophosphamide*, Busulfan, Mercaptopurine, Fluorouracil*, Methotrexate, Dactinomycin, Doxorubicin Hydrochloride, Vinblastine Sulphate, Cisplatin*, Dromostanolone Propionate	
	Mode of examination	**A.** Theory	
	Weightage Distribution	Sessional Exam	ETE
	Weightage	20	80

	Distribution Text book/s*	**1.** Medicinal & Pharmaceutical chemistry by Harikishan Singh and VK Kapoor **2.** Wilson and Griswold's Text book of Organic Medicinal and pharmaceutical Chemistry **3.** Practical Organic Chemistry by Mann and Saunders. **4.** Practical Pharmaceutical Chemistry, Volume- I & II by Beckett and J. B. Stenlake **5.** Indian Pharmacopoeia **6.** Vogel's text book of Practical Organic Chemistry.
	Other References	

School:		SOP
Program:		D.Pharm
Branch:		Semester: 1
1	Course Code	ER 20-13T
2	Course Title	Pharmacognosy Theory
3	Credits	4
4	Contact Hours (L-T-P)	3-1-0
	Course Type	Compulsory
5	Course Objective	Upon completion of this course the student should be able to 1. Demonstrate and interpret the different indigenous system of medicines, related drugs and able to analyze the adulteration and quality control parameters as per Pharmacopeia standards. 2. Biological source, chemical constituents of selected crude drugs and their therapeutic efficacy in common diseases and ailments 3. Demonstrate the uses of various slides and the preparation of reagent 4. Appreciate correlation of pharmacognosy with related medical sciences
6	Course Outcomes	CO1: Demonstrate and interpret the different indigenous system of medicines, related drugs and able to analyze the adulteration and quality control parameters as per Pharmacopoeia standards CO2: Apply the different tests and techniques for identification and isolation of therapeutic important category of compounds CO3: Relate and generalize the importance of Pharmaceutical aids. CO4: Apply the knowledge of occurrence, distribution, organoleptic evaluation, chemical tests and therapeutic efficacy of various categories of drugs. CO5: Students will be able to identify the crude drugs CO6: Evaluate the Ayurvedic Preparation methods & Crude drug monograph and justify their importance in registration of drugs.
7	Course Description	This course deals with the fundamentals of crude drug, its properties and its evaluation parameters
8	Outline syllabus	

<table>
<tr><td></td><td>1</td><td>UNIT-I
A. History of Pharmacognosy: Definition, history and scope of Pharmacognosy including indigenous system of medicine. Various systems of classification of drugs and natural origin.
B. Adulteration and drug evaluation; significance of Pharmacopoeial standards.
C. Classification of drugs:
● Alphabetical
● Taxonomical
● Morphological
● Pharmacological
● Chemical
● Chemo-taxonomical</td></tr>
<tr><td></td><td>2</td><td>UNIT-II
A. Quality control of crude drugs:
Different methods of adulteration of crude drugs, Evaluation of crude drugs
B. Brief outline of occurrence, distribution, outline of isolation, identification tests, therapeutic effects and pharmaceutical application of alkaloids, terpenoids, glycosides, volatile oils, tannins and resins.</td></tr>
<tr><td></td><td>3</td><td>UNIT-III
A. A. Biological source, chemical constituents and therapeutic efficacy of the following categories of crude drugs
<table>
<tr><td>Laxatives</td><td>Aloe, Castor oil, Ispaghula, Senna</td></tr>
<tr><td>Cardiotonic</td><td>Digitalis, Arjuna</td></tr>
<tr><td>Carminatives and G.I. regulators</td><td>Coriander, Fennel, Cardamom, Ginger, Clove, Black Pepper, Asafoetida, Nutmeg, Cinnamon</td></tr>
<tr><td>Astringents</td><td>Myrobalan, Black Catechu, Pale Catechu</td></tr>
<tr><td>Drugs acting on nervous system</td><td>Hyoscyamus, Belladonna, Ephedra, Opium, Tea leaves, Coffee seeds, Coca</td></tr>
</table>
B.</td></tr>
</table>

Anti-hypertensive	Rauwolfia	
Anti-tussive	Vasaka, Tolu Balsam	
Anti-rheumatics	Colchicum seed	
Anti-tumour	Vinca, Podophyllum	
Antidiabetics	Pterocarpus, Gymnema	
Diuretics	Gokhru, Punarnava	
Anti-dysenteric	Ipecacuanha	
Antiseptics and disinfectants	Benzoin, Myrrh, Neem, Turmeric	
Antimalarials	Cinchona, Artemisia	
Oxytocic	Ergot	
Vitamins	Cod liver oil, Shark liver oil	
Enzymes	Papaya, Diastase, Pancreatin, Yeast	
Pharmaceutical Aids	Kaolin, Lanolin, Beeswax, Acacia, Tragacanth, Sodium alginate, Agar, Guar gum, Gelatine	
Miscellaneous	Squill, Galls, Ashwagandha, Tulsi, Guggul	

4

UNIT-IV

A. Plant fibres used as surgical dressings: Cotton, silk, wool and regenerated fibres

Sutures – Surgical Catgut and Ligatures

B. Basic principles involved in the traditional systems of medicine like: Ayurveda, Siddha, Unani and Homeopathy

C. Method of preparation of Ayurvedic formulations like:
Arista, Asava, Gutika, Taila, Churna, Lehya and Bhasma

D. Role of medicinal and aromatic plants in national economy and their export potential

	5	UNIT-V **A.** Herbs as health food: Brief introduction and therapeutic applications of: Nutraceuticals, Antioxidants, Pro-biotics, Pre-biotics, Dietary fibres, Omega-3-fatty acids, Spirulina, Carotenoids, Soya and Garlic **B.** Introduction to herbal formulations Herbal cosmetics: Sources, chemical constituents, commercial preparations, therapeutic and cosmetic uses of: Aloe vera gel, Almond oil, Lavender oil, Olive oil, Rosemary oil, Sandal Wood oil Phytochemical investigation of drugs	
	Mode of examination	Theory	
	Weightage Distribution	Sessional Exam	ESE
		20	80
	Text book/s*	**1.** Kokate C.K., Gokhale AS, Gokhale SB, Cultivation of Medicinal Plants, Nirali Prakashan. **2.** Kokate C.K., et al, Pharmacognosy, Nirali Prakashan, Pune. **3.** Wallis. T.E., TextBook of Pharmacognosy, J&A Churchill Ltd. London. **4.** Tyler V.E. et al, Pharmacognosy, Lea & Febiger, Philadelphia. **5.** Shah B, Seth AK. Pharmacognosy & Phytochemistry. CBS Publishers & Distributors Pvt. Ltd. **6.** Indian Pharmacopoeia.	

School:		SOP
Program:		D.Pharm
Branch:		Semester: 1
1	Course Code	ER 20-14T
2	Course Title	Human Anatomy and Physiology – Theory
3	Credits	4
4	Contact Hours (L-T-P)	3-1-0
	Course Type	Compulsory
5	Course Objective	Upon completion of this course the student should be able to **1.** Identify different types of cells and organelles describe their functions. **2.** Identify the three types of muscle and describe the muscular system's functions. **3.** Identify the major components of the nervous system and describe their functions. **4.** Identify the major components of the endocrine system and describe their functions. **5.** Identify the major components of the circulatory system and describe their functions.
6	Course Outcomes	CO1: Define and differentiate the scope and terminology used in anatomy and physiology. CO2: Classify and analyze the various structural levels of the human body, including cells, tissues, and organs. Describe the structure, composition, and functions of the plasma membrane. CO3: Apply knowledge of homeostatic mechanisms to explain how the human body maintains internal stability under various conditions. CO4: Evaluate the anatomy and physiology of the lymphatic, urinary, cardiovascular, arterial, and venous systems. Analyze common cardiovascular disorders and the pathophysiology of renal diseases. CO5: Describe and illustrate the anatomy and physiology of the digestive, reproductive, skeletal, urinary, respiratory, sensory, endocrine, and nervous systems. CO6: Recall the anatomy of skeletal, cardiac, and smooth muscle tissues. Explain the process of neurotransmission at the neuromuscular junction. Identify and describe various types of joints and their functions, as well as common joint disorders.
7	Course Description	This course is designed to impart a fundamental knowledge on the cell, tissues, and anatomy of the different systems of the human body
8	Outline syllabus	

	1	UNIT-I Scope of Anatomy and physiology Scope of Anatomy and physiology. Definition of various terms used in Anatomy. Structure of cell, function of its components with special reference to mitochondria and microsomes. Elementary tissues: Elementary tissues of the body, i.e. epithelial tissue, muscular tissue, connective tissue and nervous tissue. Skeletal System (Osseous System): Structure and function of Skeleton. Classification of joints and their function. Joint disorders.
	2	UNIT-II **A.** Haemopoietic System Composition of blood, functions of blood elements. Blood group and coagulation of blood. Brief information regarding disorders of blood. Arterial and venous system with special reference to the names and positions of main arteries and veins. Blood pressure and its recording. Brief information about cardiovascular disorders. **B.** Lymphatic system Lymph and lymphatic system, composition, function and its formation, Structure and functions of spleen and lymph node. **C.** Cardiovascular system ● Anatomy and Physiology of heart ● Blood vessels and circulation (Pulmonary, coronary and systemic circulation) ● Cardiac cycle and Heart sounds, Basics of ECG ● Blood pressure and its regulation
	3	UNIT-III **A.** Respiratory system Various parts of the respiratory system and their functions, physiology of respiration. **B.** Digestive System ● Anatomy and Physiology of the GIT ● Anatomy and functions of accessory glands ● Physiology of digestion and absorption **C.** Skeletal muscles ● Histology ● Physiology of muscle contraction ● Disorder of skeletal muscles

