

COURSE BOOK B. PHARM I YEAR

(Autonomous)



CURRICULUM STRUCTURE & SYLLABUS

Effective from the Session: 2025-26

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1. Teaching Scheme of (B. Pharm. I Year)

1st SEM

S. No.	Course Type	BOS	Course Code	Course Name	Academic Learning (AL)			Continuous Internal Examination (CIE)		Mid Sem Exam (MSE)	End Semester Examination (ESE)	CIE+ESE	Total Credit
					L	T	P	MSE	CA				
1	B. Pharm	KSOP	BP101T	Human Anatomy and Physiology I– Theory	3	1	0	15	10	25	75	100	4
2	B. Pharm	KSOP	BP102T	Pharmaceutical Analysis I –Theory	3	1	0	15	10	25	75	100	4
3	B. Pharm	KSOP	BP103T	Pharmaceutics I –Theory	3	1	0	15	10	25	75	100	4
4	B. Pharm	KSOP	BP104T	Pharmaceutical Inorganic Chemistry – Theory	3	1	0	15	10	25	75	100	4
5	B. Pharm	KSOP	BP105T*	Communication Skills –Theory *	2	0	0	30	20	50	-	50	2
6	B. Pharm	KSOP	BP106RBT*# BP106RMT*\$	Remedial Biology/ Mathematics – Theory*	2	0	0	30	20	50	-	50	2
7	B. Pharm	KSOP	BPH1 113	Emerging Technologies in Pharmacy-AI, Data Science, Cloud, IOT, 3D Printing	3	0	0	15	10	25	-	25	0.2
Lab/Internship/Project work/Workshop													
8	B. Pharm	KSOP	BP107P	Human Anatomy and Physiology –Practical	0	0	4	10	5	15	35	50	2
9	B. Pharm	KSOP	BP108P	Pharmaceutical Analysis I – Practical	0	0	4	10	5	15	35	50	2
10	B. Pharm	KSOP	BP109P	Pharmaceutics I – Practical	0	0	4	10	5	15	35	50	2
11	B. Pharm	KSOP	BP110P	Pharmaceutical Inorganic Chemistry – Practical	0	0	4	10	5	15	35	50	2
12	B. Pharm	KSOP	BP111P*	Communication skills – Practical*	0	0	2	15	10	25	-	25	1
13	B. Pharm	KSOP	BP112RBP*	Remedial Biology – Practical*	0	0	2	15	10	25	-	25	1
Total Hours = 43 hrs.					19	4	18/20#					775	30.2
<i>* Non-University Examination (NUE)</i>													
<i>#Applicable ONLY for the students who have studied Mathematics/ Physics/ Chemistry at HSC and appearing for Remedial Biology (RB) course.</i>													
<i>\$Applicable ONLY for the students who have studied Physics/ Chemistry/ Botany/ Zoology at HSC and appearing for Remedial Mathematics (RM) course.</i>													



2nd SEM

S No.	Course Type	BOS	Course Code	Course Name	Academic Learning (AL)			Continuous Internal Examination (CIE)		Mid Sem Exam (MSE)	End Semester Examination (ESE)	CIE+ESE	Total Credit
					L	T	P	MSE	CA				
1	B. Pharm	KSOP	BP201T	Human Anatomy and Physiology II – Theory	3	1	0	15	10	25	75	100	4
2	B. Pharm	KSOP	BP202T	Pharmaceutical Organic Chemistry I – Theory	3	1	0	15	10	25	75	100	4
3	B. Pharm	KSOP	BP203T	Biochemistry – Theory	3	1	0	15	10	25	75	100	4
4	B. Pharm	KSOP	BP204T	Pathophysiology - Theory	3	1	0	15	10	25	75	100	4
5	B. Pharm	KSOP	BP205T	Computer Applications in Pharmacy – Theory *	3	0	0	50	25	75	-	75	3
6	B. Pharm	KSOP	BP206T	Environmental sciences – Theory*	3	0	0	50	25	75	-	75	3
7	B. Pharm	KSOP	BPH1 211	Upskilling Including Python	3	0	0	15	10	25	-	25	NC
Lab/Internship/Project work/Workshop													
8	B. Pharm	KSOP	BP207P	Human Anatomy and Physiology -II – Practical	0	0	4	10	5	15	35	50	2
9	B. Pharm	KSOP	BP208P	Pharmaceutical Organic Chemistry I – Practical	0	0	4	10	5	15	35	50	2
10	B. Pharm	KSOP	BP209P	Biochemistry – Practical	0	0	4	10	5	15	35	50	2
11	B. Pharm	KSOP	BP210P	Computer Applications in Pharmacy – Practical*	0	0	2	15	10	25	-	25	1
Total Hours = 39 hrs.					21	4	14					750	29
<i>*Non-University Examination (NUE)</i>													



1. Theory Courses Detail Syllabus

Course Code: BP101T				Course Name: Human Anatomy and Physiology I-Theory				L	T	P	C	
Course Offered in: KIET School of Pharmacy								3	1	0	4	
Pre-requisite: NA												
Course Objectives: Upon completion of this course the student should be able to												
1. Explain the gross morphology, structure and functions of various organs of the human body.												
2. Describe the various homeostatic mechanisms and their imbalances.												
3. Identify the various tissues and organs of different systems of human body.												
4. Perform the various experiments related to special senses and nervous system.												
5. Appreciate coordinated working pattern of different organs of each system												
Course Outcome: After completion of the course, the student will be able to												
1. Understand the basics of human body parts including cell, tissue and various types of cellular communication pathways.												
2. Illustrate the structural and functional characteristics of bones and muscles of the human body.												
3. Compare the composition and functions of Blood and Lymph.												
4. Illustrate the anatomical and physiological aspects of peripheral nervous system and sense organs.												
5. Illustrate the structural and functional aspects of heart and ECG in correlation with related disorders.												
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)												
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	
CO1	3	-	-	-	-	-	1	1	1	-	2	
CO2	3	-	-	-	-	-	1	1	1	-	2	
CO3	3	-	-	-	-	-	1	1	1	-	2	
CO4	3	-	-	-	-	-	1	1	1	-	2	
CO5	3	-	-	-	-	-	1	1	1	-	2	
Unit 1			Introduction to human body								10 hours	
Introduction to human body: Definition and scope of anatomy and physiology, levels of structural organization and body systems, basic life processes, homeostasis, basic anatomical terminology.												
Cellular level of organization: Structure and functions of cell, transport across cell membrane, cell division, cell junctions. General principles of cell communication, intracellular signaling pathway activation by extracellular signal molecule, Forms of intracellular signaling: a) Contact-dependent b) Paracrine c) Synaptic d) Endocrine												
Tissue level of organization: Classification of tissues, structure, location and functions of epithelial, muscular and nervous and connective tissues												
Unit 2			Integumentary system, Skeletal system and Joints								10 hours	
Integumentary system: Structure and functions of skin												
Skeletal system: Divisions of skeletal system, types of bone, salient features and functions of bones of axial and appendicular skeletal system Organization of skeletal muscle, physiology of muscle contraction, neuromuscular junction												
Joints: Structural and functional classification, types of joints movements and its articulation												
Unit 3			Body fluids, blood and Lymphatic system								10 hours	
Bodyfluids and blood: Body fluids, composition and functions of blood, hemopoeisis, formation of hemoglobin, anemia, mechanisms of coagulation, blood grouping, Rh factors, transfusion, its significance and disorders of blood, Reticulo endothelial system.												
Lymphatic system: Lymphatic organs and tissues, lymphatic vessels, lymph circulation and functions of lymphatic system												
Unit 4			Peripheral nervous system and Special senses								08 hours	
Peripheral nervous system: Classification of peripheral nervous system: Structure and functions of												

sympathetic and parasympathetic nervous system. Origin and functions of spinal and cranial nerves. Special senses: Structure and functions of eye, ear, nose and tongue and their disorders.						
Unit 5		Cardiovascular system			07 hours	
Heart– anatomy of heart, blood circulation, blood vessels, structure and functions of artery, vein and capillaries. elements of conduction system of heart and heartbeat, its regulation by autonomic nervous system, cardiac output, cardiac cycle. Regulation of blood pressure, pulse, electrocardiogram and disorders of heart.						
Total Lecture Hours					45 hours	
Textbook: 1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brothers 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 byTortora Grabowski. Palmetto, GA, U.S.A. 31 6. Textbook of Human Histology by Inderbir Singh, Jaypee brother’s medical publishers, New Delhi. 7. Textbook of Practical Physiology by C.L. Ghai, Jaypee brother’s medical publishers, New Delhi. 8. Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother’s medical publishers, New Delhi.						
Reference Books: 1. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co, Riverview, MI USA 2. Text book 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						
Mode of Evaluation						
MSE		CA			ESE	TOTAL
MSE1	MSE2	CA1	CA2 (TA)	CA3		
30	30	3	3	(ATT) 4		
Avg. of MSE1 & MSE2 and converted to 15		10			75	100

Course Code: BP107P		Course Name: Human Anatomy and Physiology (Practical)				L	T	P	C		
Course Offered in: KIET School of Pharmacy						0	0	4	2		
Pre-requisite: NA											
Course Objectives: This course aims to:											
1. To familiarize students with the use and components of the compound microscope and enable microscopic examination of basic tissue types including epithelial, connective, muscular, and nervous tissues.											
2. To develop skills in identifying human skeletal structures, specifically axial and appendicular bones, through hands-on examination and study.											
3. To introduce hemocytometry techniques and train students in the enumeration of red and white blood cells using standard laboratory procedures.											
4. To perform and interpret basic hematological tests, such as bleeding time, clotting time, hemoglobin estimation, blood grouping, and erythrocyte sedimentation rate (ESR).											
5. To measure and analyze cardiovascular parameters, including heart rate, pulse rate, and blood pressure, for a foundational understanding of circulatory system function.											
Course Outcome: After completion of the course, the student will be able to											
1. Illustrate the microscopical characteristics of different types of cells and tissues in human body under the light of microscopic techniques.											
2. Illustrate identify of various types of bones and joints under the background of their anatomical correlation											
3. Assess the methods and techniques to measure the various components of blood.											
4. Demonstrate the process of recording of blood pressure, pulse rate and heart rate.											
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	-	-	2	-	-	-	1	2	-	2
CO2	3	-	-	2	-	-	-	1	2	-	2
CO3	3	-	1	2	-	-	-	1	2	-	3
CO4	3	-	-	2	-	-	-	1	2	-	3
List Of Practical's (Indicative & Not Limited To)											
1. Study of compound microscope.											
2. Microscopic study of epithelial and connective tissue											
3. Microscopic study of muscular and nervous tissue											
4. Identification of axial bones											
5. Identification of appendicular bones											
6. Introduction to hemocytometry.											
7. Enumeration of white blood cell (WBC) count											
8. Enumeration of total red blood corpuscles (RBC) count											
9. Determination of bleeding time											
10. Determination of clotting time											
11. Estimation of hemoglobin content											
12. Determination of blood group.											
13. Determination of erythrocyte sedimentation rate (ESR).											
14. Determination of heart rate and pulse rate.											
15. Recording of blood pressure.											
Total Lecture Hours: 4 hrs./week											
Mode of Evaluation											
MSE				CA			ESE	Total			
MSE1 40	MSE2 40			CA1 3	CA2	CA3 (ATT) 2					
Avg. of MSE1 & MSE2 and converted to 10				5			35	50			

Course Code: BP102T				Course Name: Pharmaceutical Analysis Theory				L	T	P	C	
Course Offered in: KIET School of Pharmacy								3	1	0	4	
Pre-requisite: NA												
Course Objectives: Upon completion of this course the student should be able to												
1. Understand the principles of volumetric and electro chemical analysis												
2. Carryout various volumetric and electrochemical titrations												
3. Develop analytical skills												
Course Outcomes: After completion of the course, the student will be able to												
1. Understand the basic concepts of pharmaceutical analysis, its techniques and errors												
2. Demonstrate the basic concepts of acid base and non-aqueous titrations and its applications												
3. Outline the basic and concepts of precipitation, complexometric, gravimetry and diazotisation titration												
4. Acquire the basic concepts of redox titration along with its applications												
5. Interpret the basics and concepts of electrochemical method of analysis.												
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)												
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	
CO1	3	-	2	3	-	1	1	-	2	-	3	
CO2	3	-	2	2	-	1	1	-	2	1	3	
CO3	3	-	2	3	-	1	1	-	2	1	3	
CO4	3	-	2	3	-	1	1	-	2	1	3	
CO5	3	-	2	3	-	1	1	-	2	1	3	
Unit 1			Pharmaceutical analysis								10 hours	
a) Pharmaceutical analysis - Definition and scope i) Different techniques of analysis ii) Methods of expressing concentration iii) Primary and secondary standards. iv) Preparation and standardization of various molar and normal solutions Oxalic acid, sodium hydroxide, hydrochloric acid, sodium thiosulphate, sulphuric acid, potassium permanganate and ceric ammonium sulphate												
b) Errors : Sources of errors, types of errors, methods of minimizing errors, accuracy, precision and significant figures												
c) Pharmacopoeia, Sources of impurities in medicinal agents, limit tests.												
Unit 2			Acid base and non-aqueous titration								10 hours	
Acid base titration: Theories of acid base indicators, classification of acid base titrations and theory involved in titrations of strong, weak, and very weak acids and bases, neutralization curves												
Non aqueous titration: Solvents, acidimetry and alkalimetry titration and estimation of Sodium benzoate and Ephedrine HCl												
Unit 3			Precipitation & Complexometric Titration and Gravimetry								10 hours	
Precipitation titrations: Mohr's method, Volhard's, Modified Volhard's, Fajans method, estimation of sodium chloride.												
Complexometric titration: Classification, metal ion indicators, masking and demasking reagents, estimation of Magnesium sulphate, and calcium gluconate.												
Gravimetry: Principle and steps involved in gravimetric analysis. Purity of the precipitate: co-precipitation and post precipitation, Estimation of barium sulphate.												
Basic Principles, methods and application of diazotisation titration.												
Unit 4			Redox titrations								08 hours	
a) Concepts of oxidation and reduction												
b) Types of redox titrations (Principles and applications) Cerimetry, Iodimetry, Iodometry, Bromatometry, Dichrometry, Titration with potassium iodate.												
Unit 5			Electrochemical methods of analysis								07 hours	
Conductometry- Introduction, Conductivity cell, Conductometric titrations, applications												

