2.3.1. Q_IM: ***Student centric methods, such as experiential learning, participative learning and problem solving methodologies are used for enhancing learning experiences using ICT tools***

STUDENT CENTRIC METHODS:

CURRICULUM PLANNING ON TEACHING PEDAGOGY

Nirmala College of Pharmacy Muvattupuzha								
Curriculam Planning								
Program	**B.Pharm**							
Course	**Human Anatomy and Physiology**					**Course Code**		
Year/ Semester	**I Sem**							
CO Code	**Course Outcomes**						**Bloom Level**	
CO 1	Upon completion of this course the student should be able to explain the gross morphology, structure, and functions of various organs of the human body							
CO 2	Describe the various homeostatic mechanisms and their imbalances							
CO 3	Identify the various tissues and organs of different systems of the human body							
CO 4	Perform various experiments related to special senses and the nervous system							
CO 5	Appreciate coordinated working pattern of different organs of each system							
CO 6								
Topic Number	**Topic**	**Topic Outcome**	**Hours required**	**Teaching Aid**	**Teaching Pedagogy**	**Assessment Method**	**Bloom level**	**Remarks**
Unit :1								
Unit Outcome: upon completion of the topic the student has able to learn the various cell transport mechanisms and functioning of cell signaling methods that act as a receptor for signal molecules								

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1.1	Introduction to human body	1. Describe the levels of structural organization and body systems, feedback systems. 2. Analyze the homeostatic imbalances related to disorders 3. Define the anatomical terminology	2hrs	https://youtu.be/mn-2ob0F5e8https://youtu.be/_obgJ2zc3ZUhttps://youtu.be/8Nb9E62p2c0https://youtu.be/pQUMJ6Gh9Bw https://youtu.be/KqgTERrYbQ4	Direct instruction. Flipped Classrooms ,	Quiz,Online tests-moodle platform	1Understand 2.Analyse 3.Remember	project- 1. reasonfors different skin colour. 2.effects of aging on the integumentary system
1.2	Cellular level of organization	1. discuss the anatomy and functions of cells.2. classify the mechanism of transport across cell membrane 3. learn about cell division 4. Identify various types of cell junctions.5. explain general principles of communication and learn about the extracellular signal molecule, state forms of intracellular signaling like a) Contact–dependent b) Paracrine c) Synaptic d) Endocrine	4 hrs	https://youtu.be/URUJD5NEXC8https://youtu.be/Sr_Ok-DaWXghttps://youtu.be/Rjsr1nNKvUE	Direct Instruction, seminar	Quiz , Test paper, seminar	1. understand2. remember and analyze .3. understand and remember. 4.understand and analyse 5. understand and remember	1. prepare models of various bones.2. demonstrate various joint movements and identify it

1.3	Tissue level organization	1. classify different types, and structures of tissues, 2, describe the function of epithelial, muscular, nervous, and connective tissues	4hrs	https://youtu.be/xShZWY-W3bg https://youtu.be/8_zI8PdJVh ttps://youtu.be/lfGgxdiXP4 https://youtu.be/NsBaPtemAjs	1. Direct Instruction 2. experiential learning. 3. GD	test paper, mcqs, viva	1. understand and remember 2.understand	
unit 2								
Unit Outcome: Upon completion of the topic the student will able to expain the structure and function of skin, features of skeletal sytem,physiology of muscle contraction ,neuromuscular junction,various joints and its movements								
2.1	Integumentary system	1 .able to describe the layers of the epidermis and the cells that compose them.2.Able to compare the composition of the pappilary and reticular regions of the dermis.3.understand the accessory structures of skin	2hr	https://slideplayer.com/slide/7568046/	1. Direct Instruction 2. inquiry-based learning 3. project based learning	Assessment can be conducted by quiz. Online tests also can be conducted through google form or moodle platform or viva	1. 3.understand 2. Analyze	2. demonstrate various joint movements and its articulation
2.2	Skeletal system	1. able to distinguish the types and salient features of the appendicular and axial skeletal system. 2. Identify the function and structure of the appendicular and axial skeletal system.3. understand the organization of skeletal muscles. 4. phy siology of muscle contraction, neuro muscular junction.	6 hrs	three dimensional model. https://www.wisc-online.com/learn/career-clusters/life-science/ap11904/classification-of-joints ww.britannica.com/science/human-skeleton	1.Flipped Classrooms. 2. experiential learning. 3. GD	Viva. Presentation with models, GD	1.understand and remember. 2. understand and analyze. 3. underst	Game-based learning : Select a group of students, each student named

