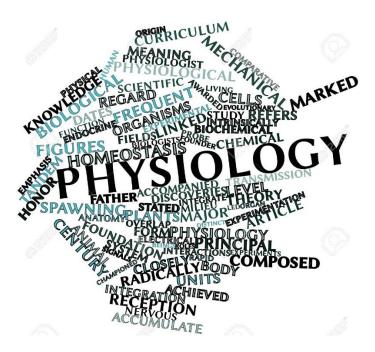


# Study Guide OF PHYSIOLOGY

# FOR 1<sup>st</sup> PROFF MBBS 2019-2020



**PREPARED BY** 

DR. MUHAMMAD ALI TAHIR

**MBBS** 

#### MESSAGE FROM PRINCIPAL, AVICENNA MEDICAL COLLEGE



PROF. DR. GULFREEN WAHEED

It is a pleasure to see Avicenna Medical College develop, progress and achieve maximum academic excellence in a short period since its inception in 2009. The institution has live up to its mission of training and producing medical graduates of international standards. We have achieved several milestones since 2009 including the recognition of our College for FCPS training by College of Physicians and Surgeons of Pakistan (CPSP), establishment of College of Nursing and Avicenna Dental College.

As a Principal I am fortunate to take quick decisions and student friendly measures, yet managing the high standards of Medical Education at the campus. The students at Avicenna are provided with an encouraging environment conducive to their learning and growth and are trained on the pattern test concepts and strategies in Medical Education. They are groomed on modern lines with due emphasis on the highest standards of discipline, Medical Professionalism, Medical and Social ethics in conformity to our cultural and religious values. These attributes along with an inclination towards research and development in academics is the focal point of our education system. Beyond this, we provide students with various opportunities to engage in co-curricular activities thus enabling them to bring out their naturally gifted talent. The student committee and clubs at Avicenna Medical College organizes events throughout the academic year which provide an opportunity to the students to enhance their talents and ability for teamwork. As an institution, we feel pride in the fact that we have won the confidence of the parents, who feel satisfied with the conservative yet progressive atmosphere of our Institution, high standards of Medical Education and discipline. Most parents show complete satisfaction once their child joins the 'Avicenna Family'. I welcome the batch of MBBS students to the continuously expanding family of Avicenna Medical College where diligent and devoted faculty members are ready to facilitate eager learners, enabling them to become future professionals and leaders. May Allah bless your endeavors with success and may you bring honors to your Alma Mater. Ameen!

# MESSAGE FROM HOD, PHYSIOLOGY AVICENNA MEDICAL COLLEGE



Prof. Dr. Binyamin Ahmad Professor MBBS, M. Phil

Human physiology seeks to understand the mechanisms that work to keep the human body alive and functioning, through scientific enquiry into the nature of mechanical, physical, and biochemical functions of humans, their organs, and the cells of which they are composed. The principal level of focus of physiology is at the level of organs and systems within systems. The endocrine and nervous systems play major roles in the reception and transmission of signals that integrate function in animals. Homeostasis is a major aspect with regard to such interactions within plants as well as animals. The biological basis of the study of physiology, integration refers to the overlap of many functions of the systems of the human body, as well as its accompanied form. It is achieved through communication that occurs in a variety of ways, both electrical and chemical.

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# WHAT IS A STUDY GUIDE?

	Inform students how student learning program has been organized according to their learning
objectiv	
	Help students organize and manage their studies throughout the course.
	Guide students on assessment methods, rules and regulations
	THE STUDY GUIDE:
	Communicates information on organization and management of the course. This will help the
student	to contact the right person in case of any difficulty.
	Defines the objectives which are expected to be achieved at the end of the course.
demons	Identifies the learning strategies such as lectures, small group teachings, clinical skills, tration, tutorial and case-based learning that will be implemented to achieve the course objectives.
links, jo	Provides a list of learning resources such as books, computer assisted learning programs, web- purnals, for students to consult in order to maximize their learning.
	STUDENT'S OVERALL PERFORMANCE:
	Includes information on the assessment methods that will be held to determine every student's
	ACHIEVEMENT OF OBJECTIVES:
	Focuses on information pertaining to examination policy, rules and regulations

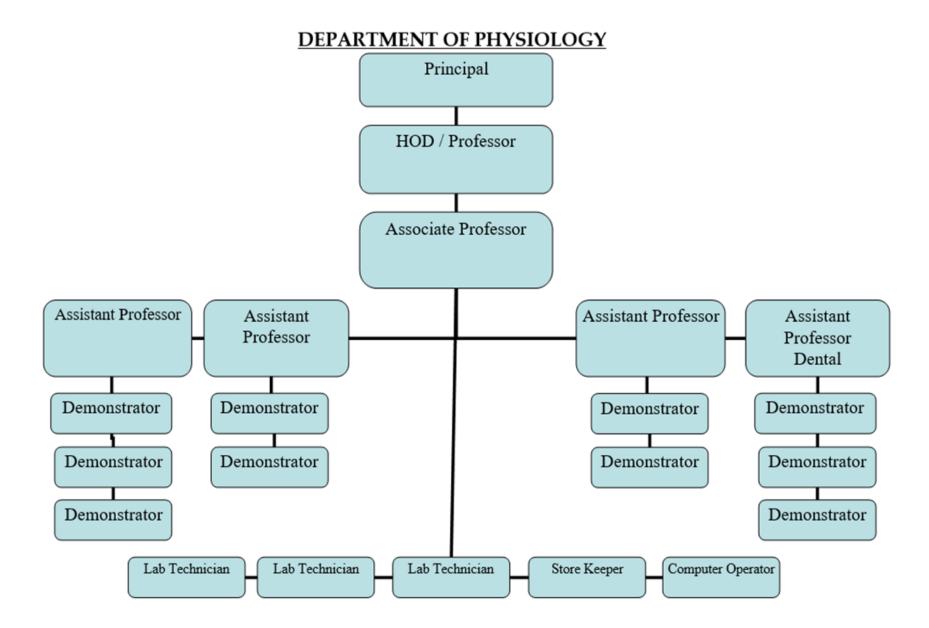
#### INTRODUCTION TO PHYSIOLOGY DEPARTMENT

The Department of Physiology entails a huge physiology lab, which has the capacity to seat 60 students, although for effective demonstration and practice, they will be dealt with in batches of 33-34 students. The first portion of the lab represents Cell physiology & body fluids portion, equipped with compound binocular microscopes & centrifuge machines. Next portion, representing blood physiology is provided with Haemocytometers, Sahli's haemoglobinometer, ESR apparatus, teaching and projection microscopes. The lab also provides distillation plant, hot air oven, physical balance & weighing machines. There are educational charts for theoretic reference. A cardio¬respiratory portion is equipped with Spirometers, Stethographs, Peak expiratory flow meters, ECG Machines, Sphygmomanometers & Ergometers. The lab is also provided with equipment to test special senses like perimeter, vision charts, fundoscope & tuning forks etc. A couch is placed in the lab for the practice of clinical methods.

