

## SECOND YEAR B.PHARMACY COURSE OUTCOMES (2019 Pattern)

Subject Code	Subject	Course Outcome Number	Course Outcome	
BP301T	<b>Pharmaceutical Organic Chemistry II – Theory</b>	<b>The students will be able to</b>		
		1	relate and account for reactivity/stability of compounds along with proper orientated products .	
		2	summarize the synthesis and chemistry of benzene and its derivatives ,phenols, aromatic amines ,polynuclear hydrocarbons and cycloalkanes	
		3	apply principles of stereochemistry to identify chiral compounds , locate and assign configuration to stereocentres, justify the stabilities and reactivity of different sterioisomers.	
		4	Assess the properties and quality of fats and oils.	
BP302T	<b>Physical Pharmaceutics I – Theory</b>	<b>The students will be able to</b>		
		1	Understand the importance of solubility, distribution phenomenon with utilization of the concepts in studying the absorption of drugs and application of phase rule for formulation of stable aerosols and emulsions.	
		2	Understand crystal habit, methods of crystal analysis, importance of polymorphism in solubility, design of dosage forms and demonstrate use of physicochemical properties of drugs in the formulation development and evaluation of dosage forms.	
		3	Select a suitable surfactant for designing a stable Pharmaceutical formulation.	
		4	To use them for calculations of drug release and stability constant.	
		5	Apply the laws, equations related to pH, buffers and understand the importance of pH, buffers and isotonic solutions in the formulation of stable and efficient formulations.	
		<b>The students will be able to</b>		
		1	Analyze the importance & applications of Pharmaceutical microbiology.	
		2	Summarize the knowledge of different microorganism like bacteria. Elaborate concept of sterilization with their methods & applications in the field of Pharmacy.	

BP303T	<b>Pharmaceutical Microbiology – Theory</b>	<p>Elaborate the classification, reproduction and applications of fungus and viruses with different examples. Differentiate the concept of antiseptic &amp; disinfection. Also, describe their mechanism of actions, evaluation tests &amp; sterility tests of pharmaceutical products.</p> <p>Elaborate designing of aseptic area, sources of contamination, principles and methods of microbial assay and the importance of environmental cleanliness.</p> <p>Recognize types and factors affecting microbial spoilage, methods of preservation of pharmaceutical products. Clarify evaluation of microbial stability of formulations and importance of cell cultures in pharmaceutical industry and research.</p>
BP304T	<b>Pharmaceutical Engineering – Theory</b>	<p><b>The students will be able to</b></p> <p>1 To understand basic principal and methodology of distillation, drying and evaporation</p> <p>2 Elucidate fundamentals and facts about flow of fluids.</p> <p>3 To understand different material handling system such as size reduction and separation, mixing</p> <p>4 To know the basic principle and equipments used in heat transfer</p> <p>5 To know different unit operations such as filtration and centrifugation</p> <p>6 To choose the material of construction of various equipment and methods prevention of corrosion</p>
BP305P	<b>Pharmaceutical Organic Chemistry II – Practical</b>	<p><b>The students will be able to</b></p> <p>1 demonstrate and explain techniques like recrystallisation and steam distillation.</p> <p>2 demonstrate laboratory skills to separate and identify the organic compounds from the given unknown binary organic compounds having different functional reactive groups (solid-solid binary mixture).</p> <p>3 to assess the quality of oils based on their saponification value .</p> <p>4 synthesize organic compounds based on various reactions.</p> <p><b>The students will be able to</b></p>

