

Shri Rawatpura Sarkar University, Raipur



Examination Scheme & Syllabus For DIPLOMA IN PHARMACY 2nd YEAR

(Effective from the session: 2021-22)



Shri Rawatpura Sarkar University, Raipur

DIPLOMA IN PHARMACY 2nd YEAR

Examination Scheme

S.N.	Course Code	Th /Pr	Subject	Type of Course	Teaching hours per week			TC	Examination Scheme						Total Marks
					L	T	P		Theory		Practical		Assignment	Field marks	
									EX	IN	EX	IN			
1	ER20-21T	Th	Pharmacology	Core	3	1		4	80	20					100
2	ER20-21P	Pr	Pharmacology	Core			3	2			80	10	05	05	100
3	ER20-22T	Th	Community Pharmacy & Management	Core	3	1		4	80	20					100
4	ER20-22P	Pr	Community Pharmacy & Management	Core			3	2			80	10	05	05	100
5	ER20-23T	Th	Biochemistry & Clinical Pathology	Core	3	1		4	80	20					100
6	ER20-23P	Pr	Biochemistry & Clinical Pathology	Core			3	2			80	10	05	05	100
7	ER20-24T	Th	Pharmacotherapeutics	Core	3	1		4	80	20					100
8	ER20-24P	Pr	Pharmacotherapeutics	Core			3	2			80	10	05	05	100
9	ER20-25T	Th	Hospital & Clinical Pharmacy	Core	3	1		4	80	20					100
10	ER20-25P	Pr	Hospital & Clinical Pharmacy	Core			3	2			80	10	05	05	100
11	ER20-26T	Th	Pharmacy Law & Ethics	Core	3	1		4							100
Total Contact hr per week:		Total Credit		34									1100		