#### **DEPARTMENTAL GOALS**

- 1. Demonstrate a knowledge of the major core concepts, theoretical underpinning and empirical findings of Biology (Content Goal)
  - 1. Students will master the core concepts in ecology, physiology, cell physiology, molecular biology, evolution and genetics.
- 2. Understand and apply basic research methods, including experimental design, data analysis and interpretation. (Research Methods Goal)
  - 1. Students will be able to design an experiment and understand its strengths and weaknesses.
  - 2. Students will be able to select an appropriate method to test a hypothesis.
  - 3. Students will be able to conduct a properly controlled experiment.
  - 4. Students will be able to prepare reagents and properly set up equipment to carry out an experiment.
  - 5. Students will be able to collect and analyze data from experiments.
  - 6. Students will be able to use computers to extract information from biologically relevant databases.
  - 7. Students will have a working knowledge of basic scientific equipment to collect and analyze data.
- 3. Understand and apply mathematical approaches to analyze, interpret and model biological processes. (Quantitative Goal)
  - 1. Students will master graphing skills (e.g., scaling and data transformations) for visualizing experimental results.
  - 2. Students are expected to understand mathematical formulas concerning biological concepts and draw inferences from them.
  - 3. Students will understand how numbers are manipulated (e.g., normalization) to yield interpretable results.
  - 4. Students will understand what the terms statistical significance and confidence intervals mean.
  - 5. Students will understand what mathematical modeling of a biological concept means.
- 4. Use critical thinking and reasoning, skeptical inquiry and scientific approach to solve problems. (Critical Thinking Goal)
  - 1. Students will be able to conduct a relevant literature review to create a hypothesis.
  - 2. Students will be able to read and evaluate scientific literature.
  - 3. Students will be able to make connections between diverse facts and observations to develop an understanding of basic core concepts.

- 4. Students will be able to draw appropriate conclusions from experimental results.
- 5. Demonstrate writing and oral communication skills important for communicating scientific ideas. (Communications Goal)
  - 1. Students will communicate experimental results in an understandable manner.
  - 2. Students will demonstrate effective oral presentation skills.
  - 3. Students will collaboratively produce scientific reports from laboratory and or classroom assignments



									Avice	nna Medi	ical Col	lege				Date:	27 JA	N 2020	)						
									(	Calender :	2019 - 20 /ear M-														
			Dec	cembe	r 2019						Janu	ary 2020							Feb	ruary 2	2020			SESSION START = 23 Dec 2019	
	Su	Мо	Tu	We	Th	Fr	Sa		Su	Мо	Tu	We	Th	Fr	Sa		Su	Мо	Tu	We	Th	Fr	Sa	SESSION END =	
	1	2	3	4	5	6	7	w.v				1	2	3	4	4							1	Wintervacation = 25 Dec 2019 To 5th Jan	
	8	9	10	11	12	13	14	1	5	6	7	8	9	10	11	5	2	3 S1 UL	4	5	6	7	8	2020	
	15	16	17	18	19	20	21	2	12	13	14	15	16	17	18	6	9	10 BL 1	11	12	13 GA1	14	15	White Coat Ceremony: 24 JAN 2020 Farewell Final Year: 25 JAN 2020	
0	22	23	24	25	26	27	28	3	19	20 GR	21	22	23 Cell	24	25	7	16	17 S2 UL	18	19	20 H1	21	22	Sports day = 31 JAN 2020 Funfare: 1 FEB 2020	
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																			Early Session= 25 Apr 2020 TO 29 Apr 2020						
			ı	March 2	020						Ap	rii 2020							N	1ay 202	20			Spring Vacation = 22 Mar 2020 TO 5 Apr 2020	
	Su	Мо	Tu	We	Th	Fr	Sa		Su	Мо	Tu	We	Th	Fr	Sa		Su	Мо	Tu	We	Th	Fr	Sa	Spring vacation = 22 star 2020 10 Stap 2020	
9	1	2 S3 UL	3	4	5 Prot.	6	7	SP.V				1	2	3	4	15						1	2	Ramadan = 24 April 2020	
10	8	9 E1	10	11	12 S4 UL	13	14	12 R	5	6	7	8 Ecm+W	9ph	10ph	11ph	16	3	4 Heart1	5	6	7 GA2	8	9	Kamadan - 2471pin 2020	
11	15	16 FS UL	17	18	19 N&M	20	21	13 R	12ph	13ph	14bio	15bio	16bio	17bio	18 UL	17	10	11 S1 Thorax	12	13	14	15	16	Wil Series - 20 Aug 20 2 Ser 20	
SP.V	22	23	24	25	26	27	28	14 ES	19 UL	20 UL	21 UL GA	22 Em	23 Histo	24	25An	18	17	18 Lipid	19	20	21 Heart2	22	23	Mid Session = 28 Aug 20 - 3 Sep 20	
SP.V	29	30	31					15 ES	26	27Ph	28	29Bio	30			EID.19	24	25	26	27	28	29	30	Eid-ul-Fitar= 22 May 2020 TO 26 May 2020	
																20	31							Em-urrar = 22 May 2020 TO 20 May 2020	
				June 20	20						Jul	ly 2020							A	ugust 20	20			Summer Vacation = 19 July 2020 TO 2 Aug	
	Su	Мо	Tu	We	Th	Fr	Sa		Su	Мо	Tu	We	Th	Fr	Sa		Su	Мо	Tu	We	Th	Fr	Sa	2020	
20		1 Enz	2	3	4 E2	5	6	24				1	2	3	4	s.v							1		
21	7	8 Cir1	9	10	11S2 Thorax	12	13	25	5	6 Vit	7	8	9 Cir 3	10	11	27 R	2	3	4 H3/ V	5	6 E3	7ph	8ph		
22	14	15 FS Thorax	16	17	18 Haem	19	20	26	12	13 S2 LL	14	15	16 Resp 1	17	18	28 R	9ph	10ph	11ph	12ph	13bio	14 bio	15bio	Muharram= 28, 29 Aug 2020	
23	21	22 H2	23	24	25 Cir 2	26	27	s.v	19	20	21	22	23	24	25	29 R	16bio	17 bio	18 UL	19 UL	20 TH	21 TH	22 LL		
24	28	29 S1 LL	30					s.v	26	27	28	29	30	31		30 MS	23 LL GA	24 Em	25 Histo	26	27 An	28	29	Send up Exam =	
																31 MS	30	31Bio						Send up Exam —	
			Se	ptembe	r 2020						Octo	ber 2020							Nov	ember 2	2020			Prof Date:	
	Su	Мо	Tu	We	Th	Fr	Sa		Su	Мо	Tu	We	Th	Fr	Sa		Su	Мо	Tu	We	Th	Fr	Sa		
31 MS			1	2	3Ph	40	5 O	35					1 E4	2	3		1	2	3	4	5	6	7		
32	6	70	8	9	10	11	12	36	4	5 Temp+Va	6	7	8 Nut	9	10		8	9	10	11	12	13	14		
33	13	14 S3 LL	15	16	17 Min	18	19	37	11	12 H4	13	14	15	16	17		15	16	17	18	19	20	21		
34	20	21 Resp 2	22	23	24 S4 LL	25	26	38	18	19	20	21	22	23	24		22	23	24	25	26	27	28		
35	27	28 FS LL	29	30					25	26	27	28	29	30	31		29	30							