BP306P	<b>Physical Pharmaceutics I – Practical</b>	<table border="1"> <tr> <td data-bbox="846 151 931 295">1</td><td data-bbox="931 151 1797 295">Calculate solubility of substance at different temperature understand the importance of partition co-efficient required for preformulation studies and determine thermodynamic parameters using stability study.</td></tr> <tr> <td data-bbox="846 295 931 404">2</td><td data-bbox="931 295 1797 404">Calculate critical solution temperature; evaluate the effect of addition of electrolyte on critical solution temperature of phenol – water system.</td></tr> <tr> <td data-bbox="846 404 931 481">3</td><td data-bbox="931 404 1797 481">Calculate the HLB value of surfactant and select a suitable surfactant for designing a stable formulation.</td></tr> <tr> <td data-bbox="846 481 931 558">4</td><td data-bbox="931 481 1797 558">Calculate critical micelle concentration of surfactant and understand the role of surfactants in solubalization.</td></tr> <tr> <td data-bbox="846 558 931 651">5</td><td data-bbox="931 558 1797 651">Calculate the pka value and understand the application of Henderson Hasselbalch equation for calculating pH.</td></tr> <tr> <td data-bbox="846 651 931 711">6</td><td data-bbox="931 651 1797 711">Understand the concept of Freundlich and Langmuir adsorption isotherm and calculate the surface area of charcoal.</td></tr> <tr> <td data-bbox="846 711 931 788">7</td><td data-bbox="931 711 1797 788">Calculate stability constant and donor acceptor ratio of different complex by solubility and pH titration method.</td></tr> <tr> <td data-bbox="846 788 931 822">8</td><td data-bbox="931 788 1797 822">Calculate the refractive index of the samples.</td></tr> </table>	1	Calculate solubility of substance at different temperature understand the importance of partition co-efficient required for preformulation studies and determine thermodynamic parameters using stability study.	2	Calculate critical solution temperature; evaluate the effect of addition of electrolyte on critical solution temperature of phenol – water system.	3	Calculate the HLB value of surfactant and select a suitable surfactant for designing a stable formulation.	4	Calculate critical micelle concentration of surfactant and understand the role of surfactants in solubalization.	5	Calculate the pka value and understand the application of Henderson Hasselbalch equation for calculating pH.	6	Understand the concept of Freundlich and Langmuir adsorption isotherm and calculate the surface area of charcoal.	7	Calculate stability constant and donor acceptor ratio of different complex by solubility and pH titration method.	8	Calculate the refractive index of the samples.
1	Calculate solubility of substance at different temperature understand the importance of partition co-efficient required for preformulation studies and determine thermodynamic parameters using stability study.																	
2	Calculate critical solution temperature; evaluate the effect of addition of electrolyte on critical solution temperature of phenol – water system.																	
3	Calculate the HLB value of surfactant and select a suitable surfactant for designing a stable formulation.																	
4	Calculate critical micelle concentration of surfactant and understand the role of surfactants in solubalization.																	
5	Calculate the pka value and understand the application of Henderson Hasselbalch equation for calculating pH.																	
6	Understand the concept of Freundlich and Langmuir adsorption isotherm and calculate the surface area of charcoal.																	
7	Calculate stability constant and donor acceptor ratio of different complex by solubility and pH titration method.																	
8	Calculate the refractive index of the samples.																	
<b>The students will be able to</b>																		
<table border="1"> <tr> <td data-bbox="846 869 931 961">1</td> <td data-bbox="931 869 1797 961">Demonstrate the principle, construction and working of various instruments and perform their operations. Also, handle microscope for observation of microbes.</td></tr> </table>	1	Demonstrate the principle, construction and working of various instruments and perform their operations. Also, handle microscope for observation of microbes.																
1	Demonstrate the principle, construction and working of various instruments and perform their operations. Also, handle microscope for observation of microbes.																	
<table border="1"> <tr> <td data-bbox="846 979 931 1070">2</td> <td data-bbox="931 979 1797 1070">Apply the skills required for maintaining strictly aseptic condition &amp; inoculation of cultures. Also, learn how to prepare and sterilize nutrient broth, nutrient agar, slants, stabs and plates.</td></tr> </table>	2	Apply the skills required for maintaining strictly aseptic condition & inoculation of cultures. Also, learn how to prepare and sterilize nutrient broth, nutrient agar, slants, stabs and plates.																
2	Apply the skills required for maintaining strictly aseptic condition & inoculation of cultures. Also, learn how to prepare and sterilize nutrient broth, nutrient agar, slants, stabs and plates.																	
<table border="1"> <tr> <td data-bbox="846 1088 931 1179">3</td> <td data-bbox="931 1088 1797 1179">Demonstrate the morphology of bacteria by simple staining, gram staining and acid fast staining.</td></tr> </table>	3	Demonstrate the morphology of bacteria by simple staining, gram staining and acid fast staining.																
3	Demonstrate the morphology of bacteria by simple staining, gram staining and acid fast staining.																	
<table border="1"> <tr> <td data-bbox="846 1197 931 1272">4</td> <td data-bbox="931 1197 1797 1272">Demonstrate skills for isolation, identification &amp; characterization of microorganisms and isolate microorganism by streak plate technique, pour plate and spread plate technique.</td></tr> </table>	4	Demonstrate skills for isolation, identification & characterization of microorganisms and isolate microorganism by streak plate technique, pour plate and spread plate technique.																
4	Demonstrate skills for isolation, identification & characterization of microorganisms and isolate microorganism by streak plate technique, pour plate and spread plate technique.																	
<table border="1"> <tr> <td data-bbox="846 1290 931 1365">5</td> <td data-bbox="931 1290 1797 1365">Demonstrate the motility of bacteria by hanging drop technique.</td></tr> </table>	5	Demonstrate the motility of bacteria by hanging drop technique.																
5	Demonstrate the motility of bacteria by hanging drop technique.																	
<table border="1"> <tr> <td data-bbox="846 1383 931 1408">6</td> <td data-bbox="931 1383 1797 1408">Describe the applications of antibiotic assay, sterility testing Bacteriological analysis of water, Biochemical Tests.</td></tr> </table>	6	Describe the applications of antibiotic assay, sterility testing Bacteriological analysis of water, Biochemical Tests.																
6	Describe the applications of antibiotic assay, sterility testing Bacteriological analysis of water, Biochemical Tests.																	
<b>The students will be able to</b>																		
<table border="1"> <tr> <td data-bbox="846 1467 931 1491">1</td> <td data-bbox="931 1467 1797 1491">To perform the experiment based on heat transfer including radiation</td></tr> </table>	1	To perform the experiment based on heat transfer including radiation																
1	To perform the experiment based on heat transfer including radiation																	