	4	UNIT-IV **A.** Urinary System Various parts of the urinary system and their functions, structure and functions of the kidney. Physiology of urine formation. Patho-physiology of renal diseases and edema, Renin - angiotensin system, Clearance tests and micturition **B.** Reproductive system ● Anatomy of male and female reproductive system ● Physiology of menstruation ● Spermatogenesis and Oogenesis ● Pregnancy and parturition	
	5	UNIT-V A. Nervous system ● Classification of nervous system ● Anatomy and physiology of cerebrum, cerebellum, midbrain ● Function of hypothalamus, medulla oblongata and basal ganglia ● Spinal cord-structure and reflexes ● Names and functions of cranial nerves. ● Anatomy and physiology of sympathetic and parasympathetic nervous system (ANS) **B.** Sense organs – Anatomy, physiology and Elementary knowledge of ● Eye ● Ear ● Skin ● Tongue ● Nose **C.** Endocrine system (Hormones and their functions) ● Pituitary gland ● Adrenal gland ● Thyroid and parathyroid gland ● Pancreas and gonads	
	Mode of examination	Theory	
	Weightage Distribution	Sessional Exam	ESE
		20	80

	Text book/s*	**1.** Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co, Riverview, MI USA.T **2.** Textbook of Medical Physiology- Arthur C, Guyton and John. E. Hall. Miamisburg, OH, U.S.A. **3.** Human Physiology (vol 1 and 2) by Dr. C.C. Chatterrje, Academic Publishers Kolkata. **4.** Difore S.H. "Atlas of Normal Histology" – Lea & Febiger Philadelphia.
	Other References	

School:		SOP
Program:		D.Pharm
Branch:		Semester: 1
1	Course Code	ER 20-15T
2	Course Title	Social Pharmacy -Theory
3	Credits	4
4	Contact Hours (L-T-P)	3-1-0
	Course Type	Compulsory
5	Course Objective	Upon completion of this course the student should be able to 1. Understand the concept of health and nutrition 2. Demonstrate and understand environmental health sciences. 3. Understand general roles and responsibilities of pharmacists in public health 4. Understand signs and Symptoms, causative organism, mode of transmission, pathogenesis of communicable and non – communicable diseases 5. Understand health education and health promotion programme
6	Course Outcomes	CO1 Analyze the concept of health and nutrition for the prevention and control of diseases as well as they will analyze the concept of family planning CO2 Apply the knowledge of first aid to come over the emergencies situation as well as they will also apply the knowledge of environmental CO3 Understand the fundamental principle of microbiology and causative agents, mode of transmission and prevention of communicable diseases. CO4 Apply the concept to prevent and control of Intestinal infection, arthropod borne infections, surface infection and sexually transmitted diseases CO5 Apply knowledge of causative agents, prevention, care and control of communicable and infectious diseases. CO6 Apply knowledge of causative agents, prevention, care and control of communicable and infectious diseases of modern era
7	Course Description	This subject deals with the study of health and nutrition and roles and responsibilities of hospital pharmacists.
8	Outline syllabus	

	1	UNIT-I A. Introduction to Social Pharmacy ● Definition and Scope. Social Pharmacy as a discipline and its scope in improving public health. Role of Pharmacists in Public Health. ● Concept of Health -WHO Definition, various dimensions, determinants, and health indicators. National Health Policy – Indian perspective ● Public and Private Health System in India, National Health Mission ● Introduction to Millennium Development Goals, Sustainable Development Goals, FIP Development Goals
	2	UNIT-II A. Preventive healthcare – Role of Pharmacists in the following ● Demography and Family Planning ● Mother and child health, importance of breastfeeding, ill effects of infant milk substitutes and bottle feeding B. Vaccines: Overview of Vaccines, types of immunity and immunization Effect of Environment on Health – Water pollution, importance of safe drinking water, waterborne diseases, air pollution, noise pollution, sewage and solid waste disposal, occupational illnesses, Environmental pollution due to pharmaceuticals C. Psychosocial Pharmacy: Drugs of misuse and abuse – psychotropics, narcotics, alcohol, tobacco products. Social Impact of these habits on social health and productivity and suicidal behaviours
	3	UNIT-III A. Nutrition and Health ● Basics of nutrition – Macronutrients and Micronutrients (3) ● Importance of water and fibres in diet (1) Balanced diet, Malnutrition, nutrition deficiency diseases, ill effects of junk foods, calorific and nutritive values of various foods, fortification of food (3) Introduction to food safety, adulteration of foods, effects of artificial ripening, use of pesticides, genetically modified foods (1) Dietary supplements, nutraceuticals, food supplements– indications, benefits, Drug-Food Interactions

	4	UNIT-IV A. Introduction to Microbiology and common microorganisms B. Epidemiology: Introduction to epidemiology, and its applications. Understanding of terms such as epidemic, pandemic, endemic, mode of transmission, outbreak, quarantine, isolation, incubation period, contact tracing, morbidity, mortality, C. Causative agents, epidemiology and clinical presentations and Role of Pharmacists in educating the public in prevention of the following communicable diseases: D. Respiratory infections – chickenpox, measles, rubella, mumps, influenza (including Avian-Flu, H1N1, SARS, MERS, COVID-19), diphtheria, whooping cough, meningococcal meningitis, acute respiratory infections, tuberculosis, Ebola E. Intestinal infections – poliomyelitis, viral hepatitis, cholera, acute diarrheal diseases, typhoid, amebiasis, worm infestations, food poisoning ● Arthropod-borne infections - dengue, malaria, filariasis and, chikungunya (4) ● Surface infections – trachoma, tetanus, leprosy (2) ● STDs, HIV/AIDS (3)
	5	UNIT-V **A.** Introduction to health systems and all ongoing National Health programs in India, their objectives, functioning, outcome, and the role of pharmacists **B.** Pharmacoeconomics – Introduction, basic terminologies, **C.** Importance of pharmacoeconomics
	Mode of examination	Theory
	Weightage Distribution	Sessional Exam: 20 / ESE: 80
	Text book/s*	**1.** S Khurana, P Suresh and R Kalsi. Health Education & Community Pharmacy. S Vikas & Co **2.** Social Pharmacy: Tayler, Geoffrey. Pharmaceutical Press. London. **3.** Textbook by Dandiya PC, Zafer ZYK, Zafer A. Health education & Community Pharmacy. Vallabh Prakashan. **4.** Websites of Ministry of Health and Family Welfare, National Health Portal **5.** Pharmacists at the Frontlines: A Novel Approach at Combating TB www.ipapharma.org Visit Publications **6.** Where There Is No Doctor: A Village Health Care Handbook by David Werner, 2015 updated version

School:		SOP
Program:		D.Pharm
Branch:		Semester: 1
1	Course Code	ER20-11P
2	Course Title	Pharmaceutics –Practical
3	Credits	2
4	Contact Hours (L-T-P)	0-0-4
	Course Type	Compulsory
5	Course Objective	**1.** To understand how to Calculation of working formula from the official master formula **2.** To understand how to formulate dosage forms based on working formula **3.** To understand appropriate Packaging and labelling requirements **4.** To understand different methods of basic quality control tests
6	Course Outcomes	CO1: Understand how to Calculate the working formula from the given master formula CO2: Formulate the dosage form and dispense in an appropriate container CO3: Design the label with the necessary product and patient information CO4: Perform the basic quality control tests for the common dosage forms CO5: Understand the knowledge of different dosage forms CO6: Understand and know properties of formulation of different dosage forms
7	Course Description	Practical knowledge is complementary to the theoretical discussions in pharmaceutics. Practicals allow the verification of his course is designed to train the students in formulating and dispensing common pharmaceutical dosage forms.
8	Outline syllabus	
	1	UNIT-I ● Handling and referring the official references: ● Pharmacopoeias, ● Formularies, etc. for retrieving formulas, procedures, etc.
	2	UNIT-II ● To perform the sterilization by dry heat method ● To perform sterilization by moist heat ● To evaluate the packaging materials and containers ● To perform the simple distillation ● To perform the aseptic transfer of microbiological samples in laminar flow bench

	3	UNIT-III ● Perform the basic quality control tests for the common dosage forms ● size reduction of a given sample by ball mill. ● size separation of given sample by sieving method ● separation of two miscible liquids by simple distillation. ● operation of manual capsule filling machine ● effect of concentration on the rate of filtration ● effect of filter media on the rate of filtration ● mixing of given powder by double cone blender ● separation of two miscible liquids by simple distillation. ● sterilization by dry heat method and moist heat	
	4	UNIT-IV ● Formulation of the following dosage forms as per monograph standards and dispensing with appropriate packaging and labeling ● Calcium carbonate granules by wet granulation technique. ● Granules of calcium carbonate for flow properties. ● To study the effect of additives on the flow properties of calcium carbonate granules. ● Calcium carbonate tablets. ● Sodium chloride tablets by direct compression technique ● To perform the sterilization by dry heat method ● To perform sterilization by moist heat ● To evaluate the packaging materials and containers ● To perform the aseptic transfer of microbiological samples in laminar flow bench	
	5	UNIT-V Formulation of at least five commonly used cosmetic preparations – ● cold ● cream ● shampoo ● lotion ● toothpaste	
	Mode of examination	Practical/Viva	
	Weightage Distribution	Sessional Exam	ESE
		20	80
	Text book/s*	1. Lachman L, Liberman H.A and Kanig J.L., “Theory and Practice of Industrial Pharmacy”, Lea and Febiger 2. Remington – “The science and practice of pharmacy” Vol. I & II. Mack Publishing Co., Pennsylvania 3. Pharmacopoeia of India, the Controller of Publications, Delhi	

	Other References	Physiological basis of Medical Practice Best and Tailor. Williams&Wilkins Co, River view, MI USA