				AVI	CENNA MEDICAL COLLEGE					
М	-19	Ist YEAR			TIME TABLE SESSION 2019 - 2020				WEEK	BASIC
DATE	DAY	8.00-9.00	9.00-10.00		10.00-11.30	11.30- 12.00		12.00-1.30		1.30-2.30
			8.00-10.00		10.00-11.30	12.00				
	MON		ID TEST	KEY DISCUSSION & FEED BACK SESSION	TUTORIAL DH GR. ANATOMY/ EMBRYOLOGY PHYSIOLOGY SELF DIRECTED EARNING/ (BIOCHEMISTRY)		VIVA	LECTURE GROSS ANATOMY <u>LECTURE HALL 1</u> [12.30- 1.30]		LECTURE IOCHEMISTRY CTURE HALL 1
	TUE	LECTURE GEN. EMBRYOLOGY LECTURE HALL 1	LECTURE PHYSIOLOGY LECTURE HALL 1		10:00-11:30  TUTORIAL GROSS ANATOMY- BATCH: A PHYSOLOGY -BATCH: B SELF DIRECTED LEARNING/ SIOCHEMISTRY) -BATCH: C	B R	BATCH BATCH	PRACTICAL : DH GROSS ANATOMY : B : HISTOLOGY I C : BIOCHEMISTRY H D : PHYSIOLOGY		LECTURE ERAL ANATOMY CTURE HALL 1
	WED	LECTURE BIOCHEMISTRY LECTURE HALL 1	LECTURE GEN. HISTOLOGY <u>LECTURE HALL 1</u>		10:00-11:30  TUTORIAL GROSS ANATOMY- BATCH: B PHYSIOL OGY -BATCH: C SELF DIRECTED LEARNING/ SIOCHEMISTRY)-BATCH: A	E A K	BATCH BATCH	PRACTICAL : DH GROSS ANATOMY CH C: HISTOLOGY D: BIOCHEMISTRY H A: PHYSIOLOGY		LECTURE PHYSIOLOGY CTURE HALL 1
		8.00	-10.00		10:00-11:30		12.00-12.45	12.45-1.30		
	тни		ID TEST		TUTORIAL GROSS ANATOMY- BATCH:C PHYSOLOGY-BATCH:A SELF DIRECTED LEARNING/ BIOCHEMISTRY) -BATCH: B		LECTURE SURGERY (33 LEC) RADIOLOGY & ORTHO ( LECTURE HALL 1	LECTURE PATHOLOGY (20 LEC)/ OBG (13 LEC) / EYE (7 LEC) LECTURE HALL 1		LECTURE PHYSIOLOGY CTURE HALL 1
				10:00-10:45	10:45-11:30		11	30-1:00		
	FRI	LECTURE PHYSIOLOGY LECTURE HALL 1	LECTURE GROSS ANATOMY LECTURE HALL 1	LECTURE MEDICINE (33+5 LEC) <u>LECTURE HALL 1</u>	LECTURE GEN. EMBRYOLOGY LECTURE HALL 1		BATCH C : DH BATCH I BATCH A :	ACTICAL GROSS ANATOMY 0: HISTOLOGY BIOCHEMISTRY : PHYSIOLOGY		
	SAT	LECTURE PHYSIOLOGY LECTURE HALL 1	LECTURE BIOCHEMISTRY LECTURE HALL 1	10:00-10:45  LECTURE COM. MEDICINE (33 LEC)/ ENT (7 LEC)  LECTURE HALL 1	10.45-11.30  LECTURE ISLAMIYAT/ PAK STUDIES (24 LEC)/ BEH.SCIENCES (7 LEC)/ PAEDS (7 LEC)  LECTURE HALL 1	11.30- 12.00 B R E A	BATCH BATCH	PRACTICAL  : DH GROSS ANATOMY  :H A: HISTOLOGY  B: BIOCHEMISTRY  H: C: PHYSIOLOGY	GRO	LECTURE RAL ANATOMY/ OSS ANATOMY CTURE HALL 1

Prof.Dr.Gulfreen Waheed\_

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	AVICEN MEDICAL CO	INA	
	MEDICAL CO		

#### **DEPARTMENT OF MEDICAL EDUCATION**

Subject: Physiology - 1st Yr MBBS

TABLE OF SPECIFICATION

Date: 18th Nov. 2019

PMDC Requirement = AVICENNA Curriculum Hour =

Sr.	Topic	LEARNING OBJECTIVES		OWLED		SKILL Psychomotor Domain	ATITTUDE Effective Domain	TOTAL %	Mode	of infor	nation tr	ansfer	TOTAL HOURS	Lecture Topics	References	Practicals
NO.			C1	C2	СЗ	P	Α		Lecture	Tutorial	Practical	Clinical Rotation	Hour			
1	Basic and Cell Physiology	Student will be able to:  1. Desribe the functional organisation of Human Body  2. Explain the concepts of Homeostasis  3. Describe the various control system of the body with clinical relevance  4. Describe and draw the structure, functions of cell membranes and intercellular connections  5. Describe the structure and functions of cell organelles, and compare their functional characteristics  6. Describe and compare the transport mechanisms through cell membrane  7. Explain the genetic components of the body, their control and functions, with clinical correlations.	1%	2%	1%	1%		5%	14 hours	4.5 hours	1.5 hour	Rotation	20 hours 3 weeks	1. Functional organisation of Human Body 2. Homeostasis: Internal Environment 3. Control systems of the body  4. Structure of the Cell, Cell Membrane and its functions  5. Structures and Functions of Endoplasmic Reticulum, Golgi Apparatus, Lysosome, Peroxisomes, and Mitochondria  6. Cell Cytoskeleton and Intercellular Connections  7. Locomotion of Cell and Autophagy 8. Transport of Substances Across the Cell: Simple and Faciliated Diffusion, Osmosis 9. Active Transport: Primary Active Transport 10. Active Transport: Secondary Active Transport 11. Endocytosis 12. Basic Building Blocks of DNA, RNA 13. Process of Transcription and Translation 14. Programmed Cell Death and Cancer	Guyton ed 13, ch. 1 Ganong ed 25, ch. 1  Guyton ed 13, ch. 2 Ganong ed 25, ch. 2  Guyton ed 13, ch. 3 Ganong ed 25, ch. 1	Use of Compound Microscope: Examination of Hair, Buccal Cells, Air Bubbles, Fat Globules, Sand Particles, Wool Fibre, Cotton Fibre

		Student will be able to:										I			
		1. Describe the components of blood and their functions  2. Describe the production and fuctions of plasma protiens  3. Describe erythropoeisis and its regulation  4. Describe the structure, functions, production, and different types of Haemoglobin with iron absorption, storage, and metabolism											1. Introduction to blood; Composition and Functions of blood; The Red Blood Cell Structure Composition of RBCs: RBCs Cell Membrane, Genesis, Life span 2. Plasma proteins: Types, Production, and Functions 3. Production of RBCs (erythropolesis): Site, Stages, and Regulation 4. Hemoglobin: Structure, Synthesis, Functions, and Derivatives Hemoglobinopathies Iron metabolism 5. Anemia: Definition,	Guyton ed 13, ch. 33 Ganong ed 25, ch. 31	1. Study of Haemocytomet er and How to Collect Blood Sample  2. Determination of RBC Count  3. Determination of TLC Count
		5. Explain the use of RBC Indicies in diagnosis of anaemias											Classification, Sign and Symptom, Causes of each type (Iron deficiency anemia, Megaloblastic anemia, Sickle Cell) Effects of anemia on circulatory system; Polycythemia: Types, Effects on circulatory system (cyanosis)		4. Estimation of Haemoglobin by Sahle's Method
		6. Describe the structure, functions, production, and type of WBCs and components of reticuloendothelial system  7. Describe the functions and production of platelets and clotting mechanism of blood  8. Describe the blood groups and their role in blood transfusion and complications											6. WBCs: Types, Genesis (Stages of Development, Site of Production), Normal Count, Life span, and Functions 7. Monocyte – Macrophages System RES (Mobile & fixed macrophages) Functions of macrophages 8. Inflammation: Lines of Defense Leukopenia, Leukocytosis,	Guyton ed 13, ch. 34 Ganong ed 25, ch. 31	5. Perform Differential Leucocyte Count of Your Own Blood 6. Determination of ESR 7. Calculation of RBC Indices
2	Blood	of blood transfusions	4%	4%	4%	6%	2%	20%	21 hours	6 hours	13.5 hours	42 hours	Leukemia, Lymphopenia 9. Immunity: Introduction and Classification Innate immunity 10. Acquired immunity Antibodies: Classes, Functions, and Mechanism of Action Vaccination, Complement System	Guyton ed 13,	8. Determine Your Own Blood Group 9. Determine Bleeding Time and Clotting Time of Your Own Blood
	-   <del>-</del>											4 weeks	11. Cellular immunity     Formation of T-cells, Types and     their Functions     Interferons     AIDS     12. Regulatory Functions of     Lymphocytes and     Immunotolerance	ch. 35 Ganong ed 25, ch. 3	
													13. Allergy—definition, types		
													Hypersensitivity reactions 14. Blood Groups: Introduction, Types, Importance, Cross matching, and ABO Subgroups 15. Rh Blood Group: Types, Rh Transfusion Reaction, Agglutinogens, Agglutinin, Landsteiner's law, Universal Donor & Recipient 16. Erythroblastosis Fetalis Changes in stored blood	Guyton ed 13, ch. 36 Ganong ed 25, ch. 31	
													Transfusion: Definition, Indications, Precautions, and Reactions 17. Hemostasis: Definition, and Stages. Platelets: Functions, Formation of Platelet Plug and its		
													Importance 18. Clotting: Pro coagulants, Anti-coagulants, Clinical Anti- coagulants Clotting factors: Natural Clotting Factors 19. Coagulation: Intrinsic and	Guyton ed 13,	
													Extrinsic Pathway, Prothrombin Activator 20. Conversion of Prothrombin to Thrombin Conversion of Fibrinogen to Fibrin, Formation of Clot, Lysis of Clot	ch. 37 Ganong ed 25, ch. 31	
													21. Anticoagulants: Uses, Intravascular anticoagulants Bleeding disorders 21. Anticoagulants: Uses, Intravascular anticoagulants Bleeding disorders		