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	<ul style="list-style-type: none">• Excretion of drugs - Definition, routes of drug excretion <p style="text-align: center;">General mechanisms of drug action and factors modifying drug action</p> <p style="text-align: center;">Unit II 13 Hour</p> <p>Drugs Acting on the Peripheral Nervous System</p> <ul style="list-style-type: none">• Steps involved in neurohumoral transmission• Definition, classification, pharmacological actions, dose, indications, and contraindications of<ol style="list-style-type: none">a) Cholinergic drugsb) Anti-Cholinergic drugsc) Adrenergic drugsd) Anti-adrenergic drugse) Neuromuscular blocking agentsf) Drugs used in Myasthenia gravisg) Local anaesthetic agentsh) Non-Steroidal Anti-Inflammatory drugs (NSAIDs) <p>Drugs Acting on the Eye</p> <p>Definition, classification, pharmacological actions, dose, indications and contraindications of</p> <ul style="list-style-type: none">• Miotics• Mydriatics• Drugs used in Glaucoma <p style="text-align: center;">Unit III 14 Hour</p> <p>Drugs Acting on the Central Nervous System</p> <p>Definition, classification, pharmacological actions, dose, indications, and contraindications of</p> <ul style="list-style-type: none">• General anaesthetics
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	<ul style="list-style-type: none">• Hypnotics and sedatives• Anti-Convulsant drugs• Anti-anxiety drugs• Anti-depressant drugs• Anti-psychotics• Nootropic agents• Centrally acting muscle relaxants• Opioid analgesics <p>Drugs Acting on the Cardiovascular System Definition, classification, pharmacological actions, dose, indications, and contraindications of</p> <ul style="list-style-type: none">• Anti-hypertensive drugs• Anti-anginal drugs• Anti-arrhythmic drugs• Drugs used in atherosclerosis and• Congestive heart failure <p>Drug therapy for shock</p> <p style="text-align: center;">Unit IV 13 Hour</p> <p>Drugs Acting on Blood and Blood Forming Organs Definition, classification, pharmacological actions, dose, indications, and contraindications of</p> <ul style="list-style-type: none">• Hematinic agents• Anti-coagulants• Anti-platelet agents• Thrombolytic drugs <p>Definition, classification, pharmacological actions, dose, indications, and contraindications of</p> <ul style="list-style-type: none">• Bronchodilators• Expectorants
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	<ul style="list-style-type: none">• Anti-tussive agents• Mucolytic agents <p>Drugs Acting on the Gastro Intestinal Tract Definition, classification, pharmacological actions, dose, indications, and contraindications of</p> <ul style="list-style-type: none">• Anti-ulcer drugs• Anti-emetics• Laxatives and purgatives• Anti-diarrheal drugs <p>Drugs Acting on the Kidney Definition, classification, pharmacological actions, dose, indications, and contraindications of</p> <ul style="list-style-type: none">• Diuretics• Anti-Diuretics <p style="text-align: center;">Unit V 25 Hour</p> <p>Hormones and Hormone Antagonists Physiological and pathological role and clinical uses of</p> <ul style="list-style-type: none">• Thyroid hormones• Anti-thyroid drugs• Parathormone• Calcitonin• Vitamin D• Insulin• Oral hypoglycemic agents• Estrogen• Progesterone• Oxytocin
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	<ul style="list-style-type: none"> • Corticosteroids <p>Autocoids</p> <ul style="list-style-type: none"> • Physiological role of Histamine, 5 HT and Prostaglandins • Classification, clinical uses, and adverse effects of antihistamines and 5 HT antagonists <p>Chemotherapeutic Agents: Introduction, basic principles of chemotherapy of infections, infestations and neoplastic diseases, Classification, dose, indication and contraindications of drugs belonging to following classes:</p> <ul style="list-style-type: none"> • Penicillins • Cephalosporins • Aminoglycosides • Fluoroquinolones • Macrolides • Tetracyclines • Sulphonamides • Anti-tubercular drugs • Anti-fungal drugs • Anti-viral drugs • Anti-amoebic agents • Anthelmintics • Anti-malarial agents • Anti-neoplastic agents <p>Biologicals Definition, types, and indications of biological agents with examples</p>
Course outcomes	<p>Upon successful completion of this course, the students will be able to</p> <ol style="list-style-type: none"> 1. Describe the basic concepts of pharmacokinetics and pharmacodynamics 2. Enlist the various classes and drugs of choices for any given disease condition 3. Advise the dosage regimen, route of administration and contraindication for

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	a given drug 3. Describe the common adverse drug reactions
Text Books	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
Reference Books	1. S.K. Kulkarni, Practical Pharmacology and Clinical Pharmacy 2. H.K. Sharma. Principles of Pharmacology 3. Mary J. Mycek, Lippincott Williams and Wilkins. Lippincott's illustrated Reviews: Pharmacology 4. Tripathi, K.D. Essentials of Medical Pharmacology. 5. Various Drug Information Books like British National Formulary, MIMS, CIMS, Drug Today etc., WHO, NIH Websites

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Course Title	Pharmacology (Practical)				
Course Code	ER20-21P				
Course Credits	L	T	P	Credits	
			3	2	
Prerequisites	Basic details fundamental aspects studied in diploma II Year Pharmacology				
Course objectives	<p>This course will demonstrate / provide hands-on experience in the virtual platform using appropriate software on the following</p> <ol style="list-style-type: none"> 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 				
Course Contents	<p>Introduction to the following topics pertaining to the experimental pharmacology have to be discussed and documented in the practical manuals.</p> <ol style="list-style-type: none"> 1. Introduction to experimental pharmacology 2. Study of laboratory animals (a) Mice; (b) Rats; (c) Guinea pigs; (d) Rabbits 3. Commonly used instruments in experimental pharmacology 4. Different routes of administration of drugs in animals 5. Types of pre-clinical experiments: In-Vivo, In-Vitro, Ex-Vivo, etc. 6. Techniques of blood collection from animals <p>Experiments</p> <p>Note: Animals shall not be used for doing / demonstrating any of the experiments given. The given experiments shall be carried-out / demonstrated as the case may be, ONLY with the use of software program(s) such as 'Ex Pharm' or any other suitable software</p>				