							and.4. understand .	with the clotting factorThey do the role play and form the clot
2.3	Joints	1. able to describe the classification, structure, functions 2. based on the body movement student is able to identify the types of movements in joints,	2 hrs	https://en.wikipedia.org/wiki/Jointhttps://youtu.be/bfiUnhAHt8Q	Direct Instruction, GD	test paper, mcqs	1. remember and analyze	IBL : Real-world connections through exploration and high-level questioning
Unit:3								
Unit Outcome: Upon completion of the topic the student will able to describe the anatomy and physiology of fluid connective tissue and analyze the pathological conditions of blood and lymph								

3.1	Body fluids and blood	1. Discuss the composition and lifecycle of blood cells with their functions.2. Demonstrate the various processes involved in the cessation of bleeding.3. List the clotting factors 4. Differentiate the pathological conditions.5. Define the antigens and antibodies in each blood group 6. State the importance of compatible blood transfusion.	7 hrs	1. Video Demo:https://youtu.be/VSVYgivfs9c https://youtu.be/qrE6Y0Se8bwHemopoiesis: https://youtu.be/0deCbmh7PHs & Erythropoiesis: ttps://youtu.be/cMqwV9Vb4_YFunction: https://youtu.be/xEHGIRpGyh4 2. Video Demo: https://youtu.be/x8TLTTyyPfI https: //youtu.be/pqo3PDHR924 3. Chart 5. Video Demo: https: //youtu.be/cKnEdvrmHK4	1. Direct Instruction 2. Game based learning 3. Game based learning4. Flipped classroom 5,6. Inquiry based learning	Assessment can be conducted by Quiz . Online tests also can be conducted through google form or moodle platform	1 understand 2 Apply 3,5,6 Remember 4 Analyze	allow the students to experience different colours or objects in dark and light
3.2	Lymphatic system	1. Describe the fuctions of lymphatic system. 2. Differentiate the role of primary and second lymphatic organs in mounting the immune response. 3. Discuss the structure and flow of lymph through lymphatic vessels.	3 hrs	https://youtu.be/cCPyWFK0IKs https://youtu.be/ktazTLF4vcI	1.Direct Instruction 2. Inquiry-based learning3. Project-based learning	Assessment can be conducted by Quiz . Online tests also can be conducted through google form or moodle platform	1. Understand2. Analyze3. Understand	allow the students to experience various smell
Unit IV								

peripheral nervous system								
4.1	Autonomic nervous system	1. describe the preganglionic and postganglionic neurons of ANS. 2. Explain the various effects of stimulation on the sympathetic and parasympathetic nervous systems. 3. able to compare the anatomical components of the sympathetic and parasympathetic nervous systems.	3hrs	https://youtu.be/B5pHcg2XwE0https://youtu.be/D96mSg2_h0c https://youtu.be/vgm5BXHoSnghttps://youtu.be/GHgGsKvkr8s	1. Direct Instruction 2. Inquiry-based learning.3.experiential learning	1.test paper, GD, presentation	1. remember 2.understand3. analyse	students get to know basic taste sensations like sweet, sour,salty and bitter
4.2	cranial nerves	1. able to Identify the cranial nerves by its name, number, type and functions 2.analyze the clinical condition that affects the cranial nerves	1hr	https://youtu.be/vFp_qNifHzw	1. Direct Instruction	mcqs, assignment, viva	1. understand2. Analyze	
4.3	spinal nerves	1. Able to list out and identify the spinal nerves, describe the origin and distribution of spinal nerves	1 hr	https://youtu.be/UQtgscgMIbE https://youtu.be/cAvR2j3jjhg https://youtu.be/4cnAkI_Zrukhttps://www.youtube.com/watch?v=nx_9WyAZnQohttps://youtu.be/V5uh3sh5IuM	1. Direct Instruction 2. GD3. Test paper, Mcqs	test paper, GD, presentation.quiz	1.remember and understand	PBL: Instruct the students to do the model which shows name of blood vessel and its working