		Student will be able to:												
		1. Different modes of transportation of ions across the cell membrane  2. Role of ions in creating resting membrane potential  3. Describe the changes in ionic channels that underlie the action potential.  4. List the various nerve fiber types found in the mammalian nervous system.										1. Neuron: Classification (Histological and Physiological); Nerve Fiber: Structure, Types, Classification Node of Ranvier, Neurilemma  2. Basic Physics of Membrane Potential  3. Resting Membrane Potential Donan's effect, Diffusion potential, Nernst Equation, Goldman Equation  4. Nerve Impulse (Action Potential): Production, Mechanism of Generation; Effect of Various Ions on Action Potential	Guyton ed 13, ch. 5 Ganong ed 25, ch. 4	
		Differentiate the major classes of muscle in the body.     Describe the molecular and electrical makeup of muscle cell										Properties of Nerve Fiber: Conduction, All or None Law, and Refractory Period     Saltatory Conduction and		
		excitation— contraction coupling.										Graded Potential		
	ıscle	7. Define elements of the sarcomere that underlie striated muscle contraction.  8. Differentiate the role(s) for Ca2+ in skeletal, cardiac, and										7. Muscle Anatomy: Types (Striated and Nonstriated) Physiological Anatomy of Skeletal Muscle Composition of Skeletal Muscle (Sarcolemma, Myofibrils, Sarcoplasm, Sarcoplasmic Reticulum, Sarcomere) 8. Mechanism of Muscle Contraction: Sliding Filament Mechanism, Walk-along Theory;	Guyton ed 13,	
3	β	smooth muscle contraction.	2%	3%	6%	4%	15%	21	12		33	Molecular Events in Muscle Contraction	ch. 6 Ganong ed 25,	
	Nerve and Muscle	9. Appreciate muscle cell diversity and function. 10. Describe the neuromuscular junction, and explain how action potentials in the motor neuron at the junction lead to contraction of the skeletal muscle.	270	378	0%	7%	1376	hours	hours		hours	9. Energetics of Muscle Contraction  10. Characteristics of whole muscle contraction (isotonic, isometric contraction)  11. Mechanics of Skeletal Muscle Contraction  12. Musce Fatigue Remodelling of Muscle, Myopathies, Rigor Mortis	ch. 5	
												13. Physiological anatomy of neuromuscular junction 14. Transmission of impulses from nerve ending to skeletal muscle fibre, Ach formation & release, EPP, 15. Drugs that enhance & block N.M transmission Myasthenia gravis 16. Excitation - contraction coupling of skeletal muscle	Guyton ed 13, ch. 7 Ganong ed 25, ch. 6	
												17. Smooth Muscles: Types and Structure; RMP of Smooth Muscle, Action potential in smooth muscle 18. Mechanism of contraction of smooth muscle 19. Excitation - contraction coupling of smooth muscle 20. Latch Mechanism and Regulation of Smooth Muscle Contraction 21. Nervous and hormonal control of smooth muscle Comparison between skeletal, smooth and cardiac muscles	Guyton ed 13, ch. 7 Ganong ed 25, ch. 5	

		Student will be able to:			l						1				
		1. Describe the structure and function of the conduction system of the heart and compare the action potentials in each part.											Physiologic Anatomy of Cardiac Muscle, Cardiac Muscle as a Syncytium, Heart chambers, nerve and blood supply of heart, Properties of myocardiumAction Potentials in Cardiac Muscle, Contractility		1. ECG 1
		<ol> <li>Describe the way the electrocardiogram (ECG) is recorded, the waves of the ECG, and the relationship of the ECG to the electrical axis of the heart.</li> </ol>											Action potentials in cardiac muscle;     Excitation-Contraction Coupling		2. ECG 2
		3. Name the common cardiac arrhythmias and describe the processes that produce them. 4. List the principal early and	-										3. Cardiac Cycle: Pressure and Volume Changes in the Ventricles	Guyton ed 13, ch. 9 Ganong ed 25,	
		at ECG manifestations of myocardial infarction and explain the early changes in terms of the underlying ionic events that produce them.  5. Describe the ECG changes and											4. Cardiac Cycle: Heart Sounds, ECG Changes, Atrial Waves	ch. 30	
		the changes in cardiac function produced by alterations in the ionic composition of the body fluids.											5. Regulation of Contraction of Ventricular Muscle		
		<ol> <li>Describe how the sequential pattern of contraction and relaxation in the heart results in a normal pattern of blood flow.</li> </ol>											6. Effect of Different Ions on Heart Function		
4	Heart	7. Understand the pressure, volume, and flow changes that occur during the cardiac cycle.	1%	3%	2%	2%	1%	9%	18 hours	9 hours	3 hours	30 hours	7. Rhythmical Excitation of the Heart: Rhythmicity, Conductivity and excitability, Specialized conducting system of heart	Guyton ed 13, ch. 10 Ganong ed 25, ch. 29	
		8. Explain the basis of the arterial pulse, heart sounds, and											8. Excitation and action potential in pace maker		
		murmurs.  9. Delineate the ways by which cardiac output can be upregulated in the setting of specific physiologic demands for increased oxygen supply to the tissues, such as exercise.	-										9. Transmission of the Cardiac Impulse Through Atria, AV Nodal Delay		
		10. Describe how the pumping action of the heart can be compromised in the setting of specific disease states.											10. Conduction Through Ventricles, Abnormal Pacemaker, Control of Heart Rhythmicity and Impulse Conduction		
													11. Electrical properties of cardiac muscle (Normal ECG	Guyton ed 13	
													recording and interpretation) 12. Electrical properties of cardiac muscle (Normal ECG recording and interpretation)—II Methods of recording ECG	Guyton ed 13, ch. 10 Ganong ed 25, ch. 30	
													13. ECG Leads		
													14. Abnormal ECG 15. Arrhythmias -1(Mechanism of Arrhythmias)		
													Abnormal Sinus Rhythms 16. Abnormal Rhythm		
													Resulting from Heart Blocks 17. Premature Contractions,		
													Paroxysmal Tachycardia, Ventricular Fibrillation 18. Atrial Fibrillation,		
													Atrial Flutter, Cardiac Arrest		