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	<ol style="list-style-type: none"> 1. Study of local anaesthetics on rabbit eye 2. Study of Mydriatic effect on rabbit eye 3. Study of Miotic effect on rabbit eye 4. Effect of analgesics using Analgesiometer 5. Study of analgesic activity by writhing test 6. Screening of anti-convulsant using Electro Convulsiometer 7. Screening of Muscle relaxants using Rota-Rod apparatus 8. Screening of CNS stimulants and depressants using Actophotometer 9. Study of anxiolytic activity using elevated plus maze method 10. Study of effect of drugs (any 2) on isolated heart 11. Effect of drugs on ciliary motility on frog's buccal cavity 12. Pyrogen testing by rabbit method
Course outcomes	<p>Upon successful completion of this course, the students will be able to</p> <ol style="list-style-type: none"> 1. Study and report the local anaesthetic, mydriatic and mitotic effects of the given drug on the rabbit eye 2. Choose appropriate animal experiment model to study the effects of the given drugs acting on the central nervous system and submit the report 3. Perform the effects of given tissues (simulated) on isolated organs / tissues and interpret the results 4. Interpret the dose dependent responses of drugs in various animal experiment models
Text books	<ol style="list-style-type: none"> 4. Pharma Satoskar, R.S. and Bhandarkar, S.D. Pharmacology and Pharmacotherapeutics 5. B. Suresh, A Text Book of Pharmacology 6. Derasari and Gandhi's Elements of Pharmacology

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Reference books	<ol style="list-style-type: none">6. S.K. Kulkarni, Practical Pharmacology and Clinical Pharmacy7. H.K. Sharma. Principles of Pharmacology8. Mary J. Mycek, Lippincott Williams and Wilkins. Lippincott's illustrated Reviews: Pharmacology9. Tripathi, K.D. Essentials of Medical Pharmacology.10. Various Drug Information Books like British National Formulary, MIMS, CIMS, Drug Today etc., WHO, NIH Websites
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	<ul style="list-style-type: none"> • Verbal communication skills (one-to-one, over the telephone) • Written communication skills • Body language • Patient interview techniques <p>Patient counselling</p> <ul style="list-style-type: none"> • 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 counselling 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 <p>Patient Information leaflets - Definition and uses</p>
	<p>Unit III 07 Hour</p>
	<p>Medication Adherence Definition, factors influencing non-adherence, strategies to overcome non-adherence</p> <p>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</p>
	<p>Unit IV 15 Hour</p>
	<p>Over The Counter (OTC) Medications</p>

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	<ul style="list-style-type: none"> • 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) <p style="text-align: center;">Unit V 25 Hour</p> <p>Community Pharmacy Management</p> <ul style="list-style-type: none"> • 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, Cashbook • 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
Course outcomes	<p>Upon successful completion of this course, the students will be able to</p> <ol style="list-style-type: none"> 1. Describe the establishment, legal requirements, and effective administration of a community pharmacy 2. Professionally handle prescriptions and dispense medications 3. Counsel patients about the disease, prescription and or non-prescription

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	<p>medicines</p> <p>4. Perform basic health screening on patients and interpret the reports in the community pharmacy settings</p>
Text books	<ol style="list-style-type: none"> 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.
Reference books	<ol style="list-style-type: none"> 1. Good Pharmacy Practices Training Manual by IPA/CDSCO/WHO India 2. Training Module for Community Pharmacists in TB Care and Control/ by MoH/IPA 3. Hand Book of PharmaSoS, Drugs in Special population- Pregnancy and Lactation, Tobacco free future- Choice is yours: KSPC Publications. 4. Responsible Use of Medicines: A Layman’s Handbook, www.ipapharma.org /publications 5. Community Pharmacy Practice around the Globe: Part

