

### THIRD YEAR B.PHARMACY COURSE OUTCOMES (2019 PCI Pattern)

Subject Code	Subject	Course Outcome Number	Course Outcome
		<b>The students will be able to</b>	
BP501T	<b>Medicinal Chemistry-I</b>	<b>1</b>	Describe the general aspects of the design & development of drugs including classification, nomenclature, structure activity relationship (SAR), mechanism of action and synthesis of Antihistaminic agents , Gastric proton pump inhibitors and leukotriene antagonist.
		<b>2</b>	Memorize chemistry of prostaglandin and prostanoids.
		<b>3</b>	Explain classification, nomenclature, structure activity relationship (SAR), mechanism of action, adverse effects, drug synthesis , therapeutic uses of various classes like anti-anginal , antiarrhythmic ,antihypertensive, antihyperlipidemic and diuretics.
		<b>4</b>	Elaborate the chemical structure and biological activity of various categories of steroid drugs and antithyroidal agents.
		<b>5</b>	Discuss the general aspects of the design & development of drugs including classification, nomenclature, structure activity relationship (SAR), mechanism of action of and synthesis of oral hypoglycemic and local anaesthetics
		<b>The students will be able to</b>	
BP502T	<b>Industrial Pharmacy-I Theory</b>	<b>1</b>	Understand the concepts of dosage form design & formulation strategies.
		<b>2</b>	Explain tablets as a dosage form for manufacture & evaluation, equipments, defects in tableting & remedies,coating, manufacture, evaluation and packaging of different liquid dosage forms.
		<b>3</b>	Explain capsules, types, additives, size selection, manufacturing equipments, defects & evaluation, and also formulation requirements, pelletization process, equipments for manufacture of pellets.
		<b>4</b>	Explain different types, preformulation, formulation , containers, evaluation of parenterals and ophthalmic preparations with production facilities and controls and aseptic processing.
		<b>5</b>	Explain formulation and preparation of different types of cosmetic products. materials ,factors influencing choice of containers, legal and official requirements, stability aspects and quality control tests of packaging materials
			<b>The students will be able to</b>

BP503T	Pharmacology II – Theory	<table border="1"> <tr><td>1</td><td>Discuss Pharmacotherapy of Cardiovascular disorders and Cardiovascular Shock.</td></tr> <tr><td>2</td><td>Explain Diuretics and anti-diuretics</td></tr> <tr><td>3</td><td>Explain Autacoids and related drugs</td></tr> <tr><td>4</td><td>Describe Drugs acting on endocrine system</td></tr> <tr><td>5</td><td>Explain and demonstrate Bioassay</td></tr> </table>	1	Discuss Pharmacotherapy of Cardiovascular disorders and Cardiovascular Shock.	2	Explain Diuretics and anti-diuretics	3	Explain Autacoids and related drugs	4	Describe Drugs acting on endocrine system	5	Explain and demonstrate Bioassay
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BP506P	Industrial Pharmacy-I - Practical	<p style="text-align: center;"><b>The students will be able to</b></p> <table border="1"> <tr><td>1</td><td>State the correct use of various equipments in pharmaceutics laboratory relevant to tablets, capsules, injections and ophthalmic preparations.</td></tr> <tr><td>2</td><td>Design and carry out formulation of granules, tablets, capsules and evaluation</td></tr> <tr><td>3</td><td>Design and carry out formulation of injectable preparations</td></tr> </table>	1	State the correct use of various equipments in pharmaceutics laboratory relevant to tablets, capsules, injections and ophthalmic preparations.	2	Design and carry out formulation of granules, tablets, capsules and evaluation	3	Design and carry out formulation of injectable preparations				
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	<b>Practical</b>	<b>4</b>	Design and carry out formulation of ophthalmic preparations and evaluation.	
		<b>5</b>	Design and carry out formulation of cosmetic preparations and evaluation.	
		<b>6</b>	Carry out evaluation of Glass containers	
<b>BP507P</b>	<b>Pharmacology-II Pr.</b>	<b>The students will be able to</b>		
		<b>1</b>	Discuss physiological salt solutions, drug solution and use of molar solution in various animal experiments.	
		<b>2</b>	Demonstrate effect of various drugs on heart rate, blood pressure in heart and on rabbit eye by using software.	
		<b>3</b>	Demonstrate bioassay of matching, graphical, three point and four point method and DRC, PA2, PD2 Value using suitable isolated tissue preparations	
		<b>4</b>	Demonstrate Anti-inflammatory activity of drugs using carrageenan induced paw-edema model	
		<b>5</b>	Demonstrate effect of spasmogens and spasmolytics using rabbit jejunum.	
		<b>6</b>	Demonstrate Analgesic activity using hotplate method	
		<b>7</b>	Demonstrate Anti allergic activity by mast cell stabilization assay	
		<b>8</b>	Demonstrate Clinical Case study and dose calculation	
		<b>The students will be able to</b>		
<b>BP508P</b>	<b>Pharmacognosy and Phytochemistry II – Practical</b>	<b>1</b>	Students are able to discuss the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents.	
		<b>2</b>	Students are able to discuss the production of Phytoconstituents /herbal formulation	
		<b>3</b>	Students are able to explain the metabolic pathways in formation of secondary metabolites and application of biogenetic studies.	
		<b>4</b>	Students are able to demonstrate isolation and identification of phytoconstituents.	
		<b>The students will be able to</b>		
<b>BP601T</b>	<b>Medicinal Chemistry III – Theory</b>	<b>1</b>	Students are able to understand raw material as source of herbal drugs from cultivation to herbal drug products.	
		<b>2</b>	Students are able to know the WHO and ICH guidelines for evaluation of herbal drugs.	
		<b>3</b>	Students are able to know the herbal cosmetics, natural sweeteners, nutraceuticals.	
		<b>4</b>	Students are able to understand & appreciate patenting of herbal drugs, GMP.	
		<b>The students will be able to</b>		
<b>BP602T</b>	<b>Pharmacology III – Theory</b>	<b>1</b>	Discuss Pharmacology of drugs acting on Respiratory system	
		<b>2</b>	Discuss Pharmacology of drugs acting on the Gastrointestinal Tract	
		<b>3</b>	Explain Chemotherapy	