Student will be able to:  1. Know physics of flow of blood	1. Overview of circulation Physical characteristics of circulation Functional Parts of the Circulation		1. Determination of Blood Pressure in Man
2. Describe the neural mechanisms that control arterial blood pressure and heart rate, including the receptors, afferent and efferent pathways, central integrating pathways, and effector mechanisms involved.  3. Describe the direct effects of CO2 and hypoxia on the rostral ventrolateral medulla.	Volumes of Blood in the Different Parts of the	Guyton ed 13, ch. 14 ranong ed 25, ch. 31	2. Study Effect of Posture on Blood Pressure in Humans
4. Define how the process of autoregulation contributes to control of vascular caliber.  5. Identify the paracrine factors and hormones that regulate vascular tone, their sources, and their mechanisms of action.	affecting it	Guyton ed 13, ch. 15 Ganong ed 25,	3. Study the Effect of Exercise on Blood Pressure
6. Define the special features of the circulation in the brain, coronary vessels, skin, and fetus, and how these are regulated.	6. Veins and their functions, varicose veins	ch. 32	4. Clinical Examination of Arterial Pulse
7. Describe how cerebrospinal fluid (CSF) is formed and reabsorbed, and its role in protecting the brain from injury.	7. Structure of microcirculation and capillary system Flow of Blood in the Capillaries- Vasomotion		5. Clinical
8. Understand how the blood- brain barrier impedes the entry of specific substances into the brain.	8. Exchange of Water, Nutrients, and Other Substances Between the Blood and Interstitial Fluid; Structure of interstitium and interstitial fluid		Examination of Precordium
9. Delineate how the oxygen needs of the contracting myocardium are met by the coronary arteries, and the consequences of their occlusion.	of Fluid Volume through the	Guyton ed 13, ch. 16 Ganong ed 25, ch. 32	
10. List the vascular reactions of the skin and the reflexes that mediate them.	10. Starling Equilibrium for Capillary Exchange		
11. Understand how the fetus is supplied with oxygen and nutrients in utero, and the circulatory events required for a transition to independent life after birth.	11. Lymphatic system (Lymph Channels of the Body, Formation of Lymph, Rate of Lymph Flow, Lymphatic Capillary Pump, Role of the Lymphatic System in Controlling Interstitial Fluid Protein Concentration,		

Circulation

												12. Local and humoral control of blood flow — I (Local Control of Blood Flow in Response to Tissue Needs, Mechanisms of Blood Flow Control, Acute Control of Local Blood Flow,  13. Reactive Hyperemia, Active Hyperemia, Auto regulation of Blood Flow, Special Mechanisms for Acute Blood Flow Control in Specific Tissues, Control of Tissue Blood Flow by Endothelial-Derived Relaxing or Constricting Factors  14. Local and humoral control of blood flow — II (Development of Collateral Circulation-a Phenomenon of Long-Term Local Blood Flow Regulation)	Guyton ed 13, ch. 17 Ganong ed 25, ch. 32	
												Nervous regulation of circulation     Short term regulation of BP, Reflex Mechanisms for Maintaining Normal Arterial Pressure,     Control of Arterial Pressure by the Carotid and Aortic Chemoreceptors-	ch. 18	
5		1%	3%	12%	6%	2%	24%	42 hours	12 hours	12 hours	66 hours	18. Atrial and Pulmonary Artery Reflexes Regulate Arterial Pressure, Atrial Reflexes That Activate the Kidneys-The "Volume Reflex, 19. Special Features of Nervous Control of Arterial Pressure	Ganong ed 25, ch. 32	
												20. Renal-Body Fluid System for Arterial Pressure Control 21. Role of increased fluid volume on control of arterial pressure 22. Long term regulation of BP (The Renin-Angiotensin aldosterone system) 23. Hypertension (Definition, types, causes, complications and treatment) 24. Intermediate regulation of BP (Renin-angiotensin vasoconstrictor system, stress relaxation, Capillary fluid shift mechanism)	Guyton ed 13, ch. 19 Ganong ed 25, ch. 32	
	Circulation											25. Cardiac output and its regulation Normal Values for Cardiac Output at Rest and During Activity Cardiac Index 25. Factors That Cause a Hyper effective Heart Factors That Cause a Hypo effective Heart		
												26. Role of the Nervous System in Controlling Cardiac Output Methods for Measuring Cardiac Output  27. Venous return and its regulation	Guyton ed 13, ch. 20 Ganong ed 25, ch. 32	
												Plateau in the Venous Return Curve at Negative Atrial Pressures Caused by Collapse of the Large Veins Resistance to Venous Return Factors effecting venous return 28. Total Peripheral resistance		
												and its regulation 29. Control of Blood Flow in Skeletal Muscles Circulatory adjustments during exercise 30. Coronary circulation and its regulation 31. Ischemic Heart Diseases	Guyton ed 13, ch. 21 Ganong ed 25, ch. 32	

					32. Shock, Classification, types and management-1 (Physiologic Causes of Shock, Stages of Shock, Shock Caused by Hypovolemia-Hemorrhagic Shock, Hypovolemic Shock Caused by Plasma Loss, Hypovolemic Shock Caused by Trauma)  33. Progressive shock	Guyton ed 13, ch. 24	
Circulation					34. Shock, Classification, types and management-2 (Neurogenic Shock-Increased Vascular Capacity, Anaphylactic Shock and Histamine Shock, Septic Shock) 35. Physiology of Treatment in Shock 35. Treatment of shock, circulatory arrest	Ganong ed 25, ch. 32	
					36. Cardiac failure (Circulatory Dynamics in Cardiac Failure) 37. Compensated Heart Failure 38. Decompensated Heart Failure, Unilateral Left Heart Failure 39. Low-Output Cardiac Failure-Cardiogenic Shock, Edema in Patients with Cardiac Failure, Cardiac Reserve)	Guyton ed 13, ch. 22 Ganong ed 25, ch. 32	
					40. Heart Sounds 41. Valvular Heart Diseases 42. Tetralogy of Fallots Patent ductus arteriosus	Guyton ed 13, ch. 23 Ganong ed 25, ch. 32	