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Course Title	Community Pharmacy & Management (Practical)				
Course Code	ER20-22P				
Course Credits	L	T	P	Credits	
			3	2	
Prerequisites	Basic details fundamental studied in diploma II Year Community Pharmacy & Management				
Course objectives	<p>This course will train the students in the following</p> <ol style="list-style-type: none"> 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 				
Course Contents	<p>Practicals</p> <p>Note: The following practicals shall be carried out in the model community pharmacy with appropriate simulated scenarios and materials. Students shall be trained through role plays wherever necessary. The activities of the students shall be assessed / evaluated using a structured objective assessment form.</p> <ol style="list-style-type: none"> 1. Handling of prescriptions with professional standards, reviewing prescriptions, checking for legal compliance and completeness (minimum 5) 2. Identification of drug-drug interactions in the prescription and follow-up actions (minimum 2) 3. Preparation of dispensing labels and auxiliary labels for the prescribed medications (minimum 5) 4. Providing the following health screening services for monitoring patients / detecting new patients (one experiment for each activity) Blood Pressure Recording, Capillary Blood Glucose Monitoring, Lung function assessment using Peak Flow Meter and incentive spirometer, recording capillary oxygen level using Pulse Oximeter, BMI measurement 				

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	<p>5. 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</p> <p>6. Providing counselling to simulated patients for the following minor ailments (any three) Headache, GI disturbances (Nausea, Vomiting, Dyspepsia, diarrhoea, constipation), Worm infestations, Pyrexia, Upper Respiratory Tract infections, Skin infections, Oral and dental disorders.</p> <p>7 Appropriate handling of dummy dosage forms with correct administration techniques - oral liquids with measuring cup/cap/dropper, Eye Drops, Inhalers, Nasal drops, Insulin pen, nebulizers, different types of tablets, patches, enemas, suppositories</p> <p>8 Use of Community Pharmacy Software and digital health tools</p>
Course outcomes	<p>Upon successful completion of this course, the students will be able to</p> <ol style="list-style-type: none"> 1. Handle and fill prescriptions in a professional manner 2. Counsel patients on various diseases and minor ailments 3. Counsel patients on prescription and or non-prescription medicines 4. Design and prepare patient information leaflets 5. Perform basic health screening tests
Text books	<ol style="list-style-type: none"> 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.

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	<ul style="list-style-type: none">• Polysaccharides - chemical nature of starch and glycogen• Qualitative tests and biological role of carbohydrates <p>Proteins</p> <ul style="list-style-type: none">• 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. <p style="text-align: center;">Unit II 20 Hour</p> <p>Lipids</p> <ul style="list-style-type: none">• 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 <p>Nucleic acids</p> <ul style="list-style-type: none">• Definition, purine and pyrimidine bases• Components of nucleosides and nucleotides with examples• Structure of DNA (Watson and Crick model), RNA and their functions <p>Enzymes</p> <ul style="list-style-type: none">• Definition, properties and IUB and MB classification• Factors affecting enzyme activity
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	<ul style="list-style-type: none">• Mechanism of action of enzymes, Enzyme inhibitor• Therapeutic and pharmaceutical importance of enzymes <p>Vitamins</p> <ul style="list-style-type: none">• Definition and classification with examples• Sources, chemical nature, functions, coenzyme form, recommended dietary requirements, deficiency diseases of fat-and water-soluble vitamins <p style="text-align: center;">Unit III 20 Hour</p> <p>Metabolism (Study of cycle/pathways without chemical structures)</p> <ul style="list-style-type: none">• Metabolism of Carbohydrates: Glycolysis, TCA cycle and glycogen metabolism, regulation of blood glucose level. 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 <p style="text-align: center;">Unit IV 10 Hour</p> <p>Minerals: Types, Functions, Deficiency diseases, recommended dietary requirements</p> <p>Water and Electrolytes</p> <ul style="list-style-type: none">• Distribution, functions of water in the body• Water turnover and balance• Electrolyte composition of the body fluids, Dietary intake of electrolyte and Electrolyte balance
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	<ul style="list-style-type: none"> • Dehydration, causes of dehydration and oral rehydration therapy <p style="text-align: center;">Unit V 13 Hour.</p> <p>Introduction to Biotechnology</p> <p>Organ function tests</p> <ul style="list-style-type: none"> • 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 <p>Introduction to Pathology of Blood and Urine</p> <ul style="list-style-type: none"> • Lymphocytes and Platelets, their role in health and disease • Erythrocytes - Abnormal cells and their significance • Normal and Abnormal constituents of Urine and their significance
Course outcomes	<p>Upon successful completion of this course, the students will be able to</p> <ol style="list-style-type: none"> 1. Describe the functions of biomolecules 2. Discuss the various functions of enzymes in the human system 3. Explain the metabolic pathways of biomolecules in both physiological and pathological conditions 4. Describe the principles of organ function tests and their clinical significances 5. Determine the biomolecules / metabolites in the given biological samples, both qualitatively and quantitatively 6. Describe the clinical pathology of blood and urine
Text Books	<ol style="list-style-type: none"> 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.