4.4	special senses-Eye	1. recognize and describe the accessory structures of the eye and the structural components of eyeball. 2. explain the image formation 3. interpret the processing of visual signals in retina and pathway of vision	1hr	Organ Model /video https://www.youtube.com/watch?v=7lBtlGvS1Gc	1. Flipped Classrooms 2. Direct Instruction	explanation on model of eye, test paper, viva	1. understand and remember 2. understand and analyse	
4.5	special senses-nose	1. state and explain the olfactory receptors and physiology of olfaction	1hr	https://youtu.be/TJfGK87CMmk https://youtu.be/a0pPgXEaTyA	1.Flipped Classrooms. 2. experiential learning. 3. GD	test paper, viva, GD	1. understand and analyse	IBL: Bloop Pressure is increased in stressful situation: Why and How? PBL: Learn by visual experimentation
4.6	special senses-tongue	1. summarize the sense of taste and physiology of gustation	1 hr	https://youtu.be/cC9lptJaM0w	1..Flipped Classrooms. 2. experiential learning. 3. GD	seminar, test paper	1. understand and analyse	

4.7	special senses -ear	1. describe the anatomy of ear. 2. describe the physiology of hearing. 3. identify the receptors for equilibrium and its function. 4. describe the auditory and equilibrium pathways		https://youtu.be/p3Oy4lodZU4	direct instruction, GD	presentation,viva,test paper	1. unserstand 2,analyze 3. remember and understand	
Unit 5 cardiovascular system								
Unit Outcome: Upon completion of this topic student can be able to learn the anatomy and physiology of the heart and its associated structures								
5.1	Anatomy of Heart and blood vessels: External and Internal	1. Discuss the external anatomy and internal anatomy of heart. 2. Differ entiate the structural variation among the different blood vessels 3. State the working of conduction system in order to control the pumping action of heart	2 hrs	1. Models2. https://youtu.be/_qmNCJxpsr03. https://youtu.be/pte5wO5ZB2Q4. https://youtu.be/UMTDmP81mG4	1. Direct Instruction 2. Project-based learning 3. Inquiry based learning	Viva,seminar	1. Understand2. Analyze3. Remember	
5.2	Functions of blood vessels and Cardiac cycle	1. Describe the type of blood vessels in each human organ in respect to the flow of blood 2. Discuss the working of heart as a pump	2 hrs	charts https://youtu.be/46u2ON6d4mg	1. Direct Instruction 2. Direct Instruction	test paper, online quiz	1. Understand2. Understand	
5.3	Regulation of Blood pressure and disorders	1. Describe the mechanism of regulation blood pressure 2. Discuss the normal ECG and cardiac output 3. Relate the abnormalities of ECG, and identify the disorders according to the etiopathogenesis	3 hrs	https://youtu.be/QvHdjYKi1N0	1. Inquiry-based Learning 2. Project Based Learning & Experential learning3. Flipped class Room		1. Understand 2. Understand3. Analyze	

Nirmala College of Pharmacy Muvattupuzha							
Curriculam Planning							
Program	**Pharm D**						
Course	**Biopharmaceutics**			**Course Code**			
Year/ Semester	**IV Year**						
CO Code	**Course Outcomes**					**Bloom level**	
CO 1	Describe the concept behind the biopharmaceutics, pharmacokinetics and design of dose and dosage regimen					Understand	
CO 2	Use plasma data and derive the pharmacokinetic parameters to describe the process of drug absorption, distribution, metabolism and elimination.					Apply	
CO 3	Design and evaluate dosage regimens of the drugs using pharmacokinetic and biopharmaceutic parameters.					Evaluate	
CO 4	Critically evaluate biopharmaceutic studies involving drug product equivalency and Assess the reason for poor bioavailablity of drug and methods to overome the poor bioavilability					Evaluate	
CO 5	Detect potential clinical pharmacokinetic problems and apply basic pharmacokinetic principles to solve them					Evaluate	
Topic Number	**Topic**	**Hours required**	**Topic Outcome**	**Teaching Aid**	**Teaching Pedagogy**	**Assessment Method**	**Bloom level**
Unit I Introduction to Biopharmaceutics							
Up on completion of the topic the student must able to 1) Describe the various factors that affecting the process of ADME. 2) Analyze or assess the bioavailabilty of drug based on the factors, and reason for the actual bioavailabilty of drugs							