Potentiometry- Electrochemical cell, construction and working of reference (Standard hydrogen, silver chloride electrode and calomel electrode) and indicator electrodes (metal electrodes and glass electrode), methods to determine end point of potentiometric titration and applications. Polarography - Principle, Ilkovic equation, construction and working of dropping mercury electrode and rotating platinum electrode, applications.						
Total Lecture Hours					45 hours	
Recommended Books: (Latest Editions)						
1. A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press of University of London.						
2. A.I. Vogel, Text Book of Quantitative Inorganic analysis.						
3. P. Gundu Rao, Inorganic Pharmaceutical Chemistry.						
4. Bentleyand Driver's Textbook of Pharmaceutical Chemistry.						
5. John H. Kennedy, Analytical chemistry principles.						
6. Indian Pharmacopoeia.						
Mode of Evaluation						
MSE		CA			ESE	TOTAL
MSE1 30	MSE2 30	CA1 3	CA2 (TA) 3	CA3 (ATT) 4		
Avg. of MSE1 & MSE2 and converted to 15		10				
					75	100

Course Code: BP108P		Course Name: Pharmaceutical Analysis (Practical)				L	T	P	C		
Course Offered in: KIET School of Pharmacy						0	0	4	2		
Pre-requisite: NA											
Course Objectives: This course aims:											
<div>1. To perform limit tests for detecting and estimating impurities such as chloride, sulphate, iron, and arsenic in pharmaceutical substances according to Indian Pharmacopoeia standards.</div> <div>2. To develop proficiency in the preparation and standardization of volumetric solutions, including acids, bases, oxidizing, and reducing agents commonly used in pharmaceutical analysis.</div> <div>3. To conduct accurate assays of pharmaceutical compounds using various titrimetric methods such as acid-base, redox, complexometric, iodometric, and precipitation titrations.</div> <div>4. To apply electro-analytical techniques such as conductometric and potentiometric titrations for the determination of normality and analysis of different acid-base systems.</div> <div>5. To interpret and validate analytical data, ensuring precision and compliance with official pharmacopeial procedures in quality control environments.</div>											
Course Outcome: After completion of the course, the student will be able to											
<div>1. Determine the qualitative and quantitative analysis of molecules in pharmaceuticals by volumetric analysis.</div> <div>2. Analyze the standardization of the given strength of molecules in pharmaceuticals.</div> <div>3. Investigate the assay of given samples of pharmaceutical molecules.</div> <div>4. Analyze the electroanalytical methods for determination of normality.</div>											
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	-	3	1	-	-	-	-	3	3	3
CO2	3	-	3	1	-	-	-	-	3	2	3
CO3	3	-	3	1	-	-	1	-	3	1	3
CO4	3	-	3	1	-	-	-	-	3	-	3
List Of Practical's (Indicative & Not Limited To)											
<div>I. Limit Test of the following</div> <div>1. Chloride</div> <div>2. Sulphate</div> <div>3. Iron</div> <div>4. Arsenic</div> <div>II. Preparation and standardization of</div> <div>1. Sodium hydroxide.</div> <div>2. Sulphuric acid.</div> <div>3. Sodium thiosulfate.</div> <div>4. Potassium permanganate.</div> <div>5. Ceric ammonium sulphate.</div> <div>III. Assay of the following compounds along with Standardization of Titrant.</div> <div>1. Ammonium chloride byacid base titration.</div> <div>2. Ferrous sulphate by Cerimetry.</div> <div>3. Copper sulphate by Iodometry.</div> <div>4. Calcium gluconate by complexometry</div> <div>5. Hydrogen peroxide by Permanganometry.</div> <div>6. Sodium benzoate by non-aqueous titration.</div> <div>7. Sodium Chloride by precipitation titration.</div> <div>IV. Determination of Normality by electro-analytical methods.</div> <div>1. Conductometric titration of strong acid against strong base.</div> <div>2. Conductometric titration of strong acid and weak acid against strong base.</div> <div>3. Potentiometric titration of strong acid against strong base.</div>											
Total Lecture Hours: 4 hrs./week											



Mode of Evaluation						
MSE		CA			ESE	Total
MSE1 40	MSE2 40	CA1 3	CA2	CA3 (ATT) 2		
Avg. of MSE1 & MSE2 and converted to 10		5			35	50

Course Code: BP103T				Course Name: Pharmaceutics-I Theory				L	T	P	C
Course Offered in: KIET School of Pharmacy								3	1	0	4
Pre-requisite: NA											
Course Objectives: Upon completion of this course the student should be able to											
1. Know the history of profession of pharmacy											
2. Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations											
3. Understand the professional way of handling the prescription											
4. Preparation of various conventional dosage forms											
Course Outcome: After completion of the course, the student will be able to											
1. Discuss the rational and concept behind the pharmacy profession, definition and types of dosage forms, pharmacopoeia, prescription & Posology.											
2. Apply different types of calculations involved in the pharmaceutics, pharmaceutical powders and liquid dosage forms.											
3. Analyze the different monophasic liquid dosage forms and biphasic liquid dosage forms like suspension and emulsions.											
4. Identify the formulation requirements of suppositories and different types of incompatibilities.											
5. Illustrate the concept and preparation of semisolid dosage forms.											
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	1	1		1	1	1	1	1		2
CO2	3	1	2			1	1				2
CO3	3	1	1	2		1	1				2
CO4	3	1	2			1	1				2
CO5	3	1	1	2		1	1				2
Unit 1				History of Pharmacy, Dosage forms, Prescription and Posology							10 hours
Historical background and development of profession of pharmacy: History of profession of Pharmacy in India in relation to pharmacy education, industry and organization, Pharmacy as a career, Pharmacopoeias: Introduction to IP, BP, USP and Extra Pharmacopoeia.											
Dosage forms: Introduction to dosage forms, classification and definitions											
Prescription: Definition, Parts of prescription, handling of Prescription and Errors in prescription. Posology: Definition, Factors affecting posology. Pediatric dose calculations based on age, body weight and body surface area.											
Unit 2				Pharmaceutical calculations, Powders and Liquid Dosage Forms							10 hours
Pharmaceutical calculations: Weights and measures– Imperial & Metric system, Calculations involving percentage solutions, allegation, proof spirit and isotonic solutions based on freezing point and molecular weight.											
Powders: Definition, classification, advantages and disadvantages, Simple & compound powders– official preparations, dusting powders, effervescent, efflorescent and hygroscopic powders, eutectic mixtures. Geometric dilutions.											
Liquid dosage forms: Advantages and disadvantages of liquid dosage forms. Excipients used in formulation of liquid dosage forms. Solubility enhancement techniques											
Unit 3				Monophasic and Biphasic Liquids							10 hours
Monophasic liquids: Definitions and preparations of Gargles, Mouthwashes, Throat Paint, Eardrops, Nasal drops, Enemas, Syrups, Elixirs, Liniments and Lotions.											
Biphasic liquids:											
Suspensions: Definition, advantages and disadvantages, classifications, Preparation of suspensions; Flocculated and Deflocculated suspension & stability problems and methods to overcome. Emulsions: Definition, classification, emulsifying agent, test for the identification of type of Emulsion, Methods of preparation & stability problems and methods to overcome.											
Unit 4				Suppositories and Pharmaceutical incompatibilities							08 hours
Suppositories: Definition, types, advantages and disadvantages, types of bases, methods of preparations											

Displacement value & its calculations, evaluation of suppositories.						
Pharmaceutical incompatibilities: Definition, classification, physical, chemical and therapeutic incompatibilities with examples.						
Unit 5		Semisolid Dosage Forms			07 hours	
Semisolid dosage forms: Definitions, classification, mechanisms and factors influencing dermal penetration of drugs. Preparation of ointments, pastes, creams and gels. Excipients used in semi solid dosage forms. Evaluation of semi solid dosages forms						
Total Lecture Hours					45 hours	
Recommended Books: (Latest Editions)						
1. H.C. Ansel et al., Pharmaceutical Dosage Form and Drug Delivery System, Lippincott Williams and Walkins, New Delhi.						
2. Carter S.J., Cooper and Gunn’s-Dispensing for Pharmaceutical Students, CBS publishers, New Delhi.						
3. M.E. Aulton, Pharmaceutics, The Science& Dosage Form Design, Churchill Livingstone, Edinburgh.						
4. Indian pharmacopoeia.						
5. British pharmacopoeia.						
6. Lachmann. Theory and Practice of Industrial Pharmacy, Lea& Febiger Publisher, The University of Michigan.						
7. Alfonso R. Gennaro Remington. The Science and Practice of Pharmacy, Lippincott Williams, New Delhi.						
8. Carter S.J., Cooper and Gunn’s. Tutorial Pharmacy, CBS Publications, New Delhi.						
9. E.A. Rawlins, Bentley’s Text Book of Pharmaceutics, English Language Book Society, Elsevier Health Sciences, USA.						
10. Isaac Ghebre Sellassie: Pharmaceutical Pelletization Technology, Marcel Dekker, INC, New York.						
11. Dilip M. Parikh: Handbook of Pharmaceutical Granulation Technology, Marcel Dekker, INC, New York.						
12. Francoise Nieloud and Gilberte Marti-Mestres: Pharmaceutical Emulsions and Suspensions, Marcel Dekker, INC, New York.						
Mode of Evaluation						
MSE		CA			ESE	TOTAL
MSE1	MSE2	CA1	CA2 (TA)	CA3		
30	30	3	3	(ATT)		
Avg. of MSE1 & MSE2 and converted to 15		10				
					75	100

Course Code: BP109P			Course Name: Pharmaceutics -1 (Practical)				L	T	P	C	
Course Offered in: KIET School of Pharmacy							0	0	4	2	
Pre-requisite: NA											
Course Objectives: This course aims to:											
<div><div>1.</div><div>To impart hands-on experience in the preparation of various liquid dosage forms, including syrups, elixirs, linctuses, and solutions, using official formulations and compendial guidelines.</div><div>2.</div><div>To train students in the formulation and evaluation of dispersed systems, such as suspensions and emulsions, ensuring stability and uniformity of the final product.</div><div>3.</div><div>To develop skills in the preparation of solid and semi-solid dosage forms, including powders, granules, ointments, gels, and suppositories, focusing on technique, accuracy, and quality.</div><div>4.</div><div>To teach the formulation of specialized pharmaceutical preparations, such as gargles, mouthwashes, and paints, for localized drug delivery and patient care.</div></div>											
Course Outcome: After completion of the course, the student will be able to											
<div><div>1.</div><div>Demonstrate the preparation and dispensing of monophasic liquid dosage forms (syrups, elixirs, linctuses, gargles, mouthwashes and solutions).</div><div>2.</div><div>Illustrate the preparation and dispensing of biphasic liquid dosage forms (suspensions and emulsions).</div><div>3.</div><div>Illustrate the preparation and dispensing of pharmaceutical powders and granules.</div><div>4.</div><div>Demonstrate the preparation and dispensing of suppositories and semisolid dosage forms such as ointments and gels.</div></div>											
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	1	1	2	-	2	1	-	-	-	2
CO2	3	1	1	2	-	2	1	-	-	-	2
CO3	3	1	1	2	-	2	1	-	-	-	2
CO4	3	1	2	2	-	2	1	-	-	-	2
List of Practical's (Indicative Not Limited To)											

Syrups

- a) Syrup IP'66
- b) Compound syrup of Ferrous Phosphate BPC'68

Elixers

- a) Piperazine citrate elixir
- b) Paracetamol pediatric elixir

Linctus

- a) Terpin Hydrate Linctus IP'66
- b) Iodine Throat Paint (Mandles Paint)