	<b>Theory</b>	4	Describe Immunopharmacology	
		5	Explain Protein drugs, monoclonal antibodies, target drugs to antigen, biosimilars	
		6	Describe Principles of toxicology	
<b>BP603T</b>	<b>Herbal Drug Technology – Theory</b>	<b>The students will be able to</b>		
		1	Apply basics of API industry and chemical process kinetics with respect to various classes of reactions for manufacturing of API.	
		2	Manufacture API utilizing knowledge of chemical process, reaction system, equipments used and layout design.	
		3	Categorize and optimize synthetic routes of reactions by selecting proper raw material and reagents, scale up techniques and considering quality control aspects, safety and environmental aspects and green chemistry approaches .	
		4	Apply the chirality and polymorphism concept in manufacturing of some important APIs.	
		5	Practice Quality Assurance (QA), Quality Control (QC) and follow GMP in API manufacturing including ICH Q7, Q7A and Q11 while working in API industry.	
<b>BP604T</b>	<b>Biopharmaceutics and Pharmacokinetics – Theory</b>	<b>The students will be able to</b>		
		1	Understand the concept of biopharmaceutics and relate different factors, types, mechanisms of absorption, distribution.	
		2	Understand different factors, types, mechanisms of elimination.	
		3	Distinguish the clinical significance of bioavailability, bioequivalence.	
		4	Justify the importance of one compartment model in the study of pharmacokinetics.	
		5	Justify the importance of two compartment model in the study of pharmacokinetics.	
		6	Interpret the non- linearity along with its significance and outline the applications	
<b>BP605T</b>	<b>Pharmaceutical Biotechnology – Theory</b>	<b>The students will be able to</b>		
		1	Recognize the importance, scope & applications of Pharmaceutical biotechnology and to elaborate applications and methods of enzyme immobilization techniques etc.	
		2	Explain the information about the techniques of genetic engineering along with applications in production of pharmaceuticals.	
		3	Elaborate different types and structures of immunizing agents with preparation and storage of vaccines and monoclonal antibodies along with their importance in industries.	
		4	Explain the use of microorganisms in fermentation technology	

BP606T	Quality Assurance –Theory	<b>The students will be able to</b>	
		1	Apply the various aspects of Quality Assurance, Quality Control, Total Quality Management and quality certifications to pharmaceutical industry.
		2	Implement concepts of Good Laboratory Practices, Quality Control tests in pharmaceutical industry.
		3	Maintain, retain and retrieve documents in pharmaceutical industry.
		4	Demonstrate laboratory skills to perform calibration and validation.
BP607P	Medicinal chemistry III – Practical	<b>The students will be able to</b>	
		1	Demonstrate laboratory skills to separate and determine $R_f$ values of mixture of amino acids, carbohydrates by paper and thin layer chromatography.
		2	Perform validation of spectrophotometric assay methods as per ICH guidelines.
		3	Summarize principle involved in Column chromatographic separation and HPTLC techniques.
BP608P	Pharmacology III – Practical	<b>The students will be able to</b>	
		1	Demonstrate anti-ulcer activity of a drug using pylorus ligand (SHAY) rat model and NSAIDS induced ulcer model.
		2	Demonstrate effect of drugs on gastrointestinal motility and Effect of agonist and antagonists on guinea pig ileum
		3	Explain estimation of serum biochemical parameters by using semi- autoanalyser and effect of saline purgative on frog intestine
		4	Explain hypoglycemic effect of insulin in rabbit and Test for pyrogens ( rabbit method)
		5	Explain determination of acute oral toxicity (LD50) of a drug from a given data and determination of acute skin irritation / corrosion of a test substance.
		6	<del>Demonstrate acute skin irritation and acute eye irritation for corrosive test substances and calculation of pharmacokinetic parameters from a given data.</del>
		7	Explain Biostatistics methods
		8	Demonstrate Bioassay of serotonin using rat fundus strip by three point bioassay and bioassay of acetylcholine using rat ileum/colon by four point bioassay.
		9	Demonstrate mydriatic and miotic effects on rabbit eye.
BP609P	Herbal Drug Technology – Practical	<b>The students will be able to</b>	
		1	Understand evaluation of excipients of natural origin.
		2	Discuss preliminary phytochemical screening of crude drugs.
		3	Understand preparation & standardization of extract in cosmetic formulations like creams, lotions and shampoos and their evaluation

	<b>4</b>	Understand preparation & standardization of extract in formulations like syrups, mixtures and tablets and their evaluation as per Pharmacopoeial requirements.
	<b>5</b>	Determine aldehyde, phenol & alkaloid content.