School:		SOP
Program:		D. Pharm
Branch:		1st Year
1	Course Code	ER20-12P
2	Course Title	Pharmaceutical Chemistry – Practical
3	Credits	2
4	Contact Hours (L-T-P)	0-0-3
	Course Type	Compulsory
5	Course Objective	This course will provide the hands-on experience on the following aspects of chemical substances used as drugs and pharmaceuticals 1. Limit tests and assays of selected chemical substances as per the monograph 2. Volumetric analysis of the chemical substances 3. Basics of preparatory chemistry and their analysis 4. Systematic qualitative analysis for the identification of the chemical drugs
6	Course Outcomes	Upon successful completion of this course, the students will be able to **1.** Perform the limit tests for various inorganic elements and report **2.** Prepare standard solutions using the principles of volumetric analysis **3.** Test the purity of the selected inorganic and organic compounds against the monograph standards **4.** Synthesize the selected chemical substances as per the standard synthetic scheme **5.** Perform qualitative tests to systematically identify the unknown chemical substances **6.** Identification tests for Anions and Cations as per Indian Pharmacopoeia.
7	Course Description	This course is designed to impart basic training and hands-on experiences to synthesis chemical substances used as drugs and pharmaceuticals. Also, to perform the quality control tests, impurity testing, test for purity and systematic qualitative analysis of chemical substances used as drugs and pharmaceuticals.
8	Outline syllabus	
	1	UNIT-I Limit test for **a.** Chlorides **b.** Sulphate **c.** Iron **d.** Heavy metals

	2	UNIT-II a. Identification tests for Anions and Cations as per Indian Pharmacopoeia. b. Fundamentals of preparative organic chemistry Determination of Melting point and boiling point of organic compounds	
	3	UNIT-III a. Fundamentals of Volumetric analysis Preparation of standard solution and standardization of Sodium Hydroxide, Potassium Permanganate b. Assay of the following compounds ● Ferrous sulphate- by redox titration ● Calcium gluconate-by complexometric ● Sodium chloride-by Modified Volhard's method ● Ascorbic acid by iodometry ● Ibuprofen by alkalimetry	
	4	UNIT-IV a. Preparation of organic compounds ● Benzoic acid from Benzamide ● Picric acid from Phenol b. Identification and test for purity of pharmaceuticals ● Aspirin, ● Caffeine, ● Paracetamol, ● Sulfanilamide	
	5	UNIT-V Systematic Qualitative analysis experiments (4 substances)	
	Mode of examination	Theory/Jury/Practical/Viva	
	Weightage Distribution	Sessional Exam	ESE
		20	80
	Text book/s*	● Practical Organic Chemistry by Mann and Saunders. ● Practical Pharmaceutical Chemistry, Volume- I & II by Beckett and J. B. Stenlake ● Indian Pharmacopoeia	

School:		SOP
Program:		D.Pharm
Branch:		Semester: 1
1	Course Code	ER 20-13P
2	Course Title	Pharmacognosy – Practical
3	Credits	2
4	Contact Hours (L-T-P)	0-0-4
	Course Type	Compulsory
5	Course Objective	Upon completion of the course, the student shall be able to -Know the classification and salient features of five kingdoms of life -Understand the basic components of anatomy & physiology of plant -Know understand the basic components of anatomy & physiology animal with special reference to human
6	Course Outcomes	CO1: Demonstrate and interpret the different indigenous system of medicines, related drugs and also able to analyze the adulteration and quality control parameters as per Pharmacopoeia standards CO2: Apply the different tests and techniques for identification and isolation of therapeutic important category of compounds CO3: Relate and generalize the importance of pharmaceutical aids. CO4: Apply the knowledge of occurrence, distribution, organoleptic evaluation, chemical tests and therapeutic efficacy of various categories of drugs. CO5: Students will be able to identify the crude drugs CO6: Evaluate the Ayurvedic Preparation methods & Crude drug monograph and justify their importance in registration of drugs.
7	Course Description	Deals with the fundamentals of analytical chemistry and principles of electrochemical analysis of drugs
8	Outline syllabus	

	1	1. UNIT-I ● 1. Morphological Identification of the following drugs: ● Ispaghula, Senna, Coriander, Fennel, Cardamom, Ginger, Nutmeg, Black Pepper, ● Cinnamon, Clove, Ephedra, Rauwolfia, Gokhru, Punarnava, Cinchona, Agar, ● Garlic, Aloe, Lemon peel, Bitter orange ● peel, Coriander and Fennel,Caraway, Black Pepper, Liquorice, potato, rice starch. ● To study the compound microscope. ● To determine the Stomatal number of the given samples. ● To determine the Stomatal Index of the given samples. ● To determine the Palisade ratio in the given samples. ● To determine the Vein-islet number in the given samples. ● To determine the vein termination number in the given samples.
	2	● Physical and chemical tests for evaluation of any FIVE of the following drugs: ● Asafoetida, Benzoin, Pale catechu, Black catechu, Castor oil, Acacia, Tragacanth, ● Agar, Guar gum, Gelatine,Tannins.Saponins, Glycosides ● Gross anatomical studies (Transverse Section) of the following drugs: ● Ajwain, Datura, Cinnamon, Cinchona, Coriander, Ashwagandha, Liquorice, Clove, ● Curcuma, Nux vomica, Vasaka

	3	● To study the microscopy, powder microscopy, transverse section: ● Nux-vomica seed. ● Senna leaf. ● Fennel ● Caraway ● Clove ● Zinger ● Cinnamon ● To perform Thin Layer Chromatography and to determine the Rf value of the given sample. ● chemical test of : Glycosides, Alkaloids		
	4	● UNIT IV ● Study of fibres: ● Cotton ● wool ● To determine the swelling factor of the given samples.		
	5	● To perform Thin Layer Chromatography and to determine the Rf value of the given sample ● Determination of Loss on drying of the given samples		
	Mode of examination	Theory/Jury/Practical/Viva		
	Weightage Distribution		Sessional Exam	ESE
			20	80
	Text book/s*	**1.** Practical Kokate C.K., Gokhale AS, Gokhale SB, Cultivation of Medicinal Plants, Nirali Prakashan. **2.** Kokate C.K., et al, Practical Pharmacognosy, Nirali Prakashan, Pune.		

School:		SOP
Program:		D. Pharm
Branch:		1st Year
1	Course Code	ER20-14P
2	Course Title	Human Anatomy and Physiology – Practical
3	Credits	3
4	Contact Hours (L-T-P)	0-0-3
	Course Type	Compulsory
5	Course Objective	This course will provide hands-on experience in the following: 1. General blood collection techniques and carrying out various haematological assessments and interpreting the results 2. Recording and monitoring the vital physiological parameters in human subjects and the basic interpretations of the results 3. Microscopic examinations of the various tissues permanently mounted in glass slides 4. Discuss the anatomical and physiological characteristics of various organ systems of the body using models, charts, and other teaching aids
6	Course Outcomes	Upon successful completion of this course, the students will be able to CO1: Student will be able to Understand how to handle the microscope in Human Anatomy & Physiology lab CO2: Describe the anatomical features of the important human tissues under the microscopical conditions CO3: Perform the haematological tests in human subjects and interpret the results CO4: Record, monitor and document the vital physiological parameters of human subjects and interpret the results CO:5 Student will be able to skeletal bones of Human skeleton CO6: Discuss the significance of various anatomical and physiological characteristics of the human body
7	Course Description	This course is designed to train the students and instill the skills for carrying out basic physiological monitoring of various systems and functions..
8	Outline syllabus	
	1	UNIT-I **a.** Study of compound microscope **b.** Microscopic examination of Epithelial tissue, Cardiac muscle, Smooth muscle, Skeletal muscle, Connective tissue, and Nervous tissue of ready / pre-prepared slides.

	2	UNIT-II a. General techniques for the collection of blood b. Determination of ● Blood group ● ESR ● Haemoglobin content of blood ● Bleeding time and Clotting time c. Determination of WBC count of blood d. Determination of RBC count of blood e. Determination of Differential count of blood	
	3	UNIT-III **a.** Recording of Blood Pressure in various postures, different arms, before and after exertion and interpreting the results **b.** Recording of Body temperature (using mercury, digital and IR thermometers at various locations), Pulse rate/ Heart rate (at various locations in the body, before and after exertion), Respiratory Rate **c.** Recording Pulse Oxygen (before and after exertion) **d.** Recording force of air expelled using Peak Flow Meter **e.** Measurement of height, weight, and BMI	
	4	UNIT-IV **a.** Study of Human Skeleton-Axial skeleton and appendicular skeleton	
	5	UNIT-V Study of various systems and organs with the help of chart, models, and specimens ● Cardiovascular system ● Respiratory system ● Digestive system ● Urinary system ● Endocrine system ● Reproductive system ● Nervous system ● Eye ● Ear ● Skin	
	Mode of examination	Theory/Jury/Practical/Viva	
	Weightage Distribution	Sessional Exam	ESE
		20	80
	Text book/s*	● S.R. Kale and R.R. Kale, Textbook of Practical Anatomy and Physiology ● Ranade V.G. Text Book of Practical Physiology ● Goyal R.K., Natvar M.P. and Shah S.A., Practical Anatomy, Physiology and Biochemistry, Experimental Physiology	

School:		SOP
Program:		D. Pharm
Branch:		1st Year
1	Course Code	ER20-15P
2	Course Title	Social Pharmacy – Practical
3	Credits	2
4	Contact Hours (L-T-P)	0-0-4
	Course Type	Compulsory
5	Course Objective	This course will train the students on various roles of pharmacists in public health and social pharmacy activities in the following areas: **1.** National immunization programs **2.** Reproductive and child health programs **3.** Food and nutrition related health programs **4.** Health education and promotion **5.** General roles and responsibilities of the pharmacists in public health **6.** First Aid for various emergency conditions including basic life support and cardiopulmonary resuscitation
6	Course Outcomes	Upon successful completion of this course, the students will be able to CO1: Demonstrate proficiency in public health interventions CO2: Promote community health and hygiene practices CO3: Provide effective first aid and emergency care CO4: Contribute to disaster management and public health communication CO5: Implement water purification and nutrition counseling strategies CO6: Promote community health through education and awareness
7	Course Description	This course is designed to provide simulated experience in various public health and social pharmacy activities.
8	Outline syllabus	
	1	UNIT-I **a.** National immunization schedule for children, adult vaccine schedule, Vaccines which are not included in the National Immunization Program. **b.** RCH – reproductive and child health – nutritional aspects, relevant national health programmes. **c.** Family planning devices
	2	UNIT-II **a.** Microscopical observation of different microbes (readymade slides) **b.** Oral Health and Hygiene **c.** Personal hygiene and etiquettes – hand washing techniques, Cough, and sneeze etiquettes. **d.** Various types of masks, PPE gear, wearing/using them, and disposal. **e.** Menstrual hygiene, products used