BP 308P	Pharmaceutical Engineering – Practical	<p>2 To study the drying curves, find out moisture content and humidity of air</p> <p>3 To understand the factors affecting filtration, evaporation and crystallization.</p> <p>4 To verify laws of size reduction using ball mill and to evaluate size analysis by sieving</p> <p>5 To be familiar with different equipment used in various pharmaceutical processes</p> <p>6 To find out the efficiency of equipment based on mixing and distillation</p>
BP401T	Pharmaceutical Organic Chemistry –III (Theory)	<p style="text-align: center;"><b>The students will be able to</b></p> <p>1 To apply principles of stereochemistry to identify chiral compounds, locate and assign configuration to stereocentres, justify stabilities and reactivities of different stereoisomers.</p> <p>2 To explain the chemistry, methods of preparation and properties of various heterocyclic compounds.</p> <p>3 To explain the medicinal uses and other applications of various heterocyclic compounds.</p> <p>4 To write the mechanism along with stereochemistry of various molecular rearrangements and apply the basic knowledge and principles to predict the product of the reaction.</p>
BP402T	Medicinal Chemistry I – Theory	<p style="text-align: center;"><b>The students will be able to</b></p> <p>1 Extend the knowledge of biological membrane and physicochemical properties, affecting drug action; solubility, partition coefficient, Ferguson principle, stereo chemical aspects of drug action ,Bioisosterism and drug metabolic pathways, adverse effect and therapeutic value of Drugs.</p> <p>2 Relate between the chemical structure and biological activity of various categories of adrenergic agonists and antagonists.</p> <p>3 Explain classification, nomenclature, structure activity relationship (SAR), mechanism of action, adverse effects, therapeutic uses of cholinergic agonists and antimuscarinic agents.</p> <p>4 Discuss classification, nomenclature, structure activity relationship (SAR), mechanism of action, adverse effects, and therapeutic uses of drugs acting on central nervous system.</p>