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Reference Books	<ol style="list-style-type: none">1. Practical Biochemistry by R.C. Gupta and S. Bhargava.2. Laboratory manual of Biochemistry by Pattabiraman and Sitaram Acharya
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Course Title	Biochemistry & Clinical Pathology (Practical)				
Course Code	ER20-23P				
Course Credits	L	T	P	Credits	
			3	2	
Prerequisites	Basic details fundamental studied in Biochemistry & Clinical Pathology diploma II Year				
Course objectives	<p>This course will train and provide hands-on experiences on the following</p> <ol style="list-style-type: none"> 1. Qualitative determination of biomolecules / metabolites in simulated biological samples 2. Determination of normal and abnormal constituents of simulated blood and urine samples 				
Course Contents	<p>Practicals</p> <ol style="list-style-type: none"> 1. Qualitative analysis of carbohydrates (4 experiments) 2. Qualitative analysis of Proteins and amino acids (4 experiments) 3. Qualitative analysis of lipids (2 experiments) 4. Qualitative analysis of urine for normal and abnormal constituents (4 experiments) 5. Determination of constituents of urine (glucose, creatinine, chlorides) (2 experiments) 6. Determination of constituents of blood/serum (simulated) (Creatine, glucose, cholesterol, Calcium, Urea, SGOT/SGPT) (5 experiments) 7. Study the hydrolysis of starch from acid and salivary amylase enzyme (1 experiment) 				
Course outcomes	<p>Upon successful completion of this course, the students will be able to</p> <ol style="list-style-type: none"> 1. Qualitatively determine the biomolecules / metabolites in the given biological samples 2. Determine the normal and abnormal constituents in blood and urine samples and interpret the results of such testing 				

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Course Title	Pharmacotherapeutics
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Text Books	<ol style="list-style-type: none">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.
Reference Books	<ol style="list-style-type: none">1. Practical Biochemistry by R.C. Gupta and S. Bhargava.2. Laboratory manual of Biochemistry by Pattabiraman and Sitaram Acharya

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<ul style="list-style-type: none">• COPD(c) Endocrine System• Diabetes• Thyroid disorders - Hypo and Hyperthyroidism(d) Central Nervous System• Epilepsy• Parkinson's disease• Alzheimer's disease• Stroke• Migraine	Unit III	12 Hour
<ul style="list-style-type: none">(e) Gastro Intestinal Disorders• Gastro oesophageal reflux disease• Peptic Ulcer Disease• Alcoholic liver disease• Inflammatory Bowel Diseases (Crohn's Disease and Ulcerative Colitis)(f) Haematological disorders• Iron deficiency anaemia• Megaloblastic anaemia	Unit IV	18 Hour
<ul style="list-style-type: none">(g) Infectious diseases• Tuberculosis• Pneumonia• Urinary tract infections• Hepatitis• Gonorrhoea and Syphilis• Malaria• HIV and Opportunistic infections		