	3	UNIT-III **a.** First Aid – Theory, basics, demonstration, hands on training, audio-visuals, and practice, BSL (Basic Life Support) Systems [SCA - Sudden Cardiac Arrest, FBAO - Foreign Body Airway Obstruction, CPR, Defibrillation (using AED) (Includes CPR techniques, First Responder). **b.** Emergency treatment for all medical emergency cases viz. snake bite, dog bite, insecticide poisoning, fractures, burns, epilepsy etc.	
	4	UNIT-IV **a.** Role of Pharmacist in Disaster Management. **b.** Marketed preparations of disinfectants, antiseptics, fumigating agents, antilarval agents, mosquito repellents, etc **c.** Health Communication: Audio / Video podcasts, Images, PowerPoint Slides, Short Films, etc. in regional language(s) for mass communication / education / Awareness on 5 different communicable diseases, their signs and symptoms, and prevention.	
	5	UNIT-V **a.** Water purification techniques, use of water testing kit, calculation of Content/percentage of KMnO4, bleaching powder to be used for wells/tanks **b.** Counseling children on junk foods, balanced diets – using Information, Education and Communication (IEC), counselling, etc. (Simulation Experiments). **c.** Preparation of various charts on nutrition, sources of various nutrients from Locally available foods, calculation of caloric needs of different groups (e.g. child, mother, sedentary lifestyle, etc.). Chart of glycemic index of foods. **d.** Tobacco cessation, counselling, identifying various tobacco containing products through charts/pictures	
	Mode of examination	Theory/Jury/Practical/Viva	
	Weightage Distribution	Sessional Exam	ESE
		20	80
	Text book/s*	● Textbook by Dandiya PC, Zafer ZYK, Zafer A. Health education & Community Pharmacy. Vallabh Prakashan ● Websites of Ministry of Health and Family Welfare, National Health Portal ● Pharmacists at the Frontlines: A Novel Approach at Combating TB www.ipapharma.org Visit Publications ● Where There Is No Doctor: A Village Health Care Handbook by David Werner ,2015 updated version ● Various WHO publications www.who.int	

School:		SOP
Programme:		D. Pharm
Branch:		II-Year
1	Course Code	ER20-21T
2	Course Title	Pharmacology – Theory
3	Credits	4
4	Contact Hours (L-T-P)	3-1-0
	Course Type	Compulsory
5	Course Objective	Upon completion of this course the student should be able to 1. Understand the mechanism of drug action and its relevance in the treatment of different diseases 2. Demonstrate isolation of different organs/tissues from the laboratory animals by simulated experiments 3. Demonstrate the various receptor actions using isolated tissue preparation 4. Appreciate correlation of pharmacology with related medical sciences
6	Course Outcomes	CO1: Students will be able to understand the pharmacological actions of different categories of drugs. CO2: Students will be able to explain the mechanism of drug action at organ system/sub cellular/macromolecular levels. CO3: Students will be able to apply the basic pharmacological knowledge in the prevention and treatment of various diseases. CO4: Students will be able to illustrate the effect of drugs on animals by simulated experiments. CO5: Students will be able to apply the correlation of pharmacology with other biomedical Sciences. CO5: Students will able to evaluate the mechanisms and action of drugs under CNS CO6: Students will be able to evaluate the mechanisms and action of drugs.
7	Course Description	This subject is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms. The subject provides the basic knowledge required to understand the various disciplines of pharmacy.
8	Outline syllabus	

	1	UNIT-I General Pharmacology ● Introduction and scope of Pharmacology, Various routes of drug administration - advantages and disadvantages ● Drug absorption - definition, types, factors affecting drug absorption, Bioavailability and the factors affecting bioavailability ● Drug distribution - definition, factors affecting drug distribution ● Biotransformation of drugs - Definition, types of biotransformation reactions, factors influencing drug metabolisms ● Excretion of drugs - Definition, routes of drug excretion ● General mechanisms of drug action and factors modifying drug action
	2	UNIT-II Drugs Acting on the Peripheral Nervous System Steps involved in neurohumoral transmission Definition, classification, pharmacological actions, dose, indications, and contraindications of ● Cholinergic drugs ● Anti- Cholinergic drugs ● Adrenergic drugs ● Anti-adrenergic drugs Drugs Acting on the Eye Definition, classification, pharmacological actions, dose, indications and contraindications of ● Miotics ● Mydriatics ● Drugs used in Glaucoma Drugs Acting on the Kidney Definition, classification, pharmacological actions, dose, indications, and contraindications of ● Diuretics ● Anti-Diuretics

	3	UNIT-III . Drugs Acting on the Central Nervous System Definition, classification, pharmacological actions, dose, indications, and contraindications of ● General anaesthetics ● Hypnotics and sedatives ● Anti-Convulsant drugs ● Anti-anxiety drugs ● Anti-depressant drugs ● Anti-psychotics ● Nootropic agents ● Centrally acting muscle relaxants Drugs Acting on the Cardiovascular System Definition, classification, pharmacological actions, dose, indications, and contraindications of ● Anti-hypertensive drugs ● Anti-anginal drugs ● Anti-arrhythmic drugs Lymphatic organs and tissues, lymphatic vessels, lymph circulation and Drugs Acting on Blood and Blood Forming Organs Definition, classification, pharmacological actions, dose,indications, and contraindications of ● Hematinic agents ● Anti-coagulants ● Anti-platelet agents

	4	UNIT-IV Drugs Acting on Blood and Blood Forming Organs Definition, classification, pharmacological actions, dose, indications, and contraindications of ● Hematinic agents ● Anti-coagulants ● Anti-platelet agents ● Thrombolytic drugs Classification of peripheral nervous system: Structure and functions of sympathetic and parasympathetic nervous system. Hormones and Hormone Antagonists Physiological and pathological role and clinical uses of ● Thyroid hormones ● Anti-thyroid drugs ● Parathormone ● Calcitonin ● Vitamin D ● Insulin ● Oral hypoglycemic agents ● Estrogen ● Progesterone ● Oxytocin ● Corticosteroids. Drugs Acting on the Gastro Intestinal Tract Definition, classification, pharmacological actions, dose, indications, and contraindications of ● Anti-ulcer drugs ● Anti-emetics ● Laxatives and purgatives ● Anti-diarrheal drugs.

<table>
<tr><td></td><td>5</td><td colspan="3">UNIT-V
Chemotherapeutic Agents:
Introduction, basic principles of chemotherapy of infections, infestations and neoplastic diseases, Classification, dose, indication and contraindications of drugs belonging to following classes:
● Penicillins
● Cephalosporins
● Aminoglycosides
● Fluoroquinolones
● Macrolides
● Tetracyclines
● Sulphonamides
● Anti-tubercular drugs
● Anti-fungal drugs
● Anti-viral drugs
● Anti-amoebic agents
● Anthelmintics
● Anti-malarial agents
Autocoids
Physiological role of Histamine, 5 HT and Prostaglandins
Classification, clinical uses, and adverse effects of antihistamines and 5 HT antagonists.
Definition, classification, pharmacological actions, dose, indications, and contraindications of
● Bronchodilators
● Expectorants
● Anti-tussive agents
● Mucolytic agents</td></tr>
<tr><td></td><td>Mode of examination</td><td colspan="3">Theory</td></tr>
<tr><td></td><td rowspan="2">Weightage Distribution</td><td>Continuous Mode Assessment</td><td>Sessional Exam</td><td>ESE</td></tr>
<tr><td></td><td>00 Marks</td><td>20</td><td>80</td></tr>
<tr><td></td><td>Text book/s*</td><td colspan="3">1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brother’s medical publishers, New Delhi.
2. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York
3. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co,Riverview,MI USA
4. Text book of Medical Physiology- Arthur C,Guyton andJohn.E. Hall. Miamisburg, OH, U.S.A.
5. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.</td></tr>
</table>

	Other References	

School:		SOP
Programme:		D.Pharm
Branch:		Year-2
1	Course Code	ER20-22T
2	Course Title	Community Pharmacy & Management – Theory
3	Credits	4
4	Contact Hours (L-T-P)	3-1-0
	Course Type	Compulsory
5	Course Objective	Upon completion of this course the student should be able to **1.** Establishing and running a community pharmacy and its legal requirements **2.** Professional aspects of handling and filling prescriptions **3.** Patient counselling on diseases, prescription and or non-prescription medicines **4.** Scope for performing basic health screening in community pharmacy settings
6	Course Outcomes	CO1: Recall the key concepts related to Trade, Industry, and Commerce. CO2: Understand the significance of purchasing, tenders, and contracts in business operations. CO3: Apply techniques for effective Inventory management. CO4: Analyze the role of Sales promotion, market research, and advertising in business strategy. CO5: Explain Accounting concepts including double entry bookkeeping, accounts, cash book, and budgeting. CO6: Apply modern techniques of double entry bookkeeping, accounts, cash book, and budgeting in practical scenarios.
7	Course Description	This course deals with the fundamentals of analytical chemistry and principles of electrochemical analysis of drug
8	Outline syllabus	
	1	UNIT-I Community Pharmacy Practice – Definition, history and development of community pharmacy - International and Indian Scenarios Professional responsibilities of community pharmacists Introduction to the concept of Good Pharmacy Practice and SOPs.