Solutions

- a) Strong solution of ammonium acetate
- b) Cresol with soap solution
- c) Lugol's solution

Suspensions

- a) Calamine lotion
- b) Magnesium Hydroxide mixture
- c) Aluminium Hydroxide gel

Emulsions

- a) Turpentine Liniment
- b) Liquid paraffin emulsion

Powders and Granules

- a) ORS powder (WHO)
- b) Effervescent granules
- c) Dusting powder
- d) Divided powders

Suppositories

- a) Glycero gelatin suppository
- b) Cocoa butter suppository
- c) Zinc Oxide suppository

Semisolids

- a) Sulphur ointment
- b) Non-staining-iodine ointment with methyl salicylate
- c) Carbopal gel

Gargles and Mouthwashes

- a) Iodine gargle
- b) Chlorhexidine mouthwash

Total Lecture Hours: 4 hrs./week**Mode of Evaluation**

MSE		CA			ESE	Total
MSE1 40	MSE2 40	CA1 3	CA2	CA3 (ATT) 2		
Avg. of MSE1 & MSE2 and converted to 10		5			35	50



Course Code: BP104T			Course Name: PHARMACEUTICAL INORGANIC CHEMISTRY (Theory)					L	T	P	C	
Course Offered in: KIET School of Pharmacy								3	1	0	4	
Pre-requisite: NA												
Course Objectives:												
1. Know the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals 2. Understand the medicinal and pharmaceutical importance of inorganic compounds												
Course Outcome: After completion of the course, the student will be able to												
1. Attain the understanding of the sources of impurities with their control and limit test of inorganic molecules in pharmaceuticals 2. Examine buffers, major intra, and extracellular electrolytes, and combination therapy including ORS and dental products. 3. Illustrate the various inorganic gastrointestinal agents and antimicrobials. 4. Acquire the knowledge of the expectorants, emetics, hematinic, and antidotes used in inorganic pharmaceuticals. 5. Explore the radiopharmaceuticals their handling and precautions.												
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)												
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	
CO1	3	-	3	-	-	-	-	-	3	3	3	
CO2	3	-	3	-	-	-	-	-	3	2	3	
CO3	3	-	3	-	-	-	-	-	3	1	3	
CO4	3	-	3	-	-	-	-	-	3	-	3	
CO5	3	2	3	2	-	-	-	-	3	3	3	
Unit 1			Impurities in pharmaceutical substances:								10 hours	
History of Pharmacopoeia, Sources and types of impurities, principle involved in the limit test for Chloride, Sulphate, Iron, Arsenic, Lead and Heavy metals, modified limit test for Chloride and Sulphate General methods of preparation: assay for the compounds superscripted with asterisk (*), properties and medicinal uses of inorganic compounds belonging to the following classes												
Unit 2			Acids, Bases, and Buffers								10 hours	
Buffer equations and buffer capacity in general, buffers in pharmaceutical systems, preparation, stability, buffered isotonic solutions, measurements of tonicity, calculations and methods of adjusting isotonicity Major extra and intracellular electrolytes: Functions of major physiological ions, Electrolytes used in the replacement therapy: Sodium chloride*, Potassium chloride, Calcium gluconate* and Oral Rehydration Salt (ORS), Physiological acid base balance. Dental products: Dentifrices, role of fluoride in the treatment of dental caries, Desensitizing agents, Calcium carbonate, Sodium fluoride, and Zinc eugenol cement.												
Unit 3			Gastrointestinal agents								10 hours	
Acidifiers: Ammonium chloride* and Dil. HCl. Antacid: Ideal properties of antacids, combinations of antacids, Sodium Bicarbonate*, Aluminum hydroxide gel, Magnesium hydroxide mixture. Cathartics: Magnesium sulphate, Sodium orthophosphate, Kaolin and Bentonite. Antimicrobials: Mechanism, classification, Potassium permanganate, Boric acid, Hydrogen peroxide*, Chlorinated lime*, Iodine and its preparations.												
Unit 4			Miscellaneous compounds								08 hours	

Expectorants: Potassium iodide, Ammonium chloride*. **Emetics:** Copper sulphate*, Sodium potassium tartarate
Haematinics: Ferrous sulphate*, Ferrous gluconate
Poison and Antidote: Sodium thiosulphate*, Activated charcoal, Sodium nitrite
Astringents: Zinc Sulphate, Potash Alum

Unit 5	Radiopharmaceuticals					07 hours	
Radio activity, Measurement of radioactivity, Properties of α , β , γ radiations, Half-life, radio isotopes and study of radio isotopes - Sodium iodide I ¹³¹ , Storage conditions, precautions & pharmaceutical application of radioactive substances.							
Total Lecture Hours						45 hours	
Textbook: 1. A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II,Stahlone Press of University of London, 4 th edition. 2. A.I. Vogel, Text Book of Quantitative Inorganic analysis 3. P. Gundu Rao, Inorganic Pharmaceutical Chemistry, 3 rd Edition 4. M.L Schroff, Inorganic Pharmaceutical Chemistry 5. Bentley and Driver's Textbook of Pharmaceutical Chemistry 6. Anand & Chatwal, Inorganic Pharmaceutical Chemistry							
Reference Books: 1. Indian Pharmacopoeia							
Mode of Evaluation							
MSE		CA				ESE	Total
MSE1 30	MSE2 30	CA1 3	CA2 3	CA3 (ATT) 4			
Avg. of MSE1 & MSE2 and converted to 15		10				75	100

Course Code: BP110P				Course Name: PHARMACEUTICAL INORGANIC CHEMISTRY-I (PRACTICAL)				L	T	P	C
Course Offered in: KIET School of Pharmacy								0	0	4	2
Pre-requisite: NA											
Course Objectives: This course aims to:											
<div>1. To perform official limit tests for detecting and estimating impurities such as chlorides, sulphates, iron, heavy metals, lead, and arsenic in pharmaceutical substances as per Indian Pharmacopoeia.</div> <div>2. To identify pharmaceutical inorganic compounds through confirmatory identification tests for substances like magnesium hydroxide, ferrous sulphate, sodium bicarbonate, calcium gluconate, and copper sulphate.</div> <div>3. To assess the purity and quality of pharmaceutical substances by evaluating parameters such as swelling power of bentonite, neutralizing capacity of aluminum hydroxide gel, and iodine content in potassium iodide.</div> <div>4. To gain practical experience in the preparation of official inorganic pharmaceuticals, including boric acid, potash alum, and ferrous sulphate, in accordance with pharmacopeial standards.</div> <div>5. To develop competency in performing qualitative and quantitative inorganic pharmaceutical analysis, fostering accuracy, precision, and adherence to quality control protocols.</div>											
Course Outcome: After completion of the course, the student will be able to											
<div>1. Examine the sources of impurities with limit test for inorganic molecules and pharmaceuticals</div> <div>2. Demonstrate the identification test and test for purity of inorganic molecules in pharmaceuticals</div> <div>3. Demonstrate on the preparation of inorganic pharmaceuticals and their assays</div> <div>4. Examine the test for purity of inorganic molecules in pharmaceuticals.</div>											
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	1	3	1	-	-	1	1	3	3	3
CO2	3	1	3	1	-	-	1	1	3	2	3
CO3	3	1	3	1	-	-	1	1	3	1	3
CO4	3	1	3	1	-	-	1	1	3	1	3
List Of Practical's (Indicative & Not Limited To)											
<div>1. Limit tests for following ions: (a)Limit test for Chlorides and Sulphates (b) Modified limit test for Chlorides and Sulphates (c) Limit test for Iron (d) Limit test for Heavy metals (e) Limit test for Lead (f) Limit test for Arsenic</div> <div>2. Identification Test: Magnesium hydroxide, Ferrous sulphate, Sodium bicarbonate Calcium gluconate, Copper sulphate</div> <div>3. Test for purity (a) Swelling power of Bentonite (b) Neutralizing capacity of aluminum hydroxide gel (c) Determination of potassium iodate and iodine in potassium Iodide</div> <div>4. Preparation of inorganic pharmaceuticals: Boric acid, Potash alum, Ferrous sulphate</div>											
Total Lecture Hours: 4 hrs/week											
Mode of Evaluation											
MSE				CA				ESE	Total		
MSE1 40	MSE2 40			CA1 3	CA2	CA3 (ATT) 2					
Avg. of MSE1 & MSE2 and converted to 10				5				35	50		

Course Code: BP105T				Course Name: COMMUNICATION SKILLS (Theory)				L	T	P	C	
Course Offered in: KIET School of Pharmacy								2	0	0	2	
Pre-requisite: NA												
Course Objectives:												
1. Understand the behavioral needs for a pharmacist to function effectively in the areas of pharmaceutical operation.												
2. Communicate effectively (Verbal and Non-Verbal).												
3. Effectively manage the team as a team player.												
4. Develop interview skills.												
5. Develop Leadership qualities and essentials.												
Course Outcome: After completion of the course, the student will be able to												
1. Understand the communication strategies and principles along with the various perspectives at workplace.												
2. Interpret the verbal & Non-verbal communication skills including the cognition of various communication styles.												
3. Attain self-confidence with improved command over listening, and writing skills.												
4. Exercise the key principles of effective presentation techniques.												
5. Acquire communication tactics for diverse day-to-day events and situation with cohesive arguments to reach a consensus.												
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)												
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	
CO1	-	-	-	-	1	-	-	3	1	1	2	
CO2	-	-	-	-	-	-	-	3	1	1	2	
CO3	-	-	-	-	2	-	-	3	1	1	2	
CO4	-	-	-	-	-	-	-	3	2	1	2	
CO5	-	-	-	-	3	-	-	3	1	1	2	
Unit 1			Communication Skills:								07 hours	
Introduction, Definition, The Importance of Communication, The Communication Process – Source, Message, Encoding, Channel, Decoding, Receiver, Feedback, Context												
Barriers to communication: Physiological Barriers, Physical Barriers, Cultural Barriers, Language Barriers, Gender Barriers, Interpersonal Barriers, Psychological Barriers, Emotional barriers												
Perspectives in Communication: Introduction, Visual Perception, Language, Other factors affecting our perspective - Past Experiences, Prejudices, Feelings, Environment												
Unit 2			Elements of Communication								07 hours	
Introduction, Face to Face Communication - Tone of Voice, Body Language (Non-verbal communication), Verbal Communication, Physical Communication												
Communication Styles: Introduction, The Communication Styles Matrix with example for each -Direct Communication Style, Spirited Communication Style, Systematic Communication Style, Considerate Communication Style												
Unit 3			Basic Listening Skills & Written Communication								07 hours	
Basic Listening Skills: Introduction, Self-Awareness, Active Listening, becoming an Active Listener, Listening in Difficult Situations												
Effective Written Communication: Introduction, When and When Not to Use												
Written Communication - Complexity of the Topic, Amount of Discussion Required, Shades of Meaning, Formal Communication												
Writing Effectively: Subject Lines, Put the Main Point First, Know Your Audience, Organization of the Message												
Unit 4			Interview Skills								05 hours	
Interview Skills: Purpose of an interview, Do's and Don'ts of an interview												
• Giving Presentations: Dealing with Fears, planning your Presentation, Structuring Your Presentation, Delivering Your Presentation, Techniques of Delivery												
Unit 5			Group Discussion								04 hours	
Introduction, Communication skills in group discussion, Do's and Don'ts of group discussion												
Total Lecture Hours										30 hours		

Textbook:

1. Basic communication skills for Technology, Andreja. J. Ruther Ford, 2nd Edition, Pearson Education, 2011
2. Communication skills, Sanjay Kumar, Pushpalata, 1st Edition, Oxford Press, 2011
3. Organizational Behaviour, Stephen .P. Robbins, 1st Edition, Pearson, 2013
4. Brilliant- Communication skills, Gill Hasson, 1st Edition, Pearson Life, 2011
5. The Ace of Soft Skills: Attitude, Communication and Etiquette for success, GopalaSwamy Ramesh, 5th Edition, Pearson, 2013
6. Developing your influencing skills, Deborah Dalley, Lois Burton, Margaret, Greenhall, 1st Edition Universe of Learning LTD, 2010
7. Communication skills for professionals, Konar nira, 2nd Edition, New arrivals – PHI, 2011.
8. Personality development and soft skills, Barun K Mitra, 1st Edition, Oxford Press, 2011
9. Soft skill for everyone, Butter Field, 1st Edition, Cengage Learning India pvt.ltd, 2011

Reference Books:

- 1 Personality development and soft skills, Barun K Mitra, 1st Edition, Oxford Press, 2011
2. Soft skill for everyone, Butter Field, 1st Edition, Cengage Learning India PVT LTD, 2011

Mode of Evaluation

MSE		CA					ESE	Total
MSE1 30	MSE2 30	CA1 6	CA2 6	CA3 (ATT) 8			-	
Avg. of MSE1 & MSE2 and converted to 30		20					NA	50