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	<ul style="list-style-type: none"> • Viral Infections (SARS, CoV2) (h) Musculoskeletal disorders • Rheumatoid arthritis • Osteoarthritis (i) Dermatology • Psoriasis • Scabies • Eczema <p style="text-align: center;">Unit V 12 Hour.</p> <ul style="list-style-type: none"> (j) Psychiatric Disorders • Depression • Anxiety • Psychosis (k) Ophthalmology • Conjunctivitis (bacterial and viral) • Glaucoma (l) anti-microbial Resistance (m) Women's Health • Polycystic Ovary Syndrome • Dysmenorrhea • Premenstrual Syndrome
Course outcomes	<p>Upon successful completion of this course, the students will be able to</p> <ol style="list-style-type: none"> 1. Help assessing the subjective and objective parameters of patients in common disease conditions 2. Assist other healthcare providers to analyse drug related problems and provide therapeutic interventions 3. Participate in planning the rational medicine therapy for common diseases 4. Design and deliver discharge counselling for patients

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Text Books	<ol style="list-style-type: none">1. Clinical Pharmacy and Therapeutics - Roger and Walker, Churchill LivingstonePublication2. Clinical Pharmacy and Therapeutics - Eric T. Herfindal, Williams and WilkinsPublication3. Applied Therapeutics: The clinical Use of Drugs. Lloyd Young and Koda-KimbleMA Lippincott, Williams and Wilkins Publication.
Reference Books	<ol style="list-style-type: none">1. Pharmacotherapy: A Pathophysiologic approach - Joseph T. Dipiro et al. Appleton and Lange Publication.2. National Formulary of India, Indian Pharmacopoeia Commission, Ghaziabad.

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Course Title	Pharmacotherapeutics (Practical)				
Course Code	ER20-24P				
Course Credits	L	T	P	Credits	
			3	2	
Prerequisites	Basic details fundamental studied in diploma II Year Pharmacotherapeutics				
Course objectives	<p>This course will train the students on</p> <ol style="list-style-type: none"> 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 				
Course Contents	<p>Practicals</p> <ol style="list-style-type: none"> 1. Preparation and discussion of SOAP (Subjective, Objective, Assessment and Plan) notes for at least SIX clinical cases (real / hypothetical) of the following disease conditions. <ol style="list-style-type: none"> 1. Hypertension 2. Angina Pectoris 3. Myocardial Infarction 4. Hyperlipidaemia 5. Rheumatoid arthritis 6. Asthma 7. COPD 8. Diabetes 9. Epilepsy 10. Stroke 11. Depression 12. Tuberculosis 13. Anaemia (any one type as covered in theory) 14. Viral infection (any one type as covered in theory) 15. Dermatological conditions (any one condition as covered in theory) 				

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	<p>II. 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. (Minimum 5 cases)</p> <p>III. Simulated cases to enable dose calculation of selected drugs in paediatrics, and geriatrics under various pathological conditions. (Minimum 4 cases)</p>
Course outcomes	<p>Upon successful completion of this course, the students will be able to</p> <ol style="list-style-type: none"> 1. Write SOAP (Subjective, Objective, Assessment and Plan) notes for the given clinical cases of selected common diseases 2. Counsel the patients about the disease conditions, uses of drugs, methods of handling and administration of drugs, life-style modifications, and monitoring parameters.
Text books	<ol style="list-style-type: none"> 1. Clinical Pharmacy and Therapeutics - Roger and Walker, Churchill LivingstonePublication 2. Clinical Pharmacy and Therapeutics - Eric T. Herfindal, Williams and WilkinsPublication 3. Applied Therapeutics: The clinical Use of Drugs. Lloyd Young and Koda-KimbleMA Lippincott, Williams and Wilkins Publication.
Reference books	<ol style="list-style-type: none"> 1. Pharmacotherapy: A Pathophysiologic approach - Joseph T. Dipiro et al. Appleton and Lange Publication. 2. National Formulary of India, Indian Pharmacopoeia Commission, Ghaziabad.