	2	UNIT-II Communication skills • Definition, types of communication skills • Interactions with professionals and patients • Verbal communication skills (one-to-one, over the telephone) • Written communication skills • Body language • Patient interview techniques. Prescription and prescription handling Definition, parts of prescriptions, legality of prescriptions, prescription handling, labelling of dispensed medications (Main label, ancillary label, pictograms), brief instructions on medication usage Dispensing process, Good Dispensing Practices, Dispensing process, Good Dispensing Practices,
	3	UNIT-III Patient counselling • Definition and benefits of patient counselling • Stages of patient counselling - Introduction, counselling content, counselling process, and closing the counselling session • Barriers to effective counseling - Types and strategies to overcome the barriers • Patient counseling points for chronic diseases/disorders - Hypertension, Diabetes, Asthma, Tuberculosis, Chronic obstructive pulmonary disease, and AIDS • Patient Package Inserts - Definition, importance and benefits, Scenarios of PPI use in India and other countries • Patient Information leaflets - Definition and uses • Medication Adherence Definition, factors influencing non- adherence, strategies to overcome non-adherence • Health Screening Services in Community Pharmacy Introduction, scope, and importance of various health screening services - for routine monitoring of patients, early detection, and referral of undiagnosed cases

	4	UNIT-IV Over The Counter (OTC) Medications • Definition, need and role of Pharmacists in OTC medication dispensing • OTC medications in India, counseling for OTC products • Self-medication and role of pharmacists in promoting the safe practices during self-medication Responding to symptoms, minor ailments, and advice for self-care in conditions such as - Pain management, Cough, Cold, Diarrhea, Constipation, Vomiting, Fever, Sore throat, Skin disorders, Oral health (mouth ulcers, dental pain, gum swelling)		
	5	UNIT-V Community Pharmacy Management Legal requirements to set up a community pharmacy • Site selection requirements • Pharmacy designs and interiors • Vendor selection and ordering • Procurement, inventory control methods, and inventory management • Financial planning and management • Accountancy in community pharmacy – Day book, Cash book • Introduction to pharmacy operation softwares – usefulness and availability • Customer Relation Management (CRM) • Audits in Pharmacies • SOP of Pharmacy Management • Introduction to Digital Health, mHealth and Online pharmacies.		
	Mode of examination	Theory		
	Weightage Distribution	Continuous Mode Assessment	Sessional Exam	ESE
		00 Marks	20	80

	Text book/s*	**1.** A.H. Beckett & J.B. Stenlake's, Practical Health Education and Community Pharmacy by N.S. Parmar. **2.** WHO consultative group report. **3.** Drug store and Business management by Mohammed Ali and Jyoti. **4.** Handbook of pharmacy – health care. Edt. Robin J Harman. The Pharmaceutical Press **5.** Comprehensive Pharmacy Review – Edt. Leon Shargel. Lippincott Williams and Wilkins. **6.** Good Pharmacy Practices Training Manual by IPA/CDSCO/WHO India **7.** Training Module for Community Pharmacists in TB Care and Control/ by MoH/IPA **8.** Hand Book of PharmaSoS, Drugs in Special population- Pregnancy and Lactation, Tobacco free future- Choice is yours: KSPC Publications. **9.** Responsible Use of Medicines: A Layman's Handbook, www.ipapharma.org /publications **10.** Community Pharmacy Practice around the Globe: Part One: www.ipapharma.org /publications

School:		SOP
Programme:		D.Pharm
Branch:		IInd year
1	Course Code	ER20-23T
2	Course Title	Biochemistry & Clinical Pathology
3	Credits	4
4	Contact Hours (L-T-P)	3-1-0
	Course Type	Compulsory
5	Course Objective	This course will discuss the following at the fundamental level 1. Structure and functions of biomolecules 2. Catalytic activity, diagnostic and therapeutic importance of enzymes 3. Metabolic pathways of biomolecules in health and illness (metabolic disorders) 4. Biochemical principles of organ function tests and their clinical significance 5. Qualitative and quantitative determination of biomolecules / metabolites in the biological sample 6. Clinical pathology of blood and urine
6	Course Outcomes	Upon successful completion of this course, the students will be able to CO1:-Discuss & Understand Chemistry & Role of carbohydrate Biological value & deficiency diseases related to it. CO2:- Discuss & Understand chemistry & role of Proteins, Polypeptides & amino acids & Lipids, along with its normal & abnormal metabolism with respect to Classification, qualitative tests, with respect to classification qualitative tests, Biological value & deficiency diseases related to it. CO3:- Classify the different vitamins and depict the biochemical reactions/role they are involved in and deficiency diseases related to it. Describe enzymatic action with respect to different graphs, structures of intermediates, along with the cofactors, therapeutic & Pharmaceutical Importance. CO4:- Understand & CO5:- Discuss Physiopathology of blood & Urine & its implications. CO6:- Understand & Explain role of minerals & water in Life Processes.\
7	Course Description	This course is designed to impart a fundamental knowledge on the preparatory pharmacy with arts and science of preparing the different conventional dosage forms.
8	Outline syllabus	
	1	UNIT-I Historical background and Introduction to biochemistry: Scope of biochemistry in pharmacy; Cell and its biochemical organization. Carbohydrates Definition, classification with examples, chemical properties Monosaccharides - Structure of glucose, fructose, and galactose Disaccharides - structure of maltose, lactose, and sucrose Polysaccharides - chemical nature of starch and glycogen Qualitative tests and biological role of carbohydrates

	2	UNIT-II Proteins Definition, classification of proteins based on composition and solubility with examples Definition, classification of amino acids based on chemical nature and nutritional requirements with examples Structure of proteins (four levels of organization of protein structure) Qualitative tests and biological role of proteins and amino acids Diseases related to malnutrition of proteins. Lipids Definition, classification with examples Structure and properties of triglycerides (oils and fats) Fatty acid classification - Based on chemical and nutritional requirements with examples Structure and functions of cholesterol in the body Lipoproteins - types, composition and functions in the body Qualitative tests and functions of lipids Nucleic acids Definition, purine and pyrimidine bases Components of nucleosides and nucleotides with examples Structure of DNA (Watson and Crick model), RNA and their functions
	3	UNIT-III Enzymes Definition, properties and IUB and MB classification Factors affecting enzyme activity Mechanism of action of enzymes, Enzyme inhibitors Therapeutic and pharmaceutical importance of enzymes Vitamins Definition and classification with examples Sources, chemical nature, functions, coenzyme form, recommended dietary requirements, deficiency diseases of fat-and water-soluble vitamins Minerals: Types, Functions, Deficiency diseases, recommended dietary requirements Water and Electrolytes Distribution, functions of water in the body Water turnover and balance Electrolyte composition of the body fluids, Dietary intake of electrolyte and Electrolyte balance Dehydration, causes of dehydration and oral rehydration therapy
	4	UNIT-IV Metabolism (Study of cycle/pathways without chemical structures) Metabolism of Carbohydrates: Glycolysis, TCA cycle and glycogen metabolism, regulation of blood glucose. Diseases related to abnormal metabolism of Carbohydrates Metabolism of lipids: Lipolysis, β-oxidation of Fatty acid (Palmitic acid) ketogenesis and ketolysis. Diseases related to abnormal metabolism of lipids such as Ketoacidosis, Fatty liver, Hypercholesterolemia Metabolism of Amino acids (Proteins): General reactions of amino acids and its significance– Transamination, deamination, Urea cycle and decarboxylation. Diseases related to abnormal metabolism of amino acids, Disorders of ammonia metabolism, phenylketonuria, alkaptonuria and Jaundice. Biological oxidation: Electron transport chain and Oxidative phosphorylation

	5	UNIT-V Introduction to Biotechnology Organ function tests Functions of kidney and routinely performed tests to assess the functions of kidney and their clinical significances Functions of liver and routinely performed tests to assess the functions of liver and their clinical significances Lipid profile tests and its clinical significances Introduction to Pathology of Blood and Urine Lymphocytes and Platelets, their role in health and disease Erythrocytes - Abnormal cells and their significance Normal and Abnormal constituents of Urine and their significance		
	Mode of examination	Theory		
	Weightage Distribution	Continuous Mode Assessment	Sessional Exam	ESE
		00	20	80
	Text book/s*	**1.** Essentials of Biochemistry by U. Satyanarayana, Books and Allied (P) Ltd. **2.** A Textbook of Biochemistry by A.V.S.S. Rama Rao, UBS Publishers' Distributors Pvt. Ltd. **3.** Practical Biochemistry by R.C. Gupta and S. Bhargava. **4.** Laboratory manual of Biochemistry by Pattabiraman and Sitaram Acharya		
	Other References			

School:		SOP
Programme:		D. Pharm
Branch:		IInd year
1	Course Code	ER20-24T
2	Course Title	PHARMACOTHERAPEUTICS - THEORY
3	Credits	4
4	Contact Hours (L-T-P)	3-1-0
	Course Type	Compulsory
5	Course Objective	This course will discuss about 1. Etiopathogenesis of selected common diseases and evidence-based medicine therapy 2. Importance of individualized therapeutic plans based on diagnosis 3. Basic methods for assessing the clinical outcomes of drug therapy
6	Course Outcomes	Upon successful completion of this course, the students will be able to C01:- Help assessing the subjective and objective parameters of patients in common disease conditions. Participate in planning the rational medicine therapy for common diseases CO2:- Assist other healthcare providers to analyse drug related Respiratory System, Endocrine System, Central Nervous System and provide therapeutic interventions CO3:- Assist other healthcare providers to analyse drug related to Gastro-Intestinal Disorders & Haematological disorders. CO4:- Design and deliver discharge counselling for patients about Infectious diseases, the mechanisms of various functioning of the body organs. CO5 & CO6:- Learn about Dermatology, Psychiatric Disorders, Ophthalmology, Anti-microbial Resistance & Women's Health.
7	Course Description	This subject is designed to impart fundamental knowledge on the etiopathogenesis, clinical manifestations, nonpharmacological and pharmacological management of the diseases associated with it.The subject provides the basic knowledge required to understand the various disciplines of pharmacy.
8	Outline syllabus	