Course Code: BP111P			Course Name: COMMUNICATION SKILLS (PRACTICAL)				L	T	P	C	
Course Offered in: KIET School of Pharmacy							0	0	2	1	
Pre-requisite: NA											
Course Objectives: This course aims to:											
<div>1. To develop basic interpersonal communication skills through interactive exercises in meeting people, asking questions, making friends, and understanding social etiquette.</div> <div>2. To enhance English pronunciation and fluency, focusing on correct articulation of consonant and vowel sounds, and pronunciation related to noun usage.</div> <div>3. To strengthen listening and speaking abilities, including comprehension of direct and indirect speech and the use of figures of speech in conversation.</div> <div>4. To improve written communication, covering effective writing strategies, email etiquette, and the structure and tone suitable for academic and professional contexts.</div> <div>5. To build confidence in professional communication scenarios, such as interviews and presentations, fostering clarity, body language awareness, and audience engagement.</div>											
Course Outcome: After completion of the course, the student will be able to											
<div>1. Attain the cognizance to exhibit interest and participate in the synergy & team work with the help of good interpersonal skills.</div> <div>2. Apply the pronunciation etiquette to build the self-confidence with improved command over the mechanics of English language.</div> <div>3. Attain both formal effective verbal and non-verbal communication skills to make information more accessible to the audience.</div> <div>4. Design well-structured written content, including emails and professional documents, by implementing advanced writing skills and etiquette for formal communication.</div>											
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	-	-	-	-	-	-	-	3	-	-	1
CO2	-	-	-	-	-	-	-	3	-	-	1
CO3	-	-	-	-	3	-	-	3	-	-	1
CO4	-	-	-	-	3	-	-	3	-	-	1
List of Practical's (Indicative & Not Limited To)											
Basic communication covering the following topics											
<div>•Meeting People.</div> <div>•Asking Questions.</div> <div>•Making Friends.</div> <div>•What did you do?</div> <div>•Do's and Don'ts.</div>											
Pronunciations covering the following topics:											
<div>•Pronunciation (Consonant Sounds).</div> <div>•Pronunciation and Nouns</div> <div>•Pronunciation (Vowel Sounds).</div>											
Advanced Learning											
<div>•Listening Comprehension / Direct and Indirect Speech.</div> <div>•Figures of Speech.</div> <div>•Effective Communication.</div> <div>•Writing Skills. Effective Writing.</div> <div>•Interview Handling Skills.</div>											

<div>•E-Mail etiquette</div> <div>•Presentation Skills</div>						
Total Lecture Hours: 2 hrs./week						
Mode of Evaluation						
MSE		CA			ESE	Total
MSE1 45	MSE2 45	CA1 6	CA2	CA3 (ATT) 4		
Avg. of MSE1 & MSE2 and converted to 15		10			NA	25



Course Code: BP106RBT			Course Name: REMEDIAL BIOLOGY (Theory)					L	T	P	C	
Course Offered in: KIET School of Pharmacy								2	-	-	2	
Pre-requisite: NA												
Course Objectives:												
<ul style="list-style-type: none">Know the classification and salient features of five kingdoms of lifeUnderstand the basic components of anatomy & physiology of plantKnow, understand the basic components of anatomy & physiology animal with special reference to human.												
Course Outcome: After completion of the course, the student will be able to												
<ol style="list-style-type: none">Describe the basic components of anatomy & morphology of plants.Explain the concept of Body fluids, circulatory system, digestive system and respiration system.Restate the basic concepts of excretory system, human reproduction system, neural, chemical control and coordinationSummarize the basic concept of plant nutrition and nitrogen metabolism with the process of photosynthesis.Elaborate about plant cell and tissues with the mechanism of plant respiration, its growth and development.												
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)												
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	
CO1	3	1	2	1	2	2	1	2	1	1	3	
CO2	3	-	3	2	1	2	1	1	3	2	3	
CO3	3	-	3	2	1	2	1	1	3	2	3	
CO4	3	1	2	1	2	2	1	2	1	1	3	
CO5	3	1	2	1	2	2	1	2	1	1	3	
Unit 1			Living world								07 hours	
<ul style="list-style-type: none">Definition and characters of living organismsDiversity in the living worldBinomial nomenclatureFive kingdoms of life and basis of classification. Salient features of Monera, Protista, Fungi, Animalia and Plantae, Virus, <p>Morphology of Flowering plants</p> <ul style="list-style-type: none">Morphology of different parts of flowering plants – Root, stem, inflorescence, flower, leaf, fruit, seed.General Anatomy of Root, stem, leaf of monocotyledons & Dicotyledons												
Unit 2			Body fluids and circulation, Digestion, Respiration								07 hours	
<ul style="list-style-type: none">Composition of blood, blood groups, coagulation of bloodComposition and functions of lymphHuman circulatory systemStructure of human heart and blood vesselsCardiac cycle, cardiac output and ECG <p>Digestion and Absorption</p> <ul style="list-style-type: none">Human alimentary canal and digestive glandsRole of digestive enzymesDigestion, absorption and assimilation of digested food <p>Breathing and respiration</p> <ul style="list-style-type: none">Human respiratory systemMechanism of breathing and its regulationExchange of gases, transport of gases and regulation of respiration, Respiratory volumes												

Unit 3	Excretory products and their elimination, Neural control, and coordination, Chemical coordination & Human reproduction						07 hours	
<ul style="list-style-type: none">Modes of excretionHuman excretory system- structure and functionUrine formationRennin angiotensin system Neural control and coordination <ul style="list-style-type: none">Definition and classification of nervous systemStructure of a neuronGeneration and conduction of nerve impulseStructure of brain and spinal cordFunctions of cerebrum, cerebellum, hypothalamus and medulla oblongata Chemical coordination and regulation <ul style="list-style-type: none">Endocrine glands and their secretionsFunctions of hormones secreted by endocrine glands Human reproduction <ul style="list-style-type: none">Parts of female reproductive systemParts of male reproductive systemSpermatogenesis and Oogenesis, Menstrual cycle								
Unit 4	Plants and mineral nutrition						05 hours	
Essential mineral, macro and micronutrients Nitrogen metabolism, Nitrogen cycle, biological nitrogen fixation Photosynthesis: Autotrophic nutrition, photosynthesis, Photosynthetic pigments, factors affecting photosynthesis								
Unit 5	Plant respiration, Cell						04 hours	
Plant growth and development <ul style="list-style-type: none">Phases and rate of plant growth, Condition of growth, Introduction to plant growthregulators Cell - The unit of life <ul style="list-style-type: none">Structure and functions of cell and cell organelles. Cell division Tissues: Definition, types of tissues, location and functions								
Total Lecture Hours						30 hours		
Textbook: 1. Text book of Biology by S. B. Gokhale 2. Text book of Biology by Dr. Thulajappa and Dr. Seetaram								
Reference Books: 1. A Text book of Biology by B.V. Sreenivasa Naidu 2. A Text book of Biology by Naidu and Murthy 3. Botany for Degree students By A.C.Dutta. 4. Outlines of Zoology by M. Ekambaranatha ayyer and T. N. Ananthakrishnan 5. A manual for pharmaceutical biology practical by S.B. Gokhale and C. K. Kokate								
Mode of Evaluation								
MSE		CA					ESE	Total
MSE1 30	MSE2 30	CA1 6	CA2 6	CA3 (ATT) 8				
Avg. of MSE1 & MSE2 and converted to 30		20					NA	50

Course Code: BP112RBP		Course Name: REMEDIAL BIOLOGY (Practical)				L	T	P	C		
Course Offered in: KIET School of Pharmacy						0	0	2	1		
Pre-requisite: NA											
Course Objectives: This course aims to:											
<div>1. To introduce basic biological laboratory techniques, including the use of the microscope, section cutting, staining, and preparation of permanent slides.</div> <div>2. To study and understand the structure and function of plant organs, such as stem, root, leaf, seed, fruit, and flower, along with their modifications through microscopic examination.</div> <div>3. To explore cellular structures and inclusions, enhancing comprehension of cell morphology and biological organization.</div> <div>4. To perform physiological assessments, including determination of blood group, blood pressure, and tidal volume, to understand basic human biological functions.</div> <div>5. To study animal anatomy using models, with a focus on the frog as a representative vertebrate, and identify key skeletal components for comparative anatomy understanding.</div>											
Course Outcome: After completion of the course, the student will be able to											
<div>1. Understand the structure of cell and its inclusions.</div> <div>2. Demonstrate microscope, section cutting, mounting and staining of slides.</div> <div>3. Contrast cell, stem, root, leaf, seed, fruit, flower and their modifications</div> <div>4. Determine the blood group, blood pressure and tidal volume in human.</div>											
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	-	-	2	-	-	1	-	-	-	3
CO2	3	-	-	2	-	-	1	-	-	-	3
CO3	3	-	3	2	-	-	1	-	-	-	3
CO4	3	-	-	2	-	-	1	1	1	-	
List Of Practical's (Indicative & Not Limited To)											
<div>1. Introduction to experiments in biology.</div> <div>a) Study of Microscope.</div> <div>b) Section cutting techniques.</div> <div>c) Mounting and staining.</div> <div>d) Permanent slide preparation.</div> <div>2. Study of cell and its inclusions.</div> <div>3. Study of Stem, Root, Leaf, seed, fruit, flower and their modifications.</div> <div>4. Detailed study of frog by using computer models.</div> <div>5. Microscopic study and identification of tissues pertinent to Stem, Root, Leaf, seed, fruit and flower.</div> <div>6. Identification of bones.</div> <div>7. Determination of blood group.</div> <div>8. Determination of blood pressure.</div> <div>9. Determination of tidal volume.</div>											
Total Lecture Hours: 2 hrs./week											
Mode of Evaluation											
MSE				CA			ESE	Total			
MSE1 45	MSE2 45			CA1 6	CA2	CA3 (ATT) 4					
Avg. of MSE1 & MSE2 and converted to 15				10			NA	25			

Course Code: BP106RMT				Course Name: REMEDIAL MATHEMATICS (Theory)				L	T	P	C	
Course Offered in: KIET School of Pharmacy								2	0	0	2	
Pre-requisite: NA												
Course Objectives:												
1. Know the theory and their application in Pharmacy 2. Solve the different types of problems by applying theory 3. Appreciate the important application of mathematics in Pharmacy												
Course Outcome: After completion of the course, the student will be able to												
1. Apply the concepts of partial fractions, logarithms, real valued functions, limits and continuity in chemical kinetics and Pharmacokinetics. 2. Apply the concepts of determinants and matrices in solving Pharmacokinetic equations. 3. Apply the concepts of derivatives of a function of one variable to find extrema at a point 4. Apply the concepts of co-ordinate geometry integration in pharmaceutical problems. 5. Apply the concepts of Differential equations and Laplace transformations in solving Chemical kinetics & Pharmacokinetic equations												
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)												
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	
CO1	2	-	-	-	-	-	1	-	1	-	1	
CO2	2	1	1	1	-	-	1	-	1	-	1	
CO3	2	1	2	-	-	-	1	-	1	-	1	
CO4	2	1	1	-	-	-	1	-	-	-	1	
CO5	2	1	2	-	-	-	1	-	-	-	1	
Unit 1			Partial fraction, Logarithms, Function, Limits and continuity								06 hours	
Partial Fractions: Introduction, Polynomial, Rational fractions, Proper and Improper fractions, Partial fraction, Resolving into Partial fraction, Application of Partial Fraction in Chemical Kinetics and Pharmacokinetics. Logarithms: Introduction, Definition, Theorems/Properties of logarithms, Common logarithms, Characteristic and Mantissa, worked examples, application of logarithm to solve pharmaceutical problems. Function: Real Valued function, Classification of real valued functions Limits and continuity: Introduction, Limit of a function, Definition of limit of a function n (∈ - δ definition), $\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a} = na^{n-1}, \quad \lim_{\theta \rightarrow 0} \frac{\sin \theta}{\theta} = 1,$												
Unit 2			Matrices and Determinant:								06 hours	
Introduction matrices, Types of matrices, Operation on matrices, Transpose of a matrix, Matrix Multiplication, Determinants, Properties of determinants, Product of determinants, Minors and co-Factors, Adjoint or adjugate of a square matrix, Singular and non-singular matrices, Inverse of a matrix, Solution of system of linear equations using matrix method, Cramer's rule, Characteristic equation and roots of a square matrix, Cayley-Hamilton theorem, Application of Matrices in solving Pharmacokinetic equations												
Unit 3			Calculus								06 hours	
Differentiation: Introductions, Derivative of a function, Derivative of a constant, Derivative of a product of a constant and a function, Derivative of the sum or difference of two functions, Derivative of the product of two functions (product formula), Derivative of the quotient of two functions (Quotient formula) – Without												