Student will be able to:	1 1 1	l	1 1	1 1	1 1 1			
1. List the passages through which air passes from the exterior to the alveoli, and describe the cells that line each of them.						Organization and Functions of the Respiratory System Respiratory unit-Dead space Blood supply of lungs-Pulmonary circulation, bronchial circulation		1. Determinatio n of Various Lung Volumes and Capacities by Spirometery
2. List the major muscles involved in respiration, and state the role of each.						2. Mechanics of Pulmonary Ventilation (Muscles That Cause Lung Expansion and Contraction, Pressures That Cause the Movement of Air In and Out of the Lungs, Pleural Pressure and Its Changes during Respiration, Alveolar Pressure, Trans pulmonary Pressure)		2. Study Respiratory Movements by Stethograph
3. Define lung compliance and airway resistance.						3. Compliance of the Lungs (Compliance Diagram of the Lungs), changes in lung compliance, Compliance of the Thorax and the Lungs Together Surfactant, Surface Tension, and Collapse of the Alveoli, Principle of Surface Tension, Surfactant and Its Effect on Surface Tension, Pressure in Occluded Alveoli Caused by Surface Tension, Effect of Alveolar Radius on the Pressure Caused by Surface Tension, "Work" of Breathing	Guyton ed 13, ch. 38 Ganong ed 25, ch. 34	3. Cardiopulmon ery Resuscitation
4. Define the basic measures of lung volume and give approximate values for each in a normal adult.						4. Pulmonary Volumes and Capacities, Measurement of Maximum Expiratory Flow, Forced Expiratory Vital Capacity and Forced Expiratory Volume measurement by spirometry, FEV1 and FVC ratio Minute Respiratory Volume		
5. Compare the pulmonary and systemic circulations, and list some major differences between them.						5. Alveolar ventilation Dead Space" and Its Effect on Alveolar Ventilation, Measurement of the Dead Space Volume Functions of the Respiratory Passageways		
Describe basic lung defense and metabolic functions.						6. Pressures in the Pulmonary System Blood Volume of the Lungs		
7. Define partial pressure and calculate the partial pressure of each of the important gases in the atmosphere at sea level.						7. Blood Flow Through the Lungs and Its Distribution	Guyton ed 13,	
8. Describe the manner in which						8. Effect of Hydrostatic Pressure Gradients in the Lungs on Regional Pulmonary Blood Flow Pulmonary Capillary Dynamics	ch. 39 Ganong ed 25, ch.	
8. Describe the manner in which O2 flows "downhill" from the lungs to the tissues and CO2 flows "downhill" from the tissues to the lungs.						9. Pulmonary Edema Fluid in the Pleural Cavity		

Respiration	9. List the important factors affecting the affinity of hemoglobin for O2 and the physiologic significance of each. 10. List the reactions that increase the amount of CO2 in the blood, and draw the CO2 dissociation curve for arterial and venous blood.  11. Define alkalosis and acidosis and list typical causes and compensatory responses to each.	2%	4%	7%	3%	3%	19%	32 hours	6 hours	9 hours	47 hours	10. Physics of Gas Diffusion and Gas Partial Pressures Laws of gas diffusion  11. Compositions of Alveolar Air and Atmospheric Air  12. Respiratory Membrane Factors That Affect the Rate of Gas Diffusion through the Respiratory Membrane Diffusing Capacity of the Respiratory Membrane Measurement of Diffusing Capacity-the Carbon Monoxide Method  13. Effect of the Ventilation-Perfusion Ratio on Alveolar Gas Concentration	Guyton ed 13, ch. 40 Ganong ed 25, ch. 35	
	<ol> <li>Define hypoxia and describe differences in subtypes of hypoxia.</li> </ol>											Concept of Physiologic Shunt Concept of the Physiologic Dead Space Abnormalities of Ventilation- Perfusion Ratio		
	<ol> <li>Describe the effects of hypercapnia and hypocapnia, and give examples of conditions that can cause them.</li> </ol>											14. Transport of Oxygen from the Lungs to the Body Tissues 15. Role of Hemoglobin in		
												Oxygen Transport (Oxygen- Hemoglobin Dissociation Curve) Effect of Hemoglobin to "Buffer" the Tissue PO2 16. Factors That Shift the		
	14. Locate the pre-Bötzinger complex and describe its role in producing spontaneous respiration.      15. Identify the location and											Oxygen-Hemoglobin Dissociation Curve Transport of Oxygen in the Dissolved State	Guyton ed 13, ch. 41 Ganong ed 25, ch. 35	
	probable functions of the dorsal and ventral groups of respiratory neurons, the pneumotaxic center, and the apneustic center in the brainstem.											17. Transport of Carbon Dioxide in the Blood Carbon Dioxide Dissociation Curve		
	16. List the specific respiratory functions of the vagus nerves and the respiratory receptors in the carotid body, the aortic body, and the ventral surface of the medulla oblongata.											18. Combination of Hemoglobin with Carbon Monoxide-Displacement of Oxygen Respiratory Exchange Ratio		
	17. Describe and explain the ventilatory responses to increased CO2 concentrations in the inspired air.  18. Describe and explain the											19. Nervous control of respiration Respiratory Center- Herring Bruer inflation reflex		
	ventilatory responses to decreased O2 concentrations in the inspired air.											20. Chemical Control of Respiration  21. Peripheral Chemoreceptor	Guyton ed 13, ch. 42	
	19. Describe the effects of each of the main nonchemical factors that influence respiration.											System for Control of Respiratory Activity; Role of Oxygen in Respiratory Control Regulation of Respiration during Exercise	Ganong ed 25, ch. 36	
	20. Describe the effects of exercise on ventilation and O2 exchange in the tissues.											22. Factors affecting respiration Periodic breathing Cheyne Stokes breathing		
	21. Define periodic breathing and explain its occurrence in various disease states.											23. Pulmonary function tests: Useful Methods for Studying Respiratory Abnormalities  24. Pathophysiology of Specific		
												Pulmonary Abnormalities		
												25. Emphysema Asthma	Guyton ed 13, ch. 43	
												26. Hypoxia and Oxygen Therapy; Effects of Hypoxia on the Body; Cyanosis	Ganong ed 25, ch. 35	
												27. Hypercapnia-Excess Carbon Dioxide in the Body Fluids; Artificial Respiration		

Varied Environment Skin and Body	1. Know various modes of transfer of heat in the body 2. Understand mode of temperature regulation 3. Describe and explain basis of sweat formation 4. Understandand and explain physiology of Fever and variousdiseasesoccuring dueto disturbance in temperature regulation	1%	3%	2%	2%	8%	4 hours	3 hours		7 hours		Guyton ed 13, ch. 74	
Varied Envii Skin and											<ul> <li>27. Effect of low oxygen pressure on body-Mountain sickness</li> <li>28. Acute and chronic changes in the body at high altitude</li> <li>29. Effect of acceleratory forces on body in space</li> <li>30. Deep sea diving, Nitrogen narcosis</li> <li>31. Oxygen toxicity, Acute Oxygen poisoning.</li> </ul>	Guyton ed 13, ch. 44 Ganong ed 25, ch. 35 Guyton ed 13, ch. 45	
											32. Decompression sickness, SCUBA diving		

#### **CURRICULUM & LEARNING OUTCOMES WITH REFRENCE TO UHS**

#### At the end of the course the student should be able to:

#### Basic and Cell Physiology

- Understand functional organization of human body
- Describe homeostasis / control systems in the body
- Describe structure, functions of cell membrane and its transport mechanisms
- List cell organelles and describe their functions
- Understand basic concepts about DNA and RNA

#### Blood

- Describe the composition and general functions of blood
- Enumerate plasma proteins, give their properties, their sites of production and explain their functions
- Explain erythropoiesis and factors affecting erythropoiesis
- Explain the functions of red blood cell
- Understand the structure; describe functions of hemoglobin and enumerate its different types.
- Describe the role of various elements especially iron in hemoglobin synthesis.
- Enumerate and define various blood indices
- Explain leucopoiesis and describe types and functions of white blood cells
- 9. Describe monocyte-macrophage system and functions of spleen
- Explain various types of immunity
- 11. Explain thrombocytopoiesis and describe functions of platelets
- Explain hemostasis, mechanism of blood coagulation, fibrinolysis and anticoagulants
- Explain the blood groups and their role in blood transfusion
- Understand fate of red blood cells and bilirubin formation

#### Applied Physiology

#### Understands:

- 1. Anemia, its types and the effects on human body
- Polycythemia, its types and effects on the human body