		5	Describe classification, nomenclature, structure activity relationship (SAR), mechanism of action, adverse effects, therapeutic uses of centrally acting analgesics Narcotic and non-narcotic analgesics Morphine and related drugs and Anti-  <b>The students will be able to</b>
BP403T	<b>Physical Pharmaceutics II – Theory</b>	1	To understand the importance of electrical double layer in formulating a stable colloidal system and the properties of colloids and its actions.
		2	Understand the different types of flow in order to identify and choose suitable flow characteristics for the formulation and calculate viscosity of formulations.
		3	Relate various physicochemical properties of drug and excipient molecules in designing the dosage forms.
		4	Evaluate particle size, particle size distribution & derived properties of powder.
		5	Evaluate the kinetics of drug system and predict the shelf life of the product, storage and its stability.
BP404T	<b>Pharmacology I – Theory</b>		<b>The students will be able to</b>
		1	Extend the knowledge of basics of pharmacology like history, scope, nature and sources of drugs, route of drug administration and pharmacokinetic processes.
		2	Describe the pharmacodynamics, adverse drug reaction, drug interaction and the process of drug discovery and development and Pharmacovigilance
		3	Summarize the Pharmacology of drugs acting on peripheral nervous system.
		4	Illustrate the concept of Neurohumoral transmission in the central nervous system and Pharmacology of drugs acting on central nervous system.
Code:	<b>Pharmacognosy and Phytochemistry- I</b>		<b>The students will be able to</b>
		1	Describe meaning and significance of Pharmacognostic parameters of crude drugs.
		2	Differentiate cells and tissue; describe their functions and anatomy of different parts of plant.
		3	Elaborate need, for classification, approaches and significance of internationally accepted standards of nomenclature.

		<p>4 Explain term pharmacognosy, it's development and linkages to other branches.</p> <p>5 To discriminate primary and secondary metabolites from their source and explain their industrial applications.</p> <p>6 Illustrate methods of extraction and explain rationale behind qualitative and quantitative analysis of primary and secondary metabolites.</p>
BP406P	Medicinal Chemistry I – Practical	<p style="text-align: center;"><b>The students will be able to</b></p> <p>1 Apply purification techniques of synthesized compounds by column chromatography.</p> <p>2 Determine the dissociation constant of various compounds</p> <p>3 Determine the partition co-efficient of various compounds.</p> <p>4 To apply thin layer chromatography and column chromatography technique for purification of synthesized compounds.</p> <p>5 Synthesize medicinal drugs and theirs intermediates.</p>
BP407P	Physical Pharmaceutics II – Practical	<p style="text-align: center;"><b>The students will be able to</b></p> <p>1 Determine the particle size and size distribution by microscopy &amp; sieve analysis &amp; understand the importance of flow properties in the formulation of dosage form.</p> <p>2 Calculate viscosity of liquids and understand the working of Brookfield viscometer.</p> <p>3 Understand the formulation of suspension and the effect of suspending agents on the formulation of suspension.</p> <p>4 Determine order of reaction and calculate the shelf life of the product.</p> <p>5 Calculate the cloud point and Krafft point of the surfactant and understand its importance in the formulation and stability of emulsions.</p> <p>6 Formulate stable colloids.</p>
BP408P	Pharmacology I – Practical	<p style="text-align: center;"><b>The students will be able to</b></p> <p>1 Extend the knowledge of basics of experimental pharmacology and commonly used instruments in experimental pharmacology.</p> <p>2 Describe the common laboratory animals used in experimental pharmacology and CPCSEA guidelines.</p> <p>3 Explain the different routes of drugs administration and Common laboratory techniques used for animal studies.</p>

		4	Explain and observe the effect of drugs on animals by simulated experiments and videos
BP409P	<b>Pharmacognosy and Phytochemistry- I (Practical)</b>	<b>The students will be able to</b>	
		1	Illustration of micrometric data and relate them to identify the crude drugs.
		2	Draw morphological and microscopical diagrams, label component and judge purity of crude drugs.
		3	Illustrate morphological and microscopical features of organized and unorganized crude drugs by applying theoretical and experimental knowledge.