Proof, Derivative of x^n w.r.t.x, where n is anyrational number, Derivative of e^x , Derivative of $\log_e x$, Derivative of a^x , Derivative of trigonometric functions from first principles (without Proof), Successive Differentiation, Conditions for a function to be amaximum or a minimum at a point. Application								
Unit 4			Analytical Geometry					06 hours
Introduction: Signs of the Coordinates, Distance formula, Straight Line: Slope or gradient of a straight line, Conditions for parallelism and perpendicularity of two lines, Slope of a line joining two points, Slope – intercept form of a straight line Integration: Introduction, Definition, Standard formulae, Rules of integration, Method of substitution, Method of Partial fractions, Integration by parts, definite integrals, application								
Unit 5			Differential Equations					06 hours
Some basic definitions, Order and degree, Equations in separable form, Homogeneous equations, Linear Differential equations, Exact equations, Application in solving Pharmacokinetic equations. Laplace Transform: Introduction, Definition, Properties of Laplace transform, Laplace Transforms of elementary functions, InverseLaplace transforms, Laplace transform of derivatives, Application to solve Linear differential equations, Application in solving Chemical kinetics and Pharmacokinetics equations								
Total Lecture Hours								30 hours
Textbook: 1. Differential Calculus by Shanthinarayan 2. Pharmaceutical Mathematics with application to Pharmacy by Panchaksharappa Gowda D.H								
Reference Books: 1. Integral Calculus by Shanthinarayan 2. Higher Engineering Mathematics by Dr. B.S.Grewal								
Mode of Evaluation								
MSE		CA					ESE	Total
MSE1 30	MSE2 30	CA1 6	CA2 6	CA3 (ATT) 8				
Avg. of MSE1 & MSE2 and converted to 30		20					NA	50

Course Code: BPH1 113				Course Name: EMERGING TECHNOLOGIES IN PHARMACY-AI, DATA SCIENCE, CLOUD COMPUTING, IOT, 3D PRINTING				L	T	P	C	
Course Offered in: KIET School of Pharmacy								3	0	0	0.2	
Pre-requisite: NA												
Course Objectives:												
Upon completion of this course, it is expected that students will be able to understand,												
1. Artificial Intelligence and its applications in Pharmacy.												
2. Data science and its applications in Pharmacy.												
3. Cloud computing and its applications in pharmacy.												
4. Internet of things and applications in pharmacy.												
5. 3D printing and its applications in Pharmacy.												
Course Outcome: After completion of the course, the student will be able to												
1. Understand the basic concepts and application of Artificial intelligence in pharmacy.												
2. Understand various Data Science tools to address Healthcare needs.												
3. Understand the concepts of Cloud Computing, key technologies, and application of cloud computing in Pharmacy.												
4. Understand basic concepts, principles and applications of IoT in Healthcare.												
5. Understand the basic concepts and applications of 3D printing in Pharmacy												
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)												
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	
CO1	2	-	1	-	-	-	1	-	-	-	2	
CO2	2	-	2	1	-	-	1	-	-	-	2	
CO3	2	-	1	-	-	-	1	-	-	-	2	
CO4	2	-	2	-	-	-	1	-	-	-	2	
CO5	2	-	-	1	-	-	1	-	-	-	2	
Unit 1			Artificial Intelligence and its applications in Pharmacy								6 hours	
Artificial Intelligence: Basic concepts												
AI in Drug Discovery and Development: AI applications in pharmaceutical research, AI tools for predicting drug interactions and patient outcomes												
Practical Applications: Case studies of AI in drug development												
Unit 2			Data science and its applications in Pharmacy								6 hours	
Introduction to Data Science in Pharmacy: Role of data science in drug development and healthcare												
Key data types: clinical data, patient records, and pharmaceutical sales data												
Basic Data Analysis: Introduction to data cleaning and visualization, Use of data science tools (R programming, maps and clustering) in analyzing pharmaceutical data												
Practical Applications: Case studies on data-driven decision-making in pharmacy												
Unit 3			Cloud Computing								6 hours	
Cloud computing basics												
Cloud Computing in the Pharmaceutical Industry: Overview of cloud computing and its relevance to pharmacy, Benefits of cloud storage for managing pharmaceutical data												
Cloud Applications in Pharmacy: Cloud-based systems for clinical trials and drug research, Data security and privacy in cloud computing												
Practical Applications: Examples of cloud-based tools used in pharmacy.												
Unit 4			Internet of things in Pharmacy								6 hours	
Introduction to IoT in Pharmacy: Overview of IoT and its significance in the pharmaceutical industry, Applications of IoT in drug monitoring and delivery systems												
IoT Devices in Healthcare: Smart pill dispensers and connected inhalers, IoT in patient monitoring and chronic disease management												

Practical Applications: Case studies on IoT-enabled healthcare devices.							
Unit 5		3D printing in healthcare					6 hours
3D Printing in the Pharmaceutical Industry: 3D printing technologies used in pharmacy, Applications in drug delivery and personalized medicine							
Practical Applications: Examples of 3D printed drugs and medical devices							
Total Lecture Hours							30 hours
Textbook: 1. AI-Powered Advances in Pharmacology: by Aminabee Shaik (V.V. Institute of Pharmaceutical Science. Gudlavalleru, India), IGI Global Publications 2. Artificial Intelligence in Healthcare by Parag Mahajan							
Reference Books: 1. Pharmacy of the Future: Emerging Trends and Innovations by Dr. Varun Singh Saggu, Dr. Cyril Sajan, Dilsar Gohil and Krupa Joshi, AkiNik Publications 2. Applications of Artificial Intelligence in Medical Imaging: series Editor Abdul amit Subasi							
Mode of Evaluation							
MSE		CA				ESE	Total
MSE1 45	MSE2 45	CA1 6	CA2	CA3 (ATT) 4			
Avg. of MSE1 & MSE2 and converted to 15		10				NA	25

Course Code: BP201T		Course Name: Human Anatomy and Physiology-II (Theory)				L	T	P		C		
Course Offered in: KIET School of Pharmacy						3	1	0		4		
Pre-requisite: NA												
Course Objectives:												
Upon completion of the course the student shall be able to:												
1. Explain the gross morphology, structure and functions of various organs of the human body.												
2. Describe the various homeostatic mechanisms and their imbalances.												
3. Identify the various tissues and organs of different systems of human body.												
4. Perform the hematological tests like blood cell counts, hemoglobin estimation, bleeding/clotting time etc and also record blood pressure, heart rate, pulse and respiratory volume.												
5. Appreciate coordinated working pattern of different organs of each system												
6. Appreciate the interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body.												
Course Outcome: After completion of the course, the student will be able to												
1. Elaborate the anatomy and physiology of the Nervous system.												
2. Illustrate anatomy and physiology of Digestive System and energetics (ATP, Creatinine Phosphate).												
3. Explore the structure and functions of Respiratory System and Urinary System.												
4. Illustrate the anatomical and physiological aspects of the Endocrine System.												
5. Infer the structural and functional aspects of Reproductive System and Genetics.												
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)												
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	
CO1	3	-	-	-	-	1	-	1	2	-	2	
CO2	3	-	-	-	-	1	-	1	2	-	2	
CO3	3	-	-	-	-	1	-	1	2	-	2	
CO4	3	-	-	-	-	1	-	1	2	-	2	
CO5	3	-	-	-	-	1	-	1	2	-	2	
Unit 1			Nervous system								10 hours	
Organization of nervous system, neuron, neuroglia, classification and properties of nerve fibre, electrophysiology, action potential, nerve impulse, receptors, synapse, neurotransmitters. Central nervous system: Meninges, ventricles of brain and cerebrospinal fluid. structure and functions of brain (cerebrum, brain stem, cerebellum), spinal cord (gross structure, functions of afferent and efferent nerve tracts, reflex activity)												
Unit 2			Digestives and Energetics								06 hours	
Digestive system: Anatomy of GI Tract with special reference to anatomy and functions of stomach, (Acid production in the stomach, regulation of acid production through parasympathetic nervous system, pepsin role in protein digestion) small intestine and large intestine, anatomy and functions of salivary glands, pancreas and liver, movements of GIT, digestion and absorption of nutrients and disorders of GIT.												
Energetics: Formation and role of ATP, Creatinine Phosphate and BMR.												
Unit 3			Respiratory system & Urinary system								10 hours	
Respiratory system: Anatomy of respiratory system with special reference to anatomy of lungs, mechanism of respiration, regulation of respiration												
Lung Volumes and capacities transport of respiratory gases, artificial respiration, and resuscitation methods.												
Urinary system: Anatomy of urinary tract with special reference to anatomy of kidney and nephrons, functions of kidney and urinary tract, physiology of urine formation, micturition reflex and role of kidneys in acid base balance, role of RAS in kidney and disorders of kidney												
Unit 4			Endocrine system								10 hours	
Classification of hormones, mechanism of hormone action, structure and functions of pituitary gland, thyroid gland, parathyroid gland, adrenal gland, pancreas, pineal gland, thymus and their disorders.												
Unit 5			Reproductive system & Introduction to genetics								09 hours	
Reproductive system: Anatomy of male and female reproductive system, Functions of male and female reproductive system, sex hormones, physiology of menstruation, fertilization, spermatogenesis, oogenesis, pregnancy and parturition												
Introduction to genetics: Chromosomes, genes and DNA, protein synthesis, genetic pattern of inheritance												
Total Lecture Hours										45 hours		



Textbook:

1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brothers 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 and John. E. Hall. Miamisburg, OH, U.S.A.
5. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.
6. Textbook of Human Histology by Inderbir Singh, Jaypee brothers medical publishers, New Delhi.
7. Textbook of Practical Physiology by C.L. Ghai, Jaypee brothers medical publishers, New Delhi.
8. Practical workbook of Human Physiology by y K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi.

Reference Books:

1. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co, Riverview, MI USA.
2. Text book 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. Chatterje, Academic Publishers Kolkata.

Mode of Evaluation

MSE		CA					ESE	Total
MSE1 30	MSE2 30	CA1 3	CA2 3	CA3 (ATT) 4				
Avg. of MSE1 & MSE2 and converted to 15		10					75	100

Course Code: BP207P		Course Name: Human Anatomy and Physiology-II (Practical)				L	T	P	C		
Course Offered in: KIET School of Pharmacy						0	0	4	2		
Pre-requisite: NA											
Course Objectives: This course aims to:											
<div>1. To develop practical knowledge of human body systems—including integumentary, nervous, endocrine, digestive, respiratory, cardiovascular, urinary, and reproductive systems—through the use of specimens, models, charts, and permanent histological slides.</div> <div>2. To perform and interpret basic physiological tests and measurements, such as recording body temperature, visual acuity, reflex actions, tidal volume, vital capacity, and Body Mass Index (BMI).</div> <div>3. To conduct sensory and neurological examinations, including testing the functions of the olfactory nerve, taste perception, and general neurological assessments.</div> <div>4. To understand and demonstrate physiological control mechanisms, including positive and negative feedback systems relevant to body regulation.</div> <div>5. To gain applied knowledge in hematology and reproductive health through demonstrations of total blood count using cell analyzers, pregnancy diagnostic tests, and the study of family planning devices.</div>											
Course Outcome: After completion of the course, the student will be able to:											
<div>1. Elaborate the anatomy and physiology of CNS, Digestive system, Respiratory system, urinary system, endocrine system and reproductive system using models and charts.</div> <div>2. Demonstrate the practical aspects related to reflex activity, body temperature recording, lung capacities, BMI and their importance.</div> <div>3. Explore the different mechanisms of responses related to sense organs and nervous system.</div> <div>4. Illustrate the recent advancements in the treatment and diagnosis of respiratory, digestive and CVS related diseases.</div>											
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	-	-	-	-	-	-	1	-	-	2
CO2	3	-	-	-	-	-	-	1	2	-	2
CO3	3	-	-	-	-	-	-	1	-	-	2
CO4	3	-	-	-	-	-	-	1	2	-	2
List of Practical's (Indicative & Not Limited To)											
<div>1. To study the integumentary and special senses using specimen, models, etc.,</div> <div>2. To study the nervous system using specimen, models, etc.,</div> <div>3. To study the endocrine system using specimen, models, etc</div> <div>4. To demonstrate the general neurological examination</div> <div>5. To demonstrate the function of olfactory nerve</div> <div>6. To examine the different types of taste.</div> <div>7. To demonstrate the visual acuity</div> <div>8. To demonstrate the reflex activity</div> <div>9. Recording of body temperature</div> <div>10. To demonstrate positive and negative feedback mechanism.</div> <div>11. Determination of tidal volume and vital capacity.</div> <div>12. Study of digestive, respiratory, cardiovascular systems, urinary and reproductive systems with the help of models, charts and specimens.</div> <div>13. Recording of basal mass index .</div> <div>14. Study of family planning devices and pregnancy diagnosis test.</div> <div>15. Demonstration of total blood count by cell analyzer.</div> <div>16. Permanent slides of vital organs and gonads.</div>											
Total Lecture Hours: 4 hrs./week											

Mode of Evaluation						
MSE		CA			ESE	Total
MSE1 40	MSE2 40	CA1 3	CA2	CA3 (ATT) 2		
Avg. of MSE1 & MSE2 and converted to 10		5			35	50