- Blood indices in various disorders
- Clotting and bleeding disorders
- Hazards of blood transfusion
- Rh incompatibility
- 7. Abnormal immune responses
- Jaundice

#### Nerve and Muscle

- Understand the structure of the neuron and describe the properties of nerve fibres
- Classify the nerve fibres
- Describe the physiological basis of resting membrane potential
- Describe the genesis of action potential and compound action potential
- Describe the propagation of action potential
- 6. Outline the structural-functional relationship of skeletal muscle
- Describe neuromuscular junction and transmission
- Explain and compare the mechanism and characteristics of contraction of the three muscle types.
- 9. Differentiate between the isometric and isotonic contraction
- 10. Understands the difference between tetany and tetanization
- Excitation contraction coupling
- Understand chemical changes during muscle contraction and muscle fatigue

# Applied Physiology

#### Understands:

- Peripheral nerve injuries
- 2. Myasthenia gravis
- Muscular dystrophy
- Muscular hypertrophy / atrophy
- 5. Rigor mortis / contracture
- 6. Drugs / poisons affecting neuromuscular junctions

# Cardiovascular System

- Describe scheme of circulation through the heart and body
- Describe the properties of cardiac muscle
- Explain the generation of cardiac impulse and its conduction

- Compare and contrast action potential of SA node and ventricular myocardium
- 5. Describe the various events in cardiac cycle
- Explain the mechanism for production of heart sounds
- Describe the lead systems for a 12 lead ECG
- Define, draw and label normal ECG and explain the physiologic basis of waves, segments and intervals
- 9. List types of blood vessels and their function
- Describe the haemodynamics of blood flow (local control systemic circulation its regulation and control)
- Explain the microcirculation and capillary dynamics.
- 12. Discuss peripheral resistance its regulation and effect on circulation
- Describe the arterial pulse
- 14. Define venous return and explain the factors affecting it.
- Explain cardiac output and its control
- Describe blood pressure and its regulation
- 17. Describe coronary circulation and factors affecting it
- Describe the factors regulating cerebral and cutaneous circulations
- Define shock and its various types with their physiological / pathophysiological basis
- Describe the various stages of shock and their physiological compensation.

# Applied Physiology

#### Understands:

- Basic concepts related to electrical axes and cardiac vectors
- Differentiation between various ECG recordings on the basis of rate and rhythm (bradycardia, tachycardia, heart-blocks, ventricular fibrillation, atrial fibrillation, myocardial ischemia / infarction)
- 3. Development of Oedema
- 4. Effects of hypertension and cardiac failure
- Clinical significance of heart sounds and murmurs
- Varicose veins

# Respiratory System

- Describe the functional organization of the respiratory tract.
- Describe respiratory and non-respiratory function of the respiratory tract
- 3. Explain the mechanics of breathing

- Describe the production & function of surfactant and compliance of lungs
- Describe the protective reflexes
- 6. Explain lung volumes and capacities including dead space
- Describe pulmonary circulation and pulmonary capillary dynamics
- Describe the composition of atmospheric, alveolar and expired air
- 9. Describe the diffusion of gases across the alveolar membrane
- 10. Explain the relationship between ventilation and perfusion
- Describe the mechanism of transport of oxygen and carbon dioxide in blood
- 12. Describe the nervous and chemical regulation of respiration
- Explain abnormal breathing
- 14. Define and explain hypoxia, its causes and effects
- 15. Define and explain cyanosis, its causes and effects

#### Applied Physiology

#### Understands:

- Causes of abnormal ventilation and perfusion
- Effects of bronchial asthma, pneumothoax, pleural effusion and pneumonia
- Respiratory failure
- 4. Artificial respiration and uses & effects of O2 therapy
- 5. Clinical significance of hypoxia, asphyxia, cyanosis, and dyspnoea
- Respiratory distress syndrome
- Differentiation between obstructive and restrictive lung disorders on the basis of pathophysiology and lung function test
- Respiratory acidosis and alkalosis.

# Skin and Body Temperature Regulation

- Describe body temperature regulation
- Describe functions of skin

# Applied Physiology

#### Understands:

Abnormalities of temperature regulation

# **Human Responses in Varied Environments:**

- 1. Describe cardiovascular, muscular and respiratory adjustments in exercise
- 2. Explain physiologic responses to high altitude and space
- Explain physiologic responses to deep sea diving and hyperbaric conditions

# Applied Physiology

- 1. Acute and chronic mountain sickness
- 2. Nitrogen narcosis and decompression sickness

# PHYSIOLOGY PRACTICALS

# Haematology

- Use of the microscope
- Determination of haemoglobin
- Osmotic fragility of RBCs
- Blood groups
- Determination of erythrocyte sedimentation rate
- Determination of packed cell volume
- Determination of bleeding and clotting times
- RBC count
- Platelet count
- Red cell indices
- Total Leukocyte count
- Differential leucocyte count

# Respiratory System

- Clinical examination of respiratory system
- 2. Pulmonary volumes, capacities and their clinical interpretation
- 3. Recording of respiratory movements using Stethograph

# Cardiovascular System

- Cardiopulmonary resuscitation (to be coordinated with the department of medicine)
- Examination of arterial pulse
- Examination of jugular venous pulse
- 4. ECG recording and interpretation of normal ECG
- Recording of arterial blood pressure
- Effects of exercise and posture on blood pressure
- Apex beat and normal heart sounds
- 8. Triple response
- ICU / CCU / Medical ward visit to study the cases of CCF, Murmurs, Hypertension, Myocardial infarction etc.

# Skin and body temperature regulation

Recording of body temperature

Demonstration of power lab (computerized data acquisition system) related experiments

# **SOURCE OF KNOWLEDGE**

# RECOMMENDED BOOKS

- Textbook of Physiology by Guyton and Hall, Latest Ed.
- Review of Medical Physiology by William F. Ganong, Latest Ed.

# REFERENCE BOOKS

- Human Physiology by Laurali Sherwood
- Physiology by Berne and Levy, Latest Ed.
- Essentials of Medical Physiology by Prof. Dr. Mushtaq Ahmad
- Physiology by Linda and Constanzo

# **POLICY & GUIDELINES OF**

# LEARNING STRATERGIES & STUDY SKILLS FOR MEDICAL STUDENTS

This document is a Summary written for the purpose of the study guides. For details refer to the document "A HANDBOOK OF POLICY & GUIDELINES OF

LEARNING STRATERGIES & STUDY SKILLS FOR MEDICAL STUDENTS" available for the students at website, Bookshop and the Department of Medical Education.

#### STEPS TO STRATEGIC LEARNING:

#### 1. Set realistic learning goals.

These goals serve as the driving force to generate and maintain the motivation, thoughts, and behaviour necessary to succeed. Set and use long-term occupational goals (you want to be a doctor) and short-term learning goals (you want to understand this new material).

#### 2. Types of knowledge needed to be a strategic learner:

- Know yourself as a learner (learning preferences, talents, best times of day to study, ability to match study skills to learning task) this knowledge helps you set realistic yet challenging learning goals.
- Knowing the nature and requirements of different types of educational tasks.
- Knowing a variety of study skills and learning strategies and how to use them.
- Knowing the contexts in which what is being learned can be used now or in the future.

## 3. Use a variety of learning strategies:

- Manage your study environment,
- Coordinate study and learning activities,
- Keep your motivation for learning clear,
- Generate positive behaviours toward learning,
- Make new information meaningful to you,
- Organize and integrate new information with existing knowledge, or Re-organize existing knowledge to fit the new understanding and information.
- Place new information in a present or future context.