	1	UNIT-I **1.** Pharmacotherapeutics – Introduction, scope, and objectives. **2.** Rational use of Medicines, Evidence Based Medicine, Essential Medicines List, Standard Treatment Guidelines (STGs) **3.** Cardiovascular System:- Hypertension Angina and Myocardial infarction Hyperlipidaemia Congestive Heart Failure		
	2	UNIT-II **1.** Respiratory System Asthma COPD **2.** Endocrine System Diabetes Thyroid disorders - Hypo and Hyperthyroidism **3.** Central Nervous System:- Epilepsy, Parkinson's disease, Alzheimer's disease Stroke Migraine		
	3	UNIT-III **1.** Gastrointestinal Disorders, Gastro oesophageal reflux disease Peptic Ulcer Disease Alcoholic liver disease Inflammatory Bowel Diseases (Crohn's Disease and Ulcerative Colitis) **2.** Haematological disorders Iron deficiency anaemia Megaloblastic anaemia		
	4	UNIT-IV **1.** Infectious diseases Tuberculosis Pneumonia Urinary tract infections Hepatitis Gonorrhoea and Syphilis Malaria HIV and Opportunistic infections Viral Infections (SARS, CoV2) 12 **2.** Musculoskeletal disorders Rheumatoid arthritis Osteoarthritis		
	5	UNIT-V **1.** Dermatology:- Psoriasis, Scabies, Eczema **2.** Psychiatric Disorders:- Depression, Anxiety Psychosis **3.** Ophthalmology:- Conjunctivitis (bacterial and viral), Glaucoma **4.** Anti-microbial Resistance **5.** Women's Health:- Polycystic Ovary Syndrome Dysmenorrhea, Premenstrual Syndrome		
	Mode of examination	Theory		
	Weightage Distribution	Continuous Mode Assessment	Sessional Exam	ESE
		00	20	80

	Text book/s*	**1.** Clinical Pharmacy and Therapeutics - Roger and Walker, Churchill Livingstone Publication **2.** Clinical Pharmacy and Therapeutics - Eric T. Herfindal, Williams and Wilkins Publication **3.** Applied Therapeutics: The clinical Use of Drugs. Lloyd Young and Koda-Kimble MA Lippincott, Williams and Wilkins Publication. **4.** Pharmacotherapy: A Pathophysiologic approach - Joseph T. Dipiro et al. Appleton and Lange Publication. **5.** National Formulary of India, Indian Pharmacopoeia Commission, Ghaziabad.
	Other References	

School:		SOP
Programme:		D.Pharm
Branch:		II-Year
1	Course Code	ER20-25T
2	Course Title	Hospital & Clinical Pharmacy – Theory
3	Credits	4
4	Contact Hours (L-T-P)	3-1-0
	Course Type	Compulsory
5	Course Objective	Upon completion of this course the student should be able to **1.** Hospital and Hospital Pharmacy organization and set-ups **2.** Basics of hospital pharmacy services including the procurement, supply chain, storage of medicines and medical supplies **3.** Basics of clinical pharmacy including introduction to comprehensive pharmaceutical care services **4.** Basic interpretations of common laboratory results used in clinical diagnosis towards optimizing the drug therapy
6	Course Outcomes	CO1: Student will be able to understand Ability to discuss the controversies in drug therapy CO2: Student will be able to apply the therapeutic approach to management of hospital CO3: Student will be able to identify the patient specific parameters relevant in monitoring therapy CO4: Student will be able to conclude the importance of individualized therapeutic plans based on diagnosis CO5: Students will be able to analyze data collected at their research work. CO6: Students shall be able to generalize the role of a Pharmacist in a community.
7	Course Description	This course is designed to impart a fundamental knowledge on the preparatory pharmacy with arts and science of preparing the different conventional dosage forms.
8	Outline syllabus	

	1	UNIT-I Hospital Pharmacy **A.** Definition, scope, national and international scenario • Organisational structure • Professional responsibilities, Qualification and experience requirements, job specifications, work load requirements and inter professional relationships • Good Pharmacy Practice (GPP) in hospital • Hospital Pharmacy Standards (FIP Basel Statements, AHSP) • Introduction to NAQS guidelines and NABH Accreditation and Role of Pharmacists **B.** Different Committees in the Hospital • Pharmacy and Therapeutics Committee - Objectives, Composition, and functions • Hospital Formulary-Definition, procedure for development and use of hospital formulary • Infection Control Committee – Role of Pharmacist in preventing Antimicrobial Resistance
	2	UNIT-II Clinical laboratory tests used in the evaluation of disease states - significance and interpretation of test results • Haematological, Liver function, Renal function, thyroid function tests • Tests associated with cardiac disorders • Fluid and electrolyte balance • Pulmonary Function Tests Compounding in Hospitals. Bulk compounding, IV admixtur services and incompatibilities, Total parenteral nutrition Drug distribution • Drug distribution (in- patients and out - patients) – Definition, advantages and disadvantages of individual prescription order method, Floor Stock Method, Unit Dose Drug Distribution Method, Drug Basket Method. • Distribution of drugs to ICCU/ICU/NICU/Emergency wards. • Automated drug dispensing systems and devices Distribution of Narcotic and Psychotropic substances and their storage Compounding in Hospitals. Bulk compounding, I admixture services and incompatibilities, Total parenteral nutrition

	3	UNIT-III Supply Chain and Inventory Control • Preparation of Drug lists - High Risk drugs, Emergency drugs, Schedule H1 drugs, NDPS drugs, reserved antibiotics • Procedures of Drug Purchases – Drug selection, short term, long term, and tender/e-tender process, quotations, etc. • Inventory control techniques: Economic Order Quantity, Reorder Quantity Level, Inventory Turnover etc. • Inventory Management of Central Drug Store – Storage conditions, Methods of storage, Distribution, Maintaining Cold Chain, Devices used for cold storage (Refrigerator, ILR, Walk-in-Cold rooms) FEFO, FIFO methods • Expiry drug removal and handling, and disposal. Disposal of Narcotics, cytotoxic drugs Documentation - purchase and inventor
	4	UNIT-IV Clinical Pharmacy: Definition, scope, and development - in India and other countries Technical definitions, common terminologies used in clinical settings and their significance such as Paediatrics, Geriatric, Anti-natal Care, Postnatal Care, etc., Daily activities of clinical pharmacists: Definition, goal, and procedure of • Ward round participation • Treatment Chart Review • Adverse drug reaction monitoring • Drug information and poisons information • Medication history • Patient counseling • Interprofessional collaboration Pharmaceutical care: Definition, classification of drug related problems. Principles and procedure to provide pharmaceutical care

	5	UNIT-V Pharmacovigilance Definition, aim and scope Overview of Pharmacovigilance Poisoning: Types of poisoning: Clinical manifestations and Antidotes Drugs and Poison Information Centre and their services – Definition, Requirements, Information resources with examples, and their advantages and disadvantages Medication errors: Definition, types, consequences, and strategies to minimize medication errors, LASA drugs and Tallman lettering as per ISMP • Drug Interactions: • Definition, types, clinical significance of drug interactions		
	Mode of examination	Theory		
	Weightage Distribution	Continuous Mode Assessment	Sessional Exam	ESE
		00 Marks	20	80
	Text book/s*	**1.** A Textbook of Clinical Pharmacy Practice - Essential concepts and skills - Parthasarathi G, Karin Nyfort-Hansen and Milap Nahata. Orient Longman Pvt. Ltd. Hyderabad. **2.** Text Book of Hospital and Clinical Pharmacy by Dr. Pratibha Nand and Dr. Roop K Khar, Birla publications, New Delhi. **3.** Gupta B.K and Gupta R.N., GPP in Hospital Pharmacy, Vallabh Prakashan. **4.** Basic skills in interpreting laboratory data - Scott LT, American Society of Health System Pharmacists Inc. **5.** Australian drug information- Procedure manual. The Society of Hospital Pharmacists of Australia.		
	Other References			

School:		SOP
Programme:		D.Pharm
Branch:		2nd year
1	Course Code	ER20-26T
2	Course Title	PHARMACY LAW AND ETHICS – THEORY
3	Credits	4
4	Contact Hours (L-T-P)	3-1-0
	Course Type	Compulsory
5	Course Objective	1. General perspectives, history, evolution of pharmacy law in India 2. Act and Rules regulating the profession and practice of pharmacy in India 3. Important code of ethical guidelines pertaining to various practice standards 4. Brief introduction to the patent laws and their applications in pharmacy
6	Course Outcomes	Upon successful completion of this course, the students will be able to CO1:- Describe the history and evolution of pharmacy law in India CO2:- Interpret the act and rules regulating the profession and practice of pharmacy in India CO3:- Discuss the various codes of ethics related to practice standards in pharmacy CO4:- Interpret the fundamentals of patent laws from the perspectives of pharmacy CO5 & CO6:-Introduction to BCS system, Blood bank, Clinical Establishment Act and Rules.
7	Course Description	This course deals with the design to impart basic knowledge on several important legislations related to the profession of pharmacy in India.
8	Outline syllabus	
	1	UNIT-I **1.** General Principles of Law, History and various Acts related to Drugs and Pharmacy profession **2.** Pharmacy Act-1948 and Rules: Objectives, Definitions, Pharmacy Council of India; its constitution and functions, Education Regulations, State and Joint state pharmacy councils, Registration of Pharmacists, Offences and Penalties. Pharmacy Practice Regulations 2015