Course Code: BP202T		Course Name: Pharmaceutical Organic Chemistry –I (Theory)					L	T	P	C	
Course Offered in: KIET School of Pharmacy							3	1	0	4	
Pre-requisite: NA											
Course Objectives:											
Upon completion of the course the student shall be able to:											
1. Write the structure, name and the type of isomerism of the organic compound											
2. Write the reaction, name the reaction and orientation of reactions											
3. Account for reactivity/stability of compounds,											
4. Identify/confirm the identification of organic compound.											
Course Outcome: After completion of the course, the student will be able to											
1. Generalize the chemistry and isomerism of Organic Compounds.											
2. Illustrate the chemistry and applications of Alkanes, Alkenes and Conjugated dienes.											
3. Explore the chemistry and applications of Alkyl halide and Alcohols											
4. Illustrate about chemistry and applications of Carbonyl compounds.											
5. Explore chemistry and applications of Carboxylic acids and Amines.											
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	-	2	2	-	2	1	-	2	-	3
CO2	3	-	2	2	-	2	1	-	2	-	3
CO3	3	-	2	2	-	2	1	-	2	-	3
CO4	3	-	2	2	-	2	1	-	2	-	3
CO5	3	-	2	2	-	2	1	-	2	-	3
Unit 1		Classification, nomenclature and isomerism								7 hours	
Classification of Organic Compounds Common and IUPAC systems of nomenclature of organic compounds (up to 10 Carbons open chain and carbocyclic compounds) Structural isomerism in organic compounds											
Unit 2		Alkanes*, Alkenes* and Conjugated dienes*								10 hours	
SP ³ hybridization in alkanes, Halogenation of alkanes, uses of paraffins. Stabilities of alkenes, SP ² hybridization in alkenes E1 and E2 reactions – kinetics, order of reactivity of alkyl halides, rearrangement of carbocations, Saytzeffs orientation and evidences. E1 verses E2 reactions, Factors affecting E1 and E2 reactions. Ozonolysis, electrophilic addition reactions of alkenes, Markownikoff’s orientation, free radical addition reactions of alkenes, Anti Markownikoff’s orientation. Stability of conjugated dienes, Diel-Alder, electrophilic addition, free radical addition reactions of conjugated dienes, allylic rearrangement											
Unit 3		Alkyl halides* & Alcohols*								10 hours	
Alkyl halides*: SN1 and SN2 reactions - kinetics, order of reactivity of alkyl halides, stereochemistry and rearrangement of carbocations. SN1 versus SN2 reactions, Factors affecting SN1 and SN2 reactions Structure and uses of ethylchloride, Chloroform, trichloroethylene, tetrachloroethylene, dichloromethane, tetrachloromethane and iodoform. Alcohols*: Qualitative tests, Structure and uses of Ethyl alcohol, Methyl alcohol, chlorobutanol, Cetosteryl alcohol, Benzyl alcohol, Glycerol, Propylene glycol											
Unit 4		Carbonyl compounds* (Aldehydes and ketones)								10 hours	
Nucleophilic addition, Electromeric effect, aldol condensation, Crossed Aldol condensation, Cannizzaro reaction, Crossed Cannizzaro reaction, Benzoin condensation, Perkin condensation, qualitative tests, Structure and uses of Formaldehyde, Paraldehyde, Acetone, Chloral hydrate, Hexamine, Benzaldehyde, Vanilin, Cinnamaldehyde.											
Unit 5		Carboxylic acids* and Aliphatic amines*								8 hours	
Carboxylic acids*: Acidity of carboxylic acids, effect of substituents on acidity, inductive effect and qualitative tests for carboxylic acids ,amide and ester Structure and Uses of Acetic acid, Lactic acid, Tartaric acid, Citric acid, Succinic acid. Oxalic acid, Salicylic acid, Benzoic acid, Benzyl benzoate, Dimethyl phthalate, Methyl salicylate and Acetyl salicylic acid. Aliphatic amines*: Basicity, effect of substituent on Basicity. Qualitative test, Structure and uses of Ethanalamine, Ethylenediamine, Amphetamine											
Total Lecture Hours										45 hours	



Textbook:

1. Organic Chemistry by Morrison and Boyd
2. Organic Chemistry by I.L. Finar, Volume-I
3. Organic Chemistry by P.L.Soni
4. Practical Organic Chemistry by Mann and Saunders.
5. Vogel's text book of Practical Organic Chemistry
6. Advanced Practical organic chemistry by N.K.Vishnoi.

Reference Books:

1. Textbook of Organic Chemistry by B.S. Bahl & Arun Bahl.
2. Reaction and reaction mechanism by Ahluwalia/Chatwal.
3. Introduction to Organic Laboratory techniques by Pavia, Lampman and Kriz.

Mode of Evaluation

MSE		CA					ESE	Total
MSE1 30	MSE2 30	CA1 3	CA2 3	CA3 (ATT) 4				
Avg. of MSE1 & MSE2 and converted to 15		10					75	100



Course Code: BP208P			Course Name: Pharmaceutical Organic Chemistry -I (Practical)				L	T	P	C	
Course Offered in: KIET School of Pharmacy							0	0	4	2	
Pre-requisite: NA											
Course Objectives: This course aims to:											
<div>1. To systematically identify unknown organic compounds through preliminary physical tests, solubility analysis, and detection of extra elements using Lassaigne’s test.</div> <div>2. To detect and confirm functional groups in organic compounds using standard qualitative chemical tests.</div> <div>3. To determine the melting point or boiling point of organic compounds and use this data, along with literature references, for compound identification.</div> <div>4. To prepare solid derivatives of organic compounds and use melting/boiling point comparisons for confirmation of structure.</div> <div>5. To construct molecular models for a better understanding of the structure, geometry, and stereochemistry of organic molecules.</div>											
Course Outcome: After completion of the course, the student will be able to											
<div>1. Explore necessary skills for performing organic chemistry experiments, including proper handling of laboratory equipment and adherence to safety protocols.</div> <div>2. Apply synthetic techniques to prepare pharmaceutical compounds, gaining proficiency in common laboratory procedures for the synthesis of organic molecules.</div> <div>3. Validate methods for the isolation and purification of organic compounds, including techniques such as extraction, distillation, and chromatography.</div> <div>4. Validate methods for the isolation and purification of organic compounds, including techniques such as extraction, distillation, and chromatography.</div>											
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	3	3	-	-	1	-	2	2	3
CO2	3	3	3	3	-	-	1	-	2	2	3
CO3	3	3	3	3	-	-	1	-	2	2	3
CO4	3	3	3	3	-	-	1	-	2	2	3
List of Practical’s (Indicative & Not Limited To)											
<div>1. Systematic qualitative analysis of unknown organic compounds like<div><div>i. Preliminary test: Color, odour, aliphatic/aromatic compounds, saturation and unsaturation, etc.</div><div>ii. Detection of elements like Nitrogen, Sulphur and Halogen by Lassaigne’s test</div><div>iii. Solubility test</div><div>iv. Functional group test like Phenols, Amides/ Urea, Carbohydrates, Amines, Carboxylic acids, Aldehydes and Ketones, Alcohols, Esters, Aromatic and Halogenated Hydrocarbons, Nitro compounds and Anilides.</div><div>v. Melting point/Boiling point of organic compounds</div><div>vi. Identification of the unknown compound from the literature using melting point/ boiling point.</div><div>vii. Preparation of the derivatives and confirmation of the unknown compound by melting point/ boiling point.</div><div>viii. Minimum 5 unknown organic compounds to be analysed systematically.</div></div></div> <div>2. Preparation of suitable solid derivatives from organic compounds</div> <div>3. Construction of molecular models</div>											
Total Lecture Hours: 4 hrs./week											
Mode of Evaluation											
MSE				CA			ESE	Total			
MSE1 40	MSE2 40			CA1 3	CA2	CA3 (ATT) 2					
Avg. of MSE1 & MSE2 and converted to 10				5			35	50			



Course Code: BP203T				Course Name: Biochemistry (Theory)							L	T	P	C
Course Offered in: KIET School of Pharmacy											3	1	0	4
Pre-requisite: NA														
Course Objectives:														
Upon completion of the course the student shall be able to:														
1. Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.														
2. Understand the metabolism of nutrient molecules in physiological and pathological conditions.														
3. Understand the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins.														
Course Outcome: After completion of the course, the student will be able to														
1. Elaborate the concepts of biomolecules and bioenergetics.														
2. Explore the knowledge of carbohydrate metabolism and biological oxidation and underlying diseases														
3. Analyze the concepts of lipid and amino acid metabolism and their role in various diseases.														
4. Illustrate the concept of nucleic acid metabolism and transfer of genetic information.														
5. Classify various types of enzymes and their role as diagnostic and therapeutic applications														
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)														
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11			
CO1	3	-	-	-	-	-	-	-	-	-	2			
CO2	3	-	-	-	-	-	-	-	2	-	2			
CO3	3	-	-	-	-	1	-	-	2	-	2			
CO4	3	-	3	2	-	2	-	-	2	2	2			
CO5	3	1	1	1	-	1	1	2	1	1	2			
Unit 1			Biomolecules & Bioenergetics								08 hours			
Biomolecules: Introduction, classification, chemical nature and biological role of carbohydrate, lipids, nucleic acids, amino acids and proteins.														
Bioenergetics: Concept of free energy, endergonic and exergonic reaction, Relationship between free energy, enthalpy and entropy; Redox potential. Energy rich compounds; classification; biological significances of ATP and cyclic AMP														
Unit 2			Carbohydrate metabolism & Biological oxidation								10 hours			
Carbohydrate metabolism														
Glycolysis – Pathway, energetics and significance														
Citric acid cycle- Pathway, energetics and significance														
HMP shunt and its significance; Glucose-6-Phosphate dehydrogenase (G6PD) deficiency														
Glycogen metabolism Pathways and glycogen storage diseases (GSD)														
Gluconeogenesis- Pathway and its significance														
Hormonal regulation of blood glucose level and Diabetes mellitus														
Biological oxidation														
Electron transport chain (ETC) and its mechanism.														
Oxidative phosphorylation & its mechanism and substrate phosphorylation														
Inhibitors ETC and oxidative phosphorylation/Uncouplers														
Unit 3			Lipid metabolism & Amino acid metabolism								10 hours			
Lipid metabolism														
β -Oxidation of saturated fatty acid (Palmitic acid)														
Formation and utilization of ketone bodies; ketoacidosis														
De novo synthesis of fatty acids (Palmitic acid)														
Biological significance of cholesterol and conversion of cholesterol into bile acids, steroid hormone and vitamin D														
Disorders of lipid metabolism: Hypercholesterolemia, atherosclerosis, fatty liver and obesity.														
Amino acid metabolism														
General reactions of amino acid metabolism: Transamination, deamination & decarboxylation, urea cycle and its disorders														

Catabolism of phenylalanine and tyrosine and their metabolic disorders (Phenyketonuria, Albinism, alkeptonuria, tyrosinemia) Synthesis and significance of biological substances; 5-HT, melatonin, dopamine, noradrenaline, adrenaline Catabolism of heme; hyperbilirubinemia and jaundice								
Unit 4		Nucleic acid metabolism and genetic information transfer					10 hours	
Biosynthesis of purine and pyrimidine nucleotides Catabolism of purine nucleotides and Hyperuricemia and Gout disease Organization of mammalian genome Structure of DNA and RNA and their functions DNA replication (semi conservative model) Transcription or RNA synthesis Genetic code, Translation or Protein synthesis and inhibitors								
Unit 5		Enzymes					7 hours	
Introduction, properties, nomenclature and IUB classification of enzymes Enzyme kinetics (Michaelis plot, Line Weaver Burke plot) Enzyme inhibitors with examples Regulation of enzymes: enzyme induction and repression, allosteric enzymes regulation Therapeutic and diagnostic applications of enzymes and isoenzymes Coenzymes –Structure and biochemical functions								
Total Lecture Hours						45 hours		
Textbook: 1. Principles of Biochemistry by Lehninger. 2. Harper’s Biochemistry by Robert K. Murry, Daryl K. Granner and Victor W. Rodwell. 3. Biochemistry by Stryer. 4. Biochemistry by D. Satyanarayan and U.Chakrapani 5. Textbook of Biochemistry by Rama Rao. 6. Textbook of Biochemistry by Deb. 7. Outlines of Biochemistry by Conn and Stumpf 8. Practical Biochemistry by R.C. Gupta and S. Bhargavan.								
Reference Books: 1. Introduction of Practical Biochemistry by David T. Plummer. (3rd Edition) 2. Practical Biochemistry for Medical students by Rajagopal and Ramakrishna. 3. Practical Biochemistry by Harold Varley.								
Mode of Evaluation								
MSE		CA					ESE	Total
MSE1 30	MSE2 30	CA1 3	CA2 3	CA3 (ATT) 4				
Avg. of MSE1 & MSE2 and converted to 15		10					75	100