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1.01	Mechanism of absorption	2	Up on completion of the topic the student must able to 1) Explain the various mechanism of absorption	https://www.youtube.com/watch?v=y5Gq136538U	Teacher centric Method	Test	Understand
1.02	Factors affecting absorption - Physiochemical factors	3	Up on completion of the topic the student must able to 1) Describe the various physico chemical factors affecting absorption, 2) Apply the knowledge to assess the absorption of a given drug	weak acid and base principle. https://www.youtube.com/watch?v=5sb3SLwwUSw, ph , pka, - https://www.youtube.com/watch?v=yiw4bE8pOgg https://www.youtube.com/watch?v=5BIgSGFPoaM	Teacher centric Method, Case study	Test	1) Understand 2)Apply
1.3	Factors affecting absorption - Pharmacotechnical factors	2	Up on completion of the topic the student must able to 1) Describe the various technical factors affecting absorption 2) Apply the knowledge to assess the absorption of a given drug	Images and graphical representation	Participative learning Case study	Test	1) Understand 2)Apply
1.4	Factors affecting absorption - Patient related factors	2	Up on completion of the topic the student must able to 1) Describe the various Patient related factors affecting absorption 2) Apply the knowledge to assess the absorption of a given drug	NA	Seminar	Test	1) Understand 2)Apply

1.5	Distribution Introduction, Factors affecting Distribution	3	Up on completion of the topic the student must able to 1) Describe the various factors affecting distribution 2) Apply the knowledge to assess the distribution of a given drug	steps in distribution, Barriers to distribution images BBB: https://www.youtube.com/watch?v=noWwbvmdhL0 CSF: https://www.youtube.com/watch?v=D4gq8MILGns	Teacher centric Method, Case study	Test	1) Understand 2)Apply
1.6	Protein binding	4	Up on completion of the topic the student must able to 1) Describe the process of protein binding factors and its significance 2) Apply the knowledge to assess the distribution of a given drug	Images, https://www.youtube.com/watch?v=mQPY1WrkNDE	Teacher centric Method, Case study	Test	1) Understand 2)Apply
1.7	Introduction to Biotransformation PhaseI and Phase II	1	Up on completion of the topic the student must able to 1) Describe the mechanism of metabolism and and oxidation reduction cycle	Images	Teacher centric Method, Case study	Test	1) Understand
1.8	Phase I	8	Up on completion of the topic the student must able to 1) Illustrate various metabolic pathways of drugs	Images	Seminar	Test	Remember

1.09	Phase II	3	Up on completion of the topic the student must able to 1) Illustrate various metabolic pathways of drugs	Images	Seminar	Test	1) Understand
1.1	introduction to excretion, renal excretion, concept of clearence	3	explain the mechanism of renal route of excretion, describe factors affecting renal excretion, describe the consept of clearence	https://www.youtube.com/watch?v=pv5-GwJ90ZM	personolized learning(group discussion)	viva	understand
1.2	non renal route of excretion: biliary, salivary, pulmonary, mammary, skin, GI	3	explain mechanism of nonrenal exretion, describe factors affecting each route of excretion	https://www.youtube.com/watch?v=zKj1qFm2BIM	direct instruction	test paper	understand
Unit 2 Introduction to Pharmacokinetics.							
Up on completion of the topic the student must able to 1) draw and describe various models							
2.1	Various mathematical models	2	Up on completion of the topic the student must able to 1) demonstrate the various mathamatical models and its concepts	Demonstration	Teacher centric Method	Test	Understand
Unit 3 One compartment open model							
Up on completion of the topic the student must able to 1) determine the kinetic parameters of a drug from its plasma drug concentration which follows one compartment model							
3.1	One compartment Iv bolus	3	Up on completion of the topic the student must able to 1) Derive the equation for iv bolus, 2)Apply the knowledge to determine	Graphical representaions	Teacher centric Method/ Experiential learning	Test	1.) Understand 2) Apply

			the compartment model it follows and varios pharmacokinetic parameters of drug				
3.2	One compartment Iv Infusion	2	Up on completion of the topic the student must able to 1) Derive the equation for iv infusion, 2)Apply the knowledge to determine the compartment model it follows and varios pharmacokinetic parameters of drug	Graphical representaions	Teacher centric Method/ Experiential learning	Test	1.) Understand 2) Apply
3.3	One compartment Extra vascular	4	Up on completion of the topic the student must able to 1) Derive the equation for extra vascular , 2)Apply the knowledge to determine the compartment model it follows and varios pharmacokinetic parameters of drug	Graphical representaions	Teacher centric Method/ Experiential learning	Test	1.) Understand 2) Apply
3.4	Wagner nelson method	1	Up on completion of the topic the student must able to 1) Derive the equation and to 2) determine the value of Ka	Graphical representaions	Teacher centric Method/ Experiential learning	Test	1.) Understand 2) Apply
Unit 4 Multicompartment models							