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	<ul style="list-style-type: none">• Hospital Pharmacy Standards (FIP Basel Statements, AHSP)• Introduction to NAQS guidelines and NABH Accreditation and Role of Pharmacists <p>Different Committees in the Hospital</p> <ul style="list-style-type: none">• 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 <p style="text-align: center;">Unit II 14 Hour</p> <p>Supply Chain and Inventory Control</p> <ul style="list-style-type: none">• 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 inventory <p style="text-align: center;">Unit III 15 Hour</p> <p>Drug distribution</p>
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- 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, IV admixture services and incompatibilities, Total parenteral nutrition
- Radio Pharmaceuticals** - Storage, dispensing and disposal of Radiopharmaceuticals
- Application of computers in Hospital Pharmacy Practice,
Electronic health records, Softwares used in hospital pharmacy

Unit IV

22 Hour

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, Post-natal 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 counselling
- Interprofessional collaboration

Pharmaceutical care: Definition, classification of drug related problems. Principles and procedure to provide pharmaceutical care

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	<p>Medication Therapy Management, Home Medication Review Clinical laboratory tests used in the evaluation of disease states - significance and interpretation of test results</p> <ul style="list-style-type: none"> • Haematological, Liver function, Renal function, thyroid function tests • Tests associated with cardiac disorders • Fluid and electrolyte balance • Pulmonary Function Tests <p style="text-align: center;">Unit V 14 Hour</p> <p>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</p> <p>Pharmacovigilance</p> <ul style="list-style-type: none"> • Definition, aim and scope • Overview of Pharmacovigilance <p>Medication errors: Definition, types, consequences, and strategies to minimize medication errors, LASA drugs and Tallman lettering as per ISMP</p> <p>Drug Interactions: Definition, types, clinical significance of drug interactions</p>
Course outcomes	<p>Upon successful completion of this course, the students will be able to</p> <ol style="list-style-type: none"> 1. Explain about the basic concepts of hospital pharmacy administration 2. Manage the supply chain and distribution of medicines within the hospital settings 3. Assist the other healthcare providers in monitoring drug therapy and address drug related problems 4. Interpret common lab investigation reports for optimizing drug therapy

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Text books	<ol style="list-style-type: none">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.
Reference books	<ol style="list-style-type: none">1. Basic skills in interpreting laboratory data - Scott LT, American Society of Health System Pharmacists Inc.2. Australian drug information- Procedure manual. The Society of Hospital Pharmacists of Australia.

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Course Title	Hospital & Clinical Pharmacy (Practical)				
Course Code	ER20-25P				
Course Credits	L	T	P	Credits	
			3	2	
Prerequisites	Basic details fundamental studied in diploma II Year Hospital & Clinical Pharmacy				
Course objectives	<p>This course will train the students with hands-on experiences, simulated clinical case studies in the following:</p> <ol style="list-style-type: none"> 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. 				
Course Contents	<p>Practicals</p> <ol style="list-style-type: none"> 1. Systematic approach to drug information queries using primary / secondary / tertiary resources of information (2 cases) 2. Interpretation of laboratory reports to optimize the drug therapy in a given clinical case (2 cases) 3. Filling up IPC's ADR Reporting Form and perform causality assessments using various scales (2 cases) 4. Demonstration / simulated / hands-on experience on the identification, types, use / application / administration of <ul style="list-style-type: none"> • Orthopaedic and Surgical Aids such as knee cap, LS belts, abdominal belt, walker, walking sticks, etc. • Different types of bandages such as sterile gauze, cotton, crepe bandages, etc. • Needles, syringes, catheters, IV set, urine bag, RYLE's tube, 				