Course Code: BP209P				Course Name: Biochemistry (Practical)				L	T	P	C
Course Offered in: KIET School of Pharmacy								0	0	4	2
Pre-requisite: NA											
Course Objectives: This course aims to:											
1) To perform qualitative and quantitative analysis of biomolecules, including carbohydrates, proteins, and abnormal constituents in urine, using standard biochemical tests.											
2) To determine clinically significant biochemical parameters, such as blood glucose, blood creatinine, and serum total cholesterol levels.											
3) To understand the preparation and role of buffer solutions, and accurately measure pH in various biochemical experiments.											
4) To study enzymatic reactions and kinetics, including the hydrolysis of starch and the activity of salivary amylase under varying temperature and substrate concentrations.											
5) To develop skills in the interpretation of biochemical test results, with relevance to physiological and pathological conditions for application in pharmaceutical and clinical settings.											
Course Outcome: After completion of the course, the student will be able to											
1. Analyze different carbohydrates, proteins, and abnormal constituents of urine.											
2. Estimate blood creatinine, salivary amylase, blood sugar and serum total cholesterol.											
3. Demonstrate the preparation of buffer solution and measurement of pH.											
4. Assess quantitative analysis of reducing sugars (DNSA method) and Proteins.											
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	2	3	-	1	2	2	2	2	3
CO2	3	3	2	3	-	1	2	2	2	2	3
CO3	3	3	2	3	-	1	2	2	2	2	3
CO4	3	3	2	3	-	1	2	2	2	2	3
List Of Practical's (Indicative & Not Limited To)											
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											
Total Lecture Hours: 4 hrs./week											
Mode of Evaluation											
MSE				CA			ESE	Total			
MSE1 40	MSE2 40			CA1 3	CA2	CA3 (ATT) 2					
Avg. of MSE1 & MSE2 and converted to 10				5			35	50			

Course Code: BP204T				Course Name: PATHOPHYSIOLOGY (Theory)				L	T	P	C
Course Offered in: KIET School of Pharmacy								3	1	0	4
Pre-requisite: NA											
Course Objectives: Upon completion of the course the student shall be able to:											
1. Describe the etiology and pathogenesis of the selected disease states;											
2. Name the signs and symptoms of the diseases;											
3. Mention the complications of the diseases.											
Course Outcome: After completion of the course, the student will be able to											
1. Illustrate the basic mechanisms involved in the process of cell injury and inflammation.											
2. Illustrate the pathological mechanisms involved in the development of cardiovascular, renal, and respiratory diseases.											
3. Explore the mechanisms of development of diseases associated with the blood, endocrine, nervous, and gastrointestinal systems.											
4. Illustrate the development and progression of inflammatory diseases along with cancer.											
5. Infer the etiology and pathogenesis of infectious and sexually transmitted diseases.											
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	-	-	-	-	1	-	1	1	-	2
CO2	3	-	1	-	-	1	-	1	3	-	2
CO3	3	-	1	-	-	1	-	1	3	-	2
CO4	3	-	1	-	-	1	-	1	3	-	2
CO5	3	-	1	-	-	1	-	1	3	-	2
Unit 1				Basic principles of Cell injury and Adaptation:							10 hours
Introduction, definitions, Homeostasis, Components and Types of Feedback systems, Causes of cellular injury,Pathogenesis (Cell membrane damage, Mitochondrial damage, Ribosome damage, Nuclear damage), Morphology of cell injury– Adaptive changes (Atrophy, Hypertrophy, hyperplasia, Metaplasia, Dysplasia),Cell swelling, Intra cellular accumulation, Calcification, Enzyme leakage and Cell Death Acidosis&Alkalosis,Electrolyte imbalance Basic mechanism involved in the process of inflammation and repair: Introduction, Clinical signs of inflammation, Different types of Inflammation, Mechanism of Inflammation– Alteration in vascular permeability and blood flow, migration of WBC's, Mediators of inflammation, Basic principles of wound healing in the skin, Pathophysiology of Atherosclerosis.											
Unit 2											10 hours
Cardiovascular System: Hypertension, congestive heart failure, ischemic heart disease (angina, myocardial infarction, atherosclerosis and arteriosclerosis) Respiratory system: Asthma, Chronic obstructive airways diseases. Renal system: Acute and chronic renal failure											
Unit 3											10 hours
Haematological Diseases: Iron deficiency, megaloblastic anemia (Vit B12 and folic acid), sickle cell anemia, thalasemia, hereditary acquired anemia, hemophilia Endocrine system: Diabetes, thyroid diseases, disorders of sex hormones Nervous system: Epilepsy, Parkinson's disease, stroke, psychiatric disorders: depression, schizophrenia and Alzheimer's disease. Gastrointestinal system: Peptic Ulcer											
Unit 4											8 hours
Inflammatory bowel diseases, jaundice, hepatitis (A,B,C,D,E,F) alcoholic liver disease. Disease of bones and joints: Rheumatoid arthritis, osteoporosis and gout Principles of cancer: classification, etiology and pathogenesis of cancer Diseases of bones and joints: Rheumatoid Arthritis, Osteoporosis, Gout											
Unit 5											7hours

Infectious diseases: Meningitis, Typhoid, Leprosy, Tuberculosis Urinary tract infections Sexually transmitted diseases: AIDS, Syphilis, Gonorrhea						
Total Lecture Hours						45 hours
Recommended Books (Latest Editions) <ol style="list-style-type: none"> 1. Vinay Kumar, Abul K. Abas, Jon C. Aster; Robbins & Cotran Pathologic Basis of Disease; South Asia edition; India; Elsevier; 2014. 2. Harsh Mohan; Text book of Pathology; 6th edition; India; Jaypee Publications; 2010. 3. Laurence B, Bruce C, Bjorn K. ; Goodman Gilman's The Pharmacological Basis of Therapeutics; 12th edition; New York; McGraw-Hill; 2011. 4. Best, Charles Herbert 1899-1978; Taylor, Norman Burke 1885-1972; West, John B (John Burnard); Best and Taylor's Physiological basis of medical practice; 12th ed; united states; 5. William and Wilkins, Baltimore; 1991 [1990 printing]. 6. Nicki R. Colledge, Brian R. Walker, Stuart H. Ralston; Davidson's Principles and Practice of Medicine; 21st edition; London; ELBS/Churchill Livingstone; 2010. 7. Guyton A, John .E Hall; Textbook of Medical Physiology; 12th edition; WB Saunders Company; 2010. 8. Joseph DiPiro, Robert L. Talbert, Gary Yee, Barbara Wells, L. Michael Posey; Pharmacotherapy: A Pathophysiological Approach; 9th edition; London; McGraw-Hill Medical; 2014. 9. V. Kumar, R. S. Cotran and S. L. Robbins; Basic Pathology; 6th edition; Philadelphia; WB Saunders Company; 1997. 10. Roger Walker, Clive Edwards; Clinical Pharmacy and Therapeutics; 3rd edition; London; Churchill Livingstone publication; 2003. 						
Recommended Journals <ol style="list-style-type: none"> 1. The Journal of Pathology. ISSN: 1096-9896 (Online) 2. The American Journal of Pathology. ISSN: 0002-9440 3. Pathology. 1465-3931 (Online) 4. International Journal of Physiology, Pathophysiology and Pharmacology. ISSN: 1944-8171 (Online) 5. Indian Journal of Pathology and Microbiology. ISSN-0377-4929. 						
Mode of Evaluation						
MSE		CA				ESE
MSE1 30	MSE2 30	CA1 3	CA2 (TA) 3	CA3 (ATT) 4		
Avg. of MSE1 & MSE2 and converted to 15		10				75
						100

Course Code: BP205T				Course Name: Computer Applications in Pharmacy (Theory)				L	T	P	C	
Course Offered in: KIET School of Pharmacy								3	0	0	3	
Pre-requisite: NA												
Course Objectives: Upon completion of the course the student shall be able to:												
1. Know the various types of application of computers in pharmacy.												
2. Know the various types of databases.												
3. Know the various applications of databases in pharmacy.												
Course Outcome: After completion of the course, the student will be able to												
1. Elaborate the concept of number system and information systems.												
2. Interpret various web technologies and databases.												
3. Illustrate various types of application of computers in pharmacy.												
4. Explore the objective, concept and impact of Bioinformatics.												
5. Acquire the application of computers in data analysis in Preclinical development.												
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)												
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	
CO1	-	-	2	3	-	-	-	2	-	-	3	
CO2	2	2	2	3	1	-	-	-	-	-	3	
CO3	3	3	2	3	1	2	2	3	2	-	3	
CO4	3	2	2	3	-	2	2	2	3	-	3	
CO5	3	3	2	2	1	2	2	2	-	-	2	
Unit 1			Number system								06 hours	
Binary number system, Decimal number system, Octal number system, Hexadecimal number systems, conversion decimal to binary, binary to decimal, octal to binary etc., binary addition, binary subtraction–One’s complement, Two’s complement method, binary multiplication, binary division Concept of Information Systems and Software: Information gathering, requirement and feasibility analysis, data flow diagrams, process specifications, input/output design, process lifecycle, planning and managing the project												
Unit 2			Web technologies								06 hours	
Introduction to HTML, XML, CSS and Programming languages, introduction to web servers and Server Products Introduction to databases, MYSQL, MS ACCESS, Pharmacy Drug database												
Unit 3			Application of computers in Pharmacy								06 hours	
Drug information storage and retrieval, Pharmacokinetics, Mathematical model in Drug design, Hospital and Clinical Pharmacy, Electronic Prescribing and discharge (EP) systems, barcode medicine identification and automated dispensing of drugs, mobile technology and adherence monitoring Diagnostic System, Lab-diagnostic System, Patient Monitoring System, Pharma Information System												
Unit 4			Bioinformatics								06 hours	
Introduction, Objective of Bioinformatics, Bioinformatics Databases, Concept of Bioinformatics, Impact of Bioinformatics in Vaccine Discovery												
Unit 5			Computers as data analysis in Preclinical development								06 hours	
Chromatographic data analysis (CDS), Laboratory Information management System (LIMS) and Text Information Management System (TIMS)												
Total Lecture Hours										30 hours		
Recommended books (Latest edition):												
1. Computer Application in Pharmacy– William E.Fassett–Lea and Febiger, 600 South Washington Square, USA, (215) 922-1330.												

2. Computer Application in Pharmaceutical Research and Development–Sean Ekins Wiley-Interscience, A John Willey and Sons, INC., Publication, USA
3. Bioinformatics (Concept, Skills and Applications)– S.C.Rastogi-CBS Publishers and Distributors, 4596/1- A, 11 Darya Gani, New Delhi– 110 002(INDIA)
4. Microsoft office Access- 2003, Application Development Using VBA, SQL Server, DAPand Infopath– CaryN.Prague– Wiley Dreamtech India (P) Ltd., 4435/7, Ansari Road, Daryagani, New Delhi- 110002.

Mode of Evaluation

MSE		CA					ESE	Total
MSE1 50	MSE2 50	CA1 10	CA2 (TA) 10	CA3 (ATT) 5				
Avg. of MSE1 & MSE2 and converted to 50		25					NA	75



Course Code: BP210P				Course Name: Computer Applications In Pharmacy (Practical)				L	T	P	C
Course Offered in: KIET School of Pharmacy								0	0	2	1
Pre-requisite: NA											
Course Objectives: This course aims to:											
<div>1. To develop basic proficiency in word processing and HTML, including creating questionnaires for health data collection and designing personal information web pages.</div> <div>2. To retrieve and utilize online drug information, focusing on identifying drug profiles and their adverse effects through web-based tools.</div> <div>3. To design and manage patient-related databases using MS Access, including creating tables, forms, queries, reports, and invoices for effective data storage and retrieval.</div> <div>4. To perform data operations and customization, such as adding, deleting, modifying records, and generating reports in database systems.</div> <div>5. To export healthcare data and reports to various digital formats, including web pages and XML, for sharing and integration with other systems.</div>											
Course Outcome: After completion of the course, the student will be able to											
<div>1. Demonstrate the utility of MS office suite to maintain patient record database.</div> <div>2. Apply the knowledge of computing fundamentals to pharmaceuticals application for any given requirement</div> <div>3. Analyze the contemporary IT tools (web technologies and databases) with pharmaceutical activities.</div> <div>4. Interpret the various application of database in pharmacy</div>											
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	2	2	-	2	-	3	2	-	3
CO2	3	2	2	2	-	2	-	3	2	-	3
CO3	3	2	2	3	2	2	2	-	2	2	3
CO4	3	-	-	2	-	2	2	2	3	2	3
List Of Practical's (Indicative & Not Limited To)											
<div>1. Design a questionnaire using a word processing package to gather information about a particular disease.</div> <div>2. Create a HTML web page to show personal information</div> <div>3. Retrieve the information of a drug and its adverse effects using online tool</div> <div>4. Creating mailing labels Using Label Wizard, generating label in MS WORD</div> <div>5. Create a database in MS Access to store the patient information with the required fields Using access</div> <div>6. Design a form in MS Access to view, add, delete and modify the patient record in the database</div> <div>7. Generating report and printing the report from patient database</div> <div>8. Creating invoice table using – MS Access</div> <div>9. Drug information storage and retrieval using MS Access</div> <div>10. Creating and working with queries in MS Access</div> <div>11. Exporting Tables, Queries, Forms and Reports to web pages</div> <div>12. Exporting Tables, Queries, Forms and Reports to XML pages</div>											
Total Lecture Hours: 2 hrs./week											
Mode of Evaluation											
MSE				CA			ESE		Total		
MSE1 45		MSE2 45		CA1 6	CA2	CA3 (ATT) 4					
Avg. of MSE1 & MSE2 and converted to 15				10			NA		25		