	2	UNIT-II **1.** Drugs and Cosmetics Act 1940 and Rules 1945 and New Amendments:- Objectives, Definitions, Legal definitions of schedules to the Act and Rules Import of drugs – Classes of drugs and cosmetics prohibited from import, Import under license or permit. Manufacture of drugs – Prohibition of manufacture and sale of certain drugs, Conditions for grant of license and conditions of license for manufacture of drugs, Manufacture of drugs for test, examination and analysis, manufacture of new drug, loan license and repacking license. Study of schedule C and C1, G, H, H1, K, P, M, N, and X. Sale of Drugs – Wholesale, Retail sale and Restricted license, Records to be kept in a pharmacy Drugs Prohibited for manufacture and sale in India Administration of the Act and Rules – Drugs Technical Advisory Board, Central Drugs Laboratory, Drugs Consultative Committee, Government analysts, licensing authorities, controlling authorities, Drug Inspectors.
	3	UNIT-III **1.** Narcotic Drugs and Psychotropic Substances Act 1985 and Rules Objectives, Definitions, Authorities and Officers, Prohibition, Control and Regulation, Offences and Penalties. **2.** Drugs and Magic Remedies (Objectionable Advertisements) Act 1954 Objectives, Definitions, Prohibition of certain advertisements, Classes of Exempted advertisements, Offences and Penalties. **3.** Prevention of Cruelty to Animals Act-1960: Objectives, Definitions, CPCSEA - brief overview, Institutional Animal Ethics Committee, Breeding and Stocking of Animals, Performance of Experiments, Transfer and Acquisition of animals for experiment, Records, Power to suspend or revoke registration, Offences and Penalties. **4.** Poisons Act-1919: Introduction, objective, definition, possession, possession for sales and sale of any poison, import of poisons

	4	UNIT-IV **1.** FSSAI (Food Safety and Standards Authority of India) Act and Rules: brief overview and aspects related to manufacture, storage, sale, and labelling of Food Supplements **2.** National Pharmaceutical Pricing Authority: Drugs Price Control Order (DPCO) - 2013. Objectives, Definitions, Sale prices of bulk drugs, Retail price of formulations, Retail price and ceiling price of scheduled formulations, Pharmaceutical Policy 2002, National List of Essential Medicines (NLEM). **3.** Code of Pharmaceutical Ethics: Definition, ethical principles, ethical problem solving, registration, code of ethics for Pharmacist in relation to his job, trade, medical profession and his profession, Pharmacist's oath. **4.** Medical Termination of Pregnancy Act and Rules – basic understanding, salient features, and Amendments **5.** Role of all the government pharma regulator bodies – Central Drugs Standards Control Organization (CDSCO), Indian Pharmacopoeia Commission (IPC) **6.** Good Regulatory practices (documentation, licenses, renewals, e-governance) in Community Pharmacy, Hospital pharmacy, Pharma Manufacturing, Wholesale business, inspections, import, export of drugs and medical devices		
	5	UNIT-V **1.** Introduction to BCS system of classification, Basic concepts of Clinical Trials, ANDA, NDA, New Drug development, New Drugs and Clinical Trials Rules, 2019. Brand v/s Generic, Trade name concept, Introduction to Patent Law and Intellectual Property Rights, Emergency Use Authorization. **2.** Blood bank – basic requirements and functions **3.** Clinical Establishment Act and Rules – Aspects related to Pharmacy **4.** Biomedical Waste Management Rules 2016 – Basic aspects, and aspects related to pharma manufacture to disposal of pharma / medical waste at homes, pharmacies, and hospitals **5.** Bioethics - Basic concepts, history and principles. Brief overview of ICMR's National Ethical Guidelines for Biomedical and Health Research involving human participants **6.** Introduction to the Consumer Protection Act **7.** Introduction to the Disaster Management Act **8.** Medical Devices – Categorization, basic aspects related to manufacture and sale		
	Mode of examination	Theory		
	Weightage Distribution	Continuous Mode Assessment	Sessional Exam	ESE
		00	20	80

	Text book/s*	**1.** Text book of Forensic Pharmacy by B.M. Mithal **2.** Hand book of drug law-by M.L. Mehra **3.** A text book of Forensic Pharmacy by N.K. Jain **4.** Drugs and Cosmetics Act/Rules by Govt. of India publications. **5.** Medicinal and Toilet preparations act 1955 by Govt. of India publications. **6.** Narcotic drugs and psychotropic substances act by Govt. of India publications **7.** Drugs and Magic Remedies act by Govt. of India publication **8.** Bare Acts of the said laws published by Government. Reference books (Theory)

School:		SOP
Programme:		D. Pharm
Branch:		II-Year
1	Course Code	ER20-21P
2	Course Title	Pharmacology – Practical
3	Credits	2
4	Contact Hours (L-T-P)	0-0-2
	Course Type	Compulsory
5	Course Objective	Upon completion of the course, the student shall be able to **1.** Study of pharmacological effects of drugs like local anaesthetics, mydriatic and mitotic on rabbit eye **2.** Screening the effects of various drugs acting in the central nervous system **3.** Study of drug effects on isolated organs / tissues **4.** Study of pyrogen testing on rabbit
6	Course Outcomes	CO1:This objective requires students to analyze the effects of a drug on the rabbit eye and report their findings. CO2 & CO6: This objective involves evaluating different animal experiment models to determine which one is most suitable for studying the effects of drugs on the central nervous system. CO3: This objective requires students to apply their knowledge of tissue effects on isolated organs/tissues in a practical setting. CO4: This objective involves analyzing dose-dependent responses of drugs in different animal experiment models. CO5: This objective involves synthesizing information on drug-drug interactions in common diseases to optimize drug therapy.
7	Course Description	This course provides the basic understanding about the uses, mechanisms of actions, dose dependent responses of drugs in simulated virtual animal models and experimental conditions.
8	Outline syllabus	
	1	UNIT-I a). Introduction to experimental pharmacology b). Commonly used instruments in experimental pharmacology c). Different routes of administration of drugs in animals
	2	UNIT-II a). Study of local anaesthetics on rabbit eye b). Study of Mydriatic effect on rabbit eye c). Study of Miotic effect on rabbit eye d). Effect of analgesics using Analgesiometer

	3	UNIT-III a). Study of analgesic activity by writhing test b). Screening of anti-convulsant using Electro Convulsiometer c). Pyrogen testing by rabbit methods		
	4	UNIT-IV a). Screening of Muscle relaxants using Rota-Rod apparatus b.) Effect of drugs on ciliary motility on frog's buccal cavity		
	5	UNIT-V a). Screening of CNS stimulants and depressants using Actophotometer b). Study of anxiolytic activity using elevated plus maze method c). Study of effect of drugs (any 2) on isolated heart		
	Mode of examination	Theory/Jury/Practical/Viva		
	Weightage Distribution	Continuous Mode Assessment	Sessional Exam	ESE
		00	20	80
	Text book/s*	**1.** Pharma Satoskar, R.S. and Bhandarkar, S.D. Pharmacology and Pharmacotherapeutics **2.** B. Suresh, A Text Book of Pharmacology **3.** Derasari and Gandhi's Elements of Pharmacology **4.** S.K. Kulkarni, Practical Pharmacology and Clinical Pharmacy **5.** H.K. Sharma. Principles of Pharmacology **6.** Mary J. Mycek, Lippincott Williams and Wilkins. Lippincott's illustrated Reviews: Pharmacology **7.** Tripathi, K.D. Essentials of Medical Pharmacology. **8.** Various Drug Information Books like British National Formulary, MIMS, CIMS, Drug Today etc., WHO, NIH Websites		

School:		SOP
Programme:		D. Pharm
Branch:		IInd Year
1	Course Code	ER20-23P
2	Course Title	Biochemistry & Clinical Pathology Practical
3	Credits	2
4	Contact Hours (L-T-P)	0-0-2
	Course Type	Compulsory
5	Course Objective	Upon completion of course student shall able to Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes. Understand the metabolism of nutrient molecules in physiological and pathological conditions. Understand the genetic organization of the mammalian genome and functions of DNA in the synthesis of RNAs and proteins.
6	Course Outcomes	CO1: Students will be able to understand the Qualitative analysis of carbohydrates CO2: Students will be able to understand the Quantitative analysis of reducing sugars. CO3: Students will be able to analyze how to determine creatinine CO4: Students will be able to determine serum cholesterol CO5: Students will be able to compare amino acids by Paper Chromatographic Technique. CO6: Students will be able to apply the practical aspect and use of biochemistry.
7	Course Description	1. Qualitative analysis of carbohydrates (Glucose, Fructose, Lactose, Maltose, Sucrose and starch) 2. Identification tests for Proteins (albumin and Casein) 3. Quantitative analysis of reducing sugars (DNSA method) and Proteins (Biuret method) 4. Qualitative analysis of urine for abnormal constituents 5. Determination of blood creatinine 6. Determination of blood sugar 7. Determination of serum total cholesterol 8. Preparation of buffer solution and measurement of pH 9. Study of enzymatic hydrolysis of starch 10. Determination of Salivary amylase activity 11. Study the effect of Temperature on Salivary amylase activity. 12. Study the effect of substrate concentration on salivary amylase activity.
8	Outline syllabus	

	1	UNIT-I \a). Qualitative analysis of carbohydrates (Glucose, Fructose, Lactose, Maltose, Sucrose and starch) b). Identification tests for Proteins (albumin and Casein)		
	2	UNIT-II a). Quantitative analysis of reducing sugars (DNSA method) and Proteins (Biuret method) b). Qualitative analysis of urine for abnormal constituents		
	3	UNIT-III a). Determination of blood creatinine b). Determination of blood sugar		
	4	UNIT-IV a). Determination of serum total cholesterol b). Preparation of buffer solution and measurement of pH		
	5	UNIT-V a). Study of enzymatic hydrolysis of starch b). Determination of amino acids by Paper Chromatographic Technique.		
	Mode of examination	Practical/Viva		
	Weightage Distribution		Sessional Exam	ESE
			20	80
	Text book/s*	Practical Biochemistry by R.C. Gupta and S. Bhargavan. Introduction of Practical Biochemistry by David T. Plummer. (3rd Edition) Practical Biochemistry for Medical students by Rajagopal and Ramakrishna. Practical Biochemistry by Harold Varley		
	Other References			