## ACADEMIC HOURS BREAKDOWN AS PER PMDC REGULATIONS

#### TABLE OF SPACING AND HOURS OF SUBJECTS IN MBBS COURSE

I* year	2 <sup>nd</sup> year	3rd year	4th year	5th year T	otal Hours
5 Hrs.	5 Hrs. 5 H	rs. 5	Hrs.	5 Hrs.	25 Hrs.
15 Hrs.	15 Hrs.10 l	Hrs. 10	0 Hrs.	-	50 Hrs.
250 Hrs.	250 Hrs.	*-	*		500 Hrs.
250 Hrs.	250 Hrs.	*	-		500 Hrs.
100 Hrs.	100 Hrs.		-		200 Hrs.
-	-	300 Hrs.	-	-	300 Hrs.
15 Hrs.	25Hrs.	260 Hrs	200 Hrs	- 32	500 Hrs.
-		100 Hrs	-	-	100 Hrs.
25 Hrs	25 Hrs	50 Hrs	150 Hrs	-	250 Hrs.
25 Hrs.	30 Hrs. 10 Hrs.	120 Hrs	265 Hrs. 10 Hrs	360Hrs	800 Hrs. 20 Hrs.
		-			
5 Hrs.	10 Hrs.	15 Hrs	50 Hrs	70 Hrs	150 Hrs.
25 Hrs.	30 Hrs.	120 Hr	265 Hr	s 360 Hrs	800 Hrs.
5 Hrs.	10 Hrs.		10 Hrs	15 Hrs	40 Hrs.
10 Hrs.	10 Hrs.	50 Hrs	100 Hr	s 130 Hrs	300 Hrs.
5 Hrs.	10 Hrs.	15 Hrs	70 Hrs		100 Hrs.
5 Hrs.	10 Hrs.	15 Hrs	70 Hrs	-	100 Hrs.
-			60 Hrs		60 Hrs.
	5 Hrs.  15 Hrs.  250 Hrs.  250 Hrs.  100 Hrs.  -  25 Hrs.  5 Hrs.  5 Hrs.  5 Hrs.  5 Hrs.	5 Hrs. 5 Hrs. 5 Hrs. 10 Hrs. 15 Hrs. 250 Hrs. 250 Hrs. 100 Hrs. 100 Hrs 15 Hrs. 25 Hrs. 25 Hrs. 25 Hrs. 30 Hrs 10 Hrs 10 Hrs. 5 Hrs. 10 Hrs. 5 Hrs. 10 Hrs. 5 Hrs. 10 Hrs. 5 Hrs. 10 Hrs. 10 Hrs. 5 Hrs. 10 Hrs. 10 Hrs.	5 Hrs. 5 Hrs. 5 Hrs. 5  15 Hrs. 15 Hrs. 10 Hrs. 10  250 Hrs. 250 Hrs  250 Hrs. 250 Hrs  100 Hrs. 100 Hrs  - 300 Hrs.  15 Hrs. 25 Hrs. 260 Hrs  - 100 Hrs  25 Hrs. 25 Hrs. 50 Hrs  25 Hrs. 30 Hrs. 120 Hrs  - 10 Hrs  5 Hrs. 10 Hrs  5 Hrs. 10 Hrs  10 Hrs  10 Hrs. 15 Hrs  5 Hrs. 10 Hrs	5 Hrs. 5 Hrs. 5 Hrs. 5 Hrs.  15 Hrs. 15 Hrs. 10 Hrs. 10 Hrs.  250 Hrs. 250 Hrs  250 Hrs. 250 Hrs  100 Hrs. 100 Hrs  - 300 Hrs  15 Hrs. 25 Hrs. 260 Hrs 200 Hrs  - 100 Hrs -  25 Hrs. 25 Hrs. 50 Hrs 150 Hrs  25 Hrs. 30 Hrs. 120 Hrs 265 Hrs.  10 Hrs  5 Hrs. 10 Hrs. 15 Hrs 50 Hrs  5 Hrs. 10 Hrs 10 Hrs  5 Hrs. 10 Hrs 10 Hrs  5 Hrs. 10 Hrs 10 Hrs  5 Hrs. 10 Hrs. 50 Hrs 100 Hrs  5 Hrs. 10 Hrs. 50 Hrs 70 Hrs  5 Hrs. 10 Hrs. 15 Hrs 70 Hrs  5 Hrs. 10 Hrs. 15 Hrs 70 Hrs	5 Hrs.       5 Hrs.       5 Hrs.       5 Hrs.       5 Hrs.         15 Hrs.       15 Hrs.       10 Hrs.       -       -         250 Hrs.       250 Hrs.       -       -       -         250 Hrs.       250 Hrs.       -       -       -         100 Hrs.       100 Hrs.       -       -       -         15 Hrs.       25 Hrs.       260 Hrs.       200 Hrs.       -         25 Hrs.       25 Hrs.       50 Hrs.       150 Hrs.       -         25 Hrs.       30 Hrs.       120 Hrs.       265 Hrs.       360 Hrs.         10 Hrs.       10 Hrs.       15 Hrs.       360 Hrs.       -         5 Hrs.       10 Hrs.       120 Hrs.       265 Hrs.       360 Hrs.         5 Hrs.       10 Hrs.       -       10 Hrs.       15 Hrs.         10 Hrs.       10 Hrs.       -       10 Hrs.       15 Hrs.         5 Hrs.       10 Hrs.       15 Hrs.       70 Hrs.       -         5 Hrs.       10 Hrs.       15 Hrs.       70 Hrs.       -         5 Hrs.       10 Hrs.       15 Hrs.       70 Hrs.       -

Bioethics will be taught in the Forensic Medicine.

Biostatistics will be taught in Community Medicine.

<sup>\*\*\*</sup> Behavioral Sciences will be taught in Psychiatry.
\*\*\*\* Biophysics will be taught in Radiology.

Distribution of subjects Instructional contents into Theory and Practical learning.

Type of subject	Theory Content	Practical Skills Content
All Basic Sciences	50%	50%
Pre-Clinical Sciences (Pharmacology and Therapeutics, Forensic Medicine, Community Medicine, Pathology)	40%	60%
Clinical Sciences	30%	70%
Internship/House Job	0%	100%

#### Time Allocation To Curriculum Content= 7493 hours

Subject specified competencies	General competencies	
80%	20%	
5994	1499	

Time Allocation To the Study Design(5184)

Instructions	Self Study	
80%	20%	
4795	1198	

Time Allocation to Site of Study(4147)

Institution Based	Community Oriented
80%	20%
3836	959

Distribution of Marks in Evaluation

University Examination	Internal Assessments	
90%	10%	

## **Examination of Subject Based MBBS Curriculum**

Total 100%

Internal Assessment 20%

University Examination 80%

Internal Assessment Theory	Internal Assessment Practical	University Assessment Theory	University Assessment Practical	Total	
10%	10%	40%	40%	100%	

Generic Competencies

Total Hours = 1499

## Compulsory

- Pakistan Studies
- Islamiyat

# ACADEMIC HOURS BREAKDOWN (ACMC)

# CURRICULUM 1ST YEAR MBBS M-19 ACADEMIC YEAR 2020

	<b>1ST</b>	YEAR MBB	S M-19 ACADE	MIC YEAR 20	)20	
S#	Subjects	PMDC Req. Study Hours	Lecture Hours	Tutorial Hours	Practical Hours	TOTAL STUDY HOURS
1	ANATOMY	250/ 503.5	1.5 x38= 57 45min x 38.5= 28.5 190+57+28.5= 275.5	1.5 x38= 57 57 x 2= 114	1.5 x 38= 57 57 x 2= 114	503.5
2	PHYSIOLOGY	