Up on completion of the topic the student must able to 1) determine the kinetic parameters of a drug from its plasma drug concentration which follows multi compartment model							
4.1	Two compartment open model Introduction	1	The student able to diffferentiate a two compartment from one compartment	Graphical representaions	Teacher centric Method/ Experiential learning	Test	Analyse
4.2	IV bolus, IV infusion and oral administration	3	Up on completion of the topic the student must able to 1) Derive the equation , 2)Apply the knowledge to determine the compartment model it follows and varios pharmacokinetic parameters of drug	Graphical representaions	Teacher centric Method/ Experiential learning	Test	1.)Underst and 2)Apply
Unit 5 Multiple – Dosage Regimens							
Up on completion of the topic the student must able to 1) determine the kinetic parameters of a drug from its plasma drug concentration afetr multiple dosing of a drug							
5.1	Introduction	1	Up on completion of the topic the student must able to describe the principle of super position or drug acumulation	Graphical representaions	Teacher centric Method/ Experiential learning	Test	1.)Underst and
5.2	Repititive Intravenous injections – One Compartment Open Model	2	Up on completion of the topic the student must able to 1) Derive the equation , 2)Apply the knowledge to determine the compartment model it follows and varios	Graphical representaions	Teacher centric Method/ Experiential learning	Test	1.)Underst and 2)Apply

			pharmacokinetic parameters of drug				
5.3	Repititive Extravascular dosing – One Compartment Open model	1	Up on completion of the topic the student must able to 1) Derive the equation , 2)Apply the knowledge to determine the compartment model it follows and varios pharmacokinetic parameters of drug	Graphical representaions	Teacher centric Method/ Experiential learning	Test	1.)Underst and 2)Apply
5.4	Multiple Dose Regimen – Two Compartment Open Model	1	Up on completion of the topic the student must able to 1) Derive the equation , 2)Apply the knowledge to determine the compartment model it follows and varios pharmacokinetic parameters of drug	Graphical representaions	Teacher centric Method/ Experiential learning	Test	1.)Underst and 2)Apply
Unit 6 Nonlinear Pharmacokinetics							
Up on completion of the topic the student must able to 1) determine the kinetic parameters of a drug from its plasma drug concentration of it follows non linear kinetics							
6.1	Factors causing Non-linearity	2	Up on completion of the topic the student must able to 1)Explain the possible reson for non linear pharmakokinetics		Teacher centric Method	Test	Understand

6.2	Michaelis-menton method of estimating parameters.	2	Up on completion of the topic the student must able to 1) Derive the equation ,	Graphical representaions	Seminar	Test	Understand
Unit 7 Noncompartmental Pharmacokinetics							
Up on completion of the topic the student must able to 1) determine the kinetic parameters of a drug from its plasma drug concentration by non compartment method							
7.1	Statistical Moment Theory	1	Up on completion of the topic the student WILL ABLE TO descirbe the theory	NA	Teacher centric Method	Test	Remember
7.2	MRT for various compartment models	1	Up on completion of the topic the student must able to 1) Derive the equation , 2)Apply the knowledge to determine the compartment model it follows and varios pharmacokinetic parameters of drug	Graphical representaions	Teacher centric Method	Test	Understand
7.3	Physiological Pharmacokinetic model	1	Up on completion of the topic the studentable TO descirbe the model	Demonstartion	Teacher centric Method	Test	Understand
Unit 8 Bioavailability and Bioequivalence							
unit outcome: at he end of this topic student has to describe the types of bioavailability and its objectives and different methods used to determine bioavailability							
8.1	bioavailability, introduction, objectives, advantages, disadvantages	1	at the end of this topic student has to describe bioavailabity and its objectives	https://www.youtube.com/watch?v=S	direct instruction	viva	understand

8.2	bioavailabity determination methods	2	at the end of this topic student has able to describe the pharmacokinetic and pharmacodynamic methods used to determine bioavailability	graph and image	direct instruction	testpaper	understand

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