Course Code: BP206T				Course Name: Environmental Sciences (Theory)				L	T	P	C
Course Offered in: KIET School of Pharmacy								3	0	0	3
Pre-requisite: NA											
Course Objectives: Upon completion of the course the student shall be able to:											
1. Create the awareness about environmental problems among learners.											
2. Impart basic knowledge about the environment and its allied problems.											
3. Develop an attitude of concern for the environment.											
4. Motivate learner to participate in environment protection and environment improvement.											
5. Acquire skills to help the concerned individuals in identifying and solving environmental problems.											
6. Strive to attain harmony with Nature.											
Course Outcome: After completion of the course, the student will be able to											
1. Review the concept of environmental studies with its natural resources.											
2. Elaborate the concept of ecosystem and its structural and functional components with its classification.											
3. Illustrate the concept of environmental pollution, its impacts and mitigation measures.											
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	-	1	1	-	1	2	1	1	3	3	3
CO2	-	2	1	-	1	1	1	1	2	3	3
CO3	-	3	3	-	1	2	1	1	3	3	3
Unit 1			The Multidisciplinary nature of environmental studies								10 hours
Natural Resources Renewable and non-renewable resources: Natural resources and associated problems a) Forest resources; b) Water resources; c) Mineral resources; d) Food resources; e) Energy resources; f) Land resources: Role of an individual in conservation of natural resources.											
Unit 2			Ecosystems								10 hours
Concept of an ecosystem. Structure and function of an ecosystem. Introduction, types, characteristic features, structure and function of the ecosystems: Forest ecosystem; Grassland ecosystem; Desert ecosystem; Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)											
Unit 3			Environmental Pollution								10 hours
Air pollution; Water pollution; Soil pollution											
Total Lecture Hours										30 hours	
Recommended Books (Latest edition):											
1. Y.K. Sing, Environmental Science, New Age International Pvt, Publishers, Bangalore											
2. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.											
3. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad– 380 013, India, 4. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p											
4. Clark R.S., Marine Pollution, Clanderson Press Oxford											
5. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p											
6. De A.K., Environmental Chemistry, Wiley Eastern Ltd.											
7. Down of Earth, Centre for Science and Environment											
Mode of Evaluation											
MSE		CA				ESE		Total			
MSE1 50	MSE2 50	CA1 10	CA2(TA) 10	CA3 (ATT) 5							
Avg. of MSE1 & MSE2 and converted to 50		25				NA		75			



Course Code: BPHI 211			Course Name: Upskilling Including Python (Theory)					L	T	P	C	
Course Offered in: KIET School of Pharmacy								3	0	0	NC	
Pre-requisite: NA												
Course Objectives: Upon completion of the course the student shall be able to:												
<div>1. To enhance students' career readiness and soft skills by developing effective communication, leadership, time management, teamwork, and interview preparation tailored to pharmacy practice in a dynamic healthcare environment.</div> <div>2. To build foundational digital and professional competencies in using productivity tools, practicing online communication etiquette, and understanding digital record-keeping, essential for modern pharmacy professionals.</div> <div>3. To introduce the applications and implications of Artificial Intelligence (AI) in various domains of pharmacy and healthcare, including drug development, diagnostics, hospital management, and personalized medicine, through theoretical concepts and real-world case studies.</div> <div>4. To develop future-oriented skills by familiarizing students with emerging technologies such as Big Data, IoT, Telemedicine, and Python programming, empowering them to adapt to AI-driven roles and leverage digital tools for pharmaceutical innovation and patient care.</div>												
Course Outcome: After completion of the course, the student will be able to												
<div>4. Elaborate the concepts of upskilling and soft skills in Pharmacy</div> <div>5. Explore the digital literacy and professional skills for Pharmacists</div> <div>6. Illustrate the significance of branch of AI and role in patient care and drug discovery</div> <div>7. Illustrate the significance of emerging technologies in Pharma and healthcare</div> <div>8. Elaborate the concept of programming in pharmaceutical research and applications of python in healthcare.</div>												
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)												
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	PO10	PO11	
CO1	3	2	-	2	2	2	-	2	3	1	3	
CO2	3	2	1	2	2	2	-	2	3	1	3	
CO3	3	2	2	3	3	3	2	2	3	1	3	
CO4	3	2	3	3	2	3	2	2	3	2	3	
CO5	3	2	2	3	2	2	2	2	2	2	3	
Unit 1			Career Upskilling & Soft Skills								4 hours	
<div><div></div>Importance of upskilling in pharmacy careers.</div> <div><div></div>Effective communication skills: verbal, written, and presentation.</div> <div><div></div>Time management, leadership, and teamwork in pharmacy practice.</div> <div><div></div>Resume writing and interview skills.</div> <div><div></div>Importance of continuous learning in a dynamic healthcare environment</div>												
Unit 2			Digital & Professional Skills for Pharmacists								4 hours	
<div><div></div>Digital literacy: computer basics, internet, online resources.</div> <div><div></div>Introduction to productivity tools: MS Word, Excel (basic data entry, charts), PowerPoint.</div> <div><div></div>Online communication etiquette: emails, video conferencing.</div> <div><div></div>Introduction to digital record-keeping in healthcare.</div>												
Unit 3			AI Applications in Pharmacy & Healthcare								10 hours	
<div><div></div>History, significance and applications of AI.</div> <div><div></div>Branches of AI: Machine Learning, Natural Language Processing, Robotics, Computer Vision.</div> <div><div></div>Role of AI in drug discovery, formulation design, clinical trials.</div> <div><div></div>AI tools in patient care: diagnostic systems, personalized medicine.</div> <div><div></div>AI-based inventory and hospital management systems.</div> <div><div></div>Case studies: AI in COVID-19 tracking, wearable health tech.</div> <div><div></div>Introduction to electronic health records (EHR) and AI-driven healthcare analytics.</div>												

Unit 4		Future Skills for Pharmacists in a Digital World			5 hours	
<ul style="list-style-type: none">• Importance of data literacy and healthcare analytics.• Overview of emerging technologies: Big Data, Internet of Things (IoT), Telemedicine.• Responsible use of digital and AI tools in healthcare.• Upskilling resources: online courses (NPTEL, Coursera, WHO Digital Learning), webinars, professional workshops.• Preparing for AI-driven careers in pharma and healthcare including data analytics.						
Unit 5		Introduction to Python			7 hours	
<ul style="list-style-type: none">• Introduction to programming.• Importance of programming languages in modern industries.• Role of programming in healthcare, pharmaceutical research, and hospital management.• Definition, history and Basic Concepts of python.• Applications of Python in Healthcare & Pharmacy						
Total Lecture Hours					30 hours	
Textbooks and Recommended Books						
<ul style="list-style-type: none">8. Parashar Shah, Faisal Khan, Artificial Intelligence in Healthcare, Academic Press (Elsevier)9. Katherine Marconi & Harold Lehmann, Big Data in Healthcare, Jones & Bartlett Learning10. Susan M. Houston, Bruce I. Blum, Introduction to Healthcare Informatics, Springer11. John Zelle, Franklin, Python Programming: An Introduction to Computer Science, Beedle & Associates.12. Sebastian Bassi, Python for Bioinformatics, CRC Press						
Mode of Evaluation						
MSE		CA			ESE	Total
MSE1 45	MSE2 45	CA1 6	CA2 (TA)	CA3 (ATT) 4		
Avg. of MSE1 & MSE2 and converted to 15		10			NA	25

Annexure-1**B. Pharm 1st semester Course Evaluation Structure**

The evaluation of the B. Pharm course consists of both theory and lab assessments. The assessments are divided into multiple components as outlined below.

Theory Evaluation Plan**1. Continuous Assessment (CA) for BP101T, BP102T, BP103T, BP104T - Total Marks: 10**

- CA-1: 3 Marks (Based on Assignment/Quiz/Class test/Presentation/GD/Seminar)
- CA-2: 3 Marks (Based on Teacher Assessment)
- CA-3: 4 Marks (Based on attendance)

2. Continuous Assessment (CA) for BP105T, BP106RBT/RMT - Total Marks: 20

- CA-1: 6 Marks (Based on Assignment/Quiz/Class test/Presentation/GD/Seminar)
- CA-2: 6 Marks (Based on Teacher Assessment)
- CA-3: 8 Marks (Based on attendance)

3. Continuous Assessment (CA) for Value Added Course BPH1 113 - Total Marks: 10

- CA-1: 6 Marks (Based on Assignment/Quiz/Class test/Presentation/Seminar/GD)
- CA-3: 4 Marks (Based on attendance)

Mid-Semester and End-Semester Evaluations BP101T, BP102T, BP103T, BP104T**Total Marks: 25 Internal, 75 External**

- MSE-1: 30 Marks
- MSE-2: 30 Marks } MSE1 and MSE2 converted to 15 marks
- CA: 10 Marks (Based on continuous assessment)
- ESE: 75 Marks (externally evaluated)

Practical Evaluation Plan**1. Continuous Assessment (CA) BP107P, BP108P, BP109P, BP110P - Total Marks: 5**

- CA-1: 3 (Based on Lab record/Viva voce)
- CA-3: 2 Marks (Based on attendance)

2. Internal and External Marks Distribution for BP107P, BP108P, BP109P, BP110P

- MSE1: 40 marks
- MSE2: 40 marks } MSE1 and MSE2 converted to 10 marks
- CA: 5 Marks
- Practical ESE: 35 Marks

3. Internal and External Marks Distribution for BP111P, BP112RBP

- MSE1: 45 marks
- MSE2: 45 marks } MSE1 and MSE2 converted to 15 marks
- External ESE: NA

4. Continuous Assessment (CA) for BP111P, BP112RBP - Total Marks: 10

- CA-1: 6 Marks (Based on Lab record/Viva voce)
- CA-3: 4 Marks (Based on attendance)

Annexure-2**B. Pharm 2nd semester Course Evaluation Structure**

The evaluation of the B. Pharm course consists of both theory and lab assessments. The assessments are divided into multiple components as outlined below.

Theory Evaluation Plan**1. Continuous Assessment (CA) for BP201T, BP202T, BP203T, BP204T - Total Marks: 10**

- CA-1: 3 Marks (Based on Assignment/Quiz/Class test/Presentation/GD/Seminar)
- CA-2: 3 Marks (Based on Teacher Assessment)
- CA-3: 4 Marks (Based on attendance)

2. Continuous Assessment (CA) for BP205T, BP206T - Total Marks: 25

- CA-1: 10 Marks (Based on Assignment/Quiz/Class test/Presentation/GD/Seminar)
- CA-2: 10 Marks (Based on Teacher Assessment)
- CA-3: 5 Marks (Based on attendance)

3. Continuous Assessment (CA) for Value Added Course BPH1 211 - Total Marks: 10

- CA-1: 6 Marks (Based on Assignment/Quiz/Class test/Presentation)
- CA-3: 4 Marks (Based on attendance)

4. Mid-Semester and End-Semester Evaluations BP201T, BP202T, BP203T, BP204T**Total Marks: 25 Internal, 75 External**

- MSE-1: 30 Marks
- MSE-2: 30 Marks } MSE1 and MSE2 converted to 15 marks
- CA: 10 Marks (Based on continuous assessment)
- ESE: 75 Marks (externally evaluated)

5. Mid-Semester and End-Semester Evaluations BP205T, BP206T**Total Marks: 75 Internal**

- MSE-1: 50 Marks
- MSE-2: 50 Marks } MSE1 and MSE2 converted to 50 marks
- CA: 25 Marks (Based on continuous assessment)
- ESE: NA

6. Mid-Semester and End-Semester Evaluations BPH1 211**Total Marks: 25 Internal**

- MSE-1: 45 Marks
- MSE-2: 45 Marks } MSE1 and MSE2 converted to 15 marks
- CA: 10 Marks (Based on continuous assessment)
- ESE: NA

Practical Evaluation Plan**1. Continuous Assessment (CA) for BP207P, BP208P, BP209P - Total Marks: 5**

- CA-1: 3 (Based on Lab record/Viva voce)
- CA-3: 2 Marks (Based on attendance)

2. Internal and External Marks Distribution for BP207P, BP208P, BP209P

- MSE1: 40 marks
- MSE2: 40 marks } MSE1 and MSE2 converted to 10 marks
- CA: 5 marks
- External: 35 Marks (Practical ESE)



3. Continuous Assessment (CA) for BP210P - Total Marks: 10

- CA-1: 6 (Based on Lab record/Viva voce)
- CA-3: 4 Marks (Based on attendance)

4. Internal and External Marks Distribution for BP210P – Total Marks: 25

- MSE1: 45 marks
- MSE2: 45 marks } MSE1 and MSE2 converted to 15 marks
- CA: 10 marks
- ESE: NA