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	<p>urine pots,colostomy bags, oxygen masks, etc.</p> <ul style="list-style-type: none"> • Case studies on drug-drug interactions (any 2 cases) • Wound dressing (simulated cases and role play –minimum 2 cases) • Vaccination and injection techniques (IV, IM, SC) using mannequins (5 activities) • Use of Hospital Pharmacy Software and various digital health tools
Course outcomes	<p>Upon completion of the course, the students will be able to</p> <ol style="list-style-type: none"> 1. Professionally handle and answer the drug information queries 2. Interpret the common laboratory reports 3. Report suspected adverse drug reactions using standard procedures 4. Understand the uses and methods of handling various medical/surgical aids and devices 5. Interpret and report the drug-drug interactions in common diseases for optimizing the drug therapy
Text Books	<ol style="list-style-type: none"> 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.
References Books	<ol style="list-style-type: none"> 1. Basic skills in interpreting laboratory data - Scott LT, American Society of Health System Pharmacists Inc. 2. Australian drug information- Procedure manual. The Society of Hospital Pharmacists of Australia.

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	<p>Study of schedule C and C1, G, H, H1, K, P, M, N, and X.</p> <p>Sale of Drugs – Wholesale, Retail sale and Restricted license, Records to be kept in a pharmacy Drugs Prohibited for manufacture and sale in India</p> <p>Administration of the Act and Rules – Drugs Technical Advisory Board, Central Drugs Laboratory, Drugs Consultative Committee, Government analysts, licensing authorities, controlling authorities, Drug Inspectors.</p> <p style="text-align: center;">Unit III 13 Hour</p> <p>Drugs and Magic Remedies (Objectionable Advertisements) Act 1954 Objectives, Definitions, Prohibition of certain advertisements, Classes of Exempted advertisements, Offences and Penalties.</p> <p>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.</p> <p>Poisons Act-1919: Introduction, objective, definition, possession, possession for sales and sale of any poison, import of poisons</p> <p>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</p> <p>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)</p>
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	Unit IV 18 Hour
	<p>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.</p> <p>Medical Termination of Pregnancy Act and Rules – basic understanding, salient features, and Amendments</p> <p>Role of all the government pharma regulator bodies –Central Drugs Standards Control Organization (CDSCO), Indian Pharmacopoeia Commission (IPC)</p> <p>Good Regulatory practices (documentation, licenses, renewals, e-governance) in Community Pharmacy, Hospital pharmacy, Pharma Manufacturing, Wholesale business,</p> <p style="padding-left: 40px;">inspections, import, export of drugs and medical devices</p> <p>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</p>
	Unit V 12 Hour
	<p>Blood bank – basic requirements and functions</p> <p>Clinical Establishment Act and Rules – Aspects related to Pharmacy</p> <p>Biomedical Waste Management Rules 2016 – Basic aspects, and aspects related to pharma manufacture to disposal of pharma / medical waste at homes, pharmacies, and hospitals</p> <p>Bioethics - Basic concepts, history and principles. Brief overview of ICMR's National Ethical Guidelines for Biomedical and Health Research involving human Participants</p> <p>Introduction to the Consumer Protection Act</p>

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	Introduction to the Disaster Management Act Medical Devices – Categorization, basic aspects related to manufacture and sale
Course outcomes	Upon successful completion of this course, the students will be able to 1. Describe the history and evolution of pharmacy law in India 2. Interpret the act and rules regulating the profession and practice of pharmacy in India 3. Discuss the various codes of ethics related to practice standards in pharmacy 4. Interpret the fundamentals of patent laws from the perspectives of pharmacy
Text Books	1. Text book of Forensic Pharmacy by B.M. Mithal 2. Forensic Pharmacy by B. Suresh 3. Hand book of drug law-by M.L. Mehra 4. A text book of Forensic Pharmacy by N.K. Jain 5. Drugs and Cosmetics Act/Rules by Govt. of India publications. 6. Medicinal and Toilet preparations Act 1955 by Govt. of India publications.
References Books	1. Narcotic Drugs and Psychotropic Substances Act by Govt. of India publications 2. Drugs and Magic Remedies Act by Govt. of India publications. 3. CDSCO Website, NPPA Website 4. Books on Drugs and Cosmetic Act by Nilesh Gandhi and Sudhir Deshpande 5. Text Book of Forensic Pharmacy by Dr Guruprasad Mohanta

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