School:		SOP
Programme:		D.Pharm
Branch:		IInd Year
1	Course Code	ER20-24P
2	Course Title	PHARMACOTHERAPEUTICS – PRACTICAL
3	Credits	1
4	Contact Hours (L-T-P)	0-0-1
	Course Type	Compulsory
5	Course Objective	Upon completion of this course the student should be able to 1. How to prepare a SOAP (Subjective, Objective, Assessment and Plan) note for clinical cases of selected common diseases 2. Patient counselling techniques/methods for common disease conditions
6	Course Outcomes	CO1 Upon successful completion of this course, the students will be able to 1. Write SOAP (Subjective, Objective, Assessment and Plan) notes for the given clinical cases of selected common diseases CO2. Counsel the patients about the disease conditions, uses of drugs, methods of handling and administration of drugs, life-style modifications, and monitoring parameters. CO3 CO4 CO5 CO6
7	Course Description	This course is designed to train the students in the basic skills required to support the pharmaceutical care services for selected common disease conditions.
8	Outline syllabus	
	1	UNIT-I Preparation and discussion of SOAP (Subjective, Objective, Assessment and Plan) notes for 1. Hypertension 2.Angina Pectoris 3. Myocardial Infarction 4. Hyperlipidaemia

	2	UNIT-II Preparation and discussion of SOAP (Subjective, Objective, Assessment and Plan) notes for **1.** Rheumatoid arthritis **2.** 2. Asthma **3.** COPD **4.** Diabetes		
	3	UNIT-III Preparation and discussion of SOAP (Subjective, Objective, Assessment and Plan) notes for **1.** Epilepsy **2.** Stroke **3.** Depression **4.** Tuberculosis **5.** Anaemia **6.** Viral infection **7.** Dermatological conditions		
	4	UNIT-IV Patient counselling exercises using role plays based on the real / hypothetical clinical case scenarios. The students are expected to provide counselling on disease condition, medications, life-style modifications, monitoring parameters, etc. and the same shall be documented.		
	5	UNIT-V Simulated cases to enable dose calculation of selected drugs in paediatrics, and geriatrics under various pathological conditions		
	Mode of examination	Practical		
	Weightage Distribution	Continuous Mode Assessment	Sessional Exam	ESE
		00	20	80
	Text book/s*	**1.** Clinical Pharmacy and Therapeutics - Roger and Walker, Churchill Livingstone Publication **2.** Clinical Pharmacy and Therapeutics - Eric T. Herfindal, Williams and Wilkins Publication **3.** Applied Therapeutics: The clinical Use of Drugs. Lloyd Young and Koda-Kimble MA Lippincott, Williams and Wilkins Publication. **4.** Pharmacotherapy: A Pathophysiologic approach - Joseph T. Dipiro et al. Appleton and Lange Publication. **5.** National Formulary of India, Indian Pharmacopoeia Commission, Ghaziabad.		

School:		SOP
Programme:		D.Pharm
Branch:		II-Year
1	Course Code	ER20-22P
2	Course Title	Community Pharmacy and Management – Practical
3	Credits	3
4	Contact Hours (L-T-P)	0-0-3
	Course Type	Compulsory
5	Course Objective	Upon completion of the course, the student shall be able to **1.** Professional handling and filling prescriptions **2.** Patient counselling on diseases and minor ailments **3.** Patient counselling on prescription and / or non-prescription medicines **4.** Preparation of counselling materials such as patient information leaflets **5.** Performing basic health screening tests
6	Course Outcomes	CO1: This objective involves applying knowledge and skills to fill prescriptions professionally. CO2: This objective also involves applying knowledge and skills to counsel patients effectively about diseases and minor ailments CO3:this objective requires students to apply their knowledge to counsel patients on the appropriate use of prescription and non-prescription medicines. CO4: This objective involves synthesizing information to create patient information leaflets. It requires students to integrate various pieces of knowledge to generate new materials. CO5: This objective involves applying knowledge and skills to conduct basic health screening tests. CO6:This objective focuses on understanding communication with patients. It involves comprehending the principles and elements of effective patient communication.
7	Course Description	Deals with designed to impart basic knowledge and skills to provide various pharmaceutical care services to patients and general practitioners in the community setup.
8	Outline syllabus	

	1	UNIT-I a). Handling of prescriptions with professional standards, reviewing prescriptions, checking for legal compliance and completeness b). Handling of prescriptions with professional standards, reviewing parameters of prescriptions. c). Handling of prescriptions with professional standards, reviewing active listening of prescriptions. d). Handling of prescriptions with professional standards, reviewing short terms of prescriptions.
	2	UNIT-II a). Identification of drug-drug interactions in the prescription and follow-up actions . b). Identification of drug interactions in the prescription and follow-up actions .
	3	UNIT-III a). Providing the following health screening services for monitoring patients / detecting new patients (one experiment for each activity) b). Blood Pressure Recording, c). Capillary Blood Glucose Monitoring, d). Lung function assessment using Peak Flow Meter and incentive spirometer, recording capillary oxygen level using Pulse Oximeter, e).BMI measurement
	4	UNIT-IV a).Providing counselling to simulated patients for the following chronic diseases / disorders including education on the use of devices such as insulin pen, inhalers, spacers, nebulizers, etc. where appropriate (one experiment for each disease) Type 2 Diabetes Mellitus, Primary Hypertension, Asthma, Hyperlipidaemia, Rheumatoid Arthritis b).Use of Community Pharmacy Software and digital health tools

	5	UNIT-V a). Providing counselling to simulated patients for the following minor ailments (any three) b). Headache, c).GI disturbances (Nausea, Vomiting, Dyspepsia, d). diarrhoea, constipation), Worm infestations, e). Pyrexia, Upper Respiratory Tract infections, f). Skin infections, g). Oral and dental disorders.			
	Mode of examination	Theory/Jury/Practical/Viva			
	Weightage Distribution	Continuous Mode Assessment		Sessional Exam	ESE
		00		20	80
	Text book/s*	**1.** Health Education and Community Pharmacy by N.S. Parmar. **2.** WHO consultative group report. **3.** Drug store and Business management by Mohammed Ali and Jyoti. **4.** Handbook of pharmacy – health care. Edt. Robin J Harman. The Pharmaceutical Press **5.** Comprehensive Pharmacy Review – Edt. Leon Shargel. Lippincott Williams and Wilkins. **6.** Good Pharmacy Practices Training Manual by IPA/CDSCO/WHO India **7.** Training Module for Community Pharmacists in TB Care and Control/ by MoH/IPA **8.** Hand Book of PharmaSoS, Drugs in Special population- Pregnancy and Lactation, Tobacco free future- Choice is yours: KSPC Publications. **9.** Responsible Use of Medicines: A Layman's Handbook, www.ipapharma.org /publications **464264240.** Community Pharmacy Practice around the Globe: Part One: www.ipapharma.org /publications			

School:		SOP
Programme:		D.Pharm
Branch:		II-Year
1	Course Code	ER20-25P
2	Course Title	Hospital and clinical pharmacy– Practical
3	Credits	1
4	Contact Hours (L-T-P)	0-0-1
	Course Type	Compulsory
5	Course Objective	Upon completion of the course, the student shall be able to 1.Methods to systematically approach and respond to drug information queries 2.How to interpret common laboratory reports to understand the need for optimizing dosage regimens 3.How to report suspected adverse drug reactions to the concerned authorities 4.Uses and methods of handling various medical/surgical aids and devices 5.How to interpret drug-drug interactions in the treatment of common diseases.
6	Course Outcomes	CO1: This objective involves applying knowledge and skills to address drug information queries in a professional manner. CO2: This objective requires students to analyze common laboratory reports to extract meaningful information. CO3: This objective involves applying knowledge to report suspected adverse drug reactions following standard procedures. CO4: This objective focuses on understanding the uses and handling methods of medical/surgical aids and devices. CO5: This objective involves analyzing drug-drug interactions in common diseases to optimize drug therapy. CO6: This objective involves analyzing laboratory reports to optimize drug therapy. Students are expected to evaluate the reports and make informed decisions regarding therapy.
7	Course Description	This course is designed to train the students to assist other healthcare providers in the basic services of hospital and clinical pharmacy.
8	Outline syllabus	
	1	UNIT-I a). Systematic approach to drug information queries using primary / secondary / tertiary resources of information (2 cases) b). Interpretation of laboratory reports to optimize the drug therapy in a given clinical case (2 cases)

	2	UNIT-II a). Filling up IPC's ADR Reporting Form and Perform causality assessments using various scales .		
	3	UNIT-III a). Demonstration / simulated / hands-on experience on the identification, types, use / application /administration of b). Orthopaedic and Surgical Aids such as knee cap, LS belts, abdominal belt, walker, walking sticks, etc c). Different types of bandages such as sterile gauze, cotton, crepe bandages, etc. d). Needles, syringes, catheters, IV set, urine bag, RYLE's tube, urine pots, colostomy bags, oxygen masks, etc		
	4	UNIT-IV a). Case studies on drug-drug interactions . b). Wound dressing (simulated cases and role play).		
	5	UNIT-V a). Vaccination and injection techniques (IV, IM, SC) using mannequins b). Use of Hospital Pharmacy Software and various digital health tools		
	Mode of examination	Theory/Jury/Practical/Viva		
	Weightage Distribution	Continuous Mode Assessment	Sessional Exam	ESE
		00	20	80
	Text book/s*	**1.** A Textbook of Clinical Pharmacy Practice - Essential concepts and skills - Parthasarathi G, Karin Nyfort-Hansen and Milap Nahata. Orient Longman Pvt. Ltd. Hyderabad. **2.** Text Book of Hospital and Clinical Pharmacy by Dr. Pratibha Nand and Dr. Roop K Khar, Birla publications, New Delhi. **3.** Gupta B.K and Gupta R.N., GPP in Hospital Pharmacy, Vallabh Prakashan. **4.** Basic skills in interpreting laboratory data - Scott LT, American Society of Health System Pharmacists Inc. **5.** Australian drug information- Procedure manual. The Society of Hospital Pharmacists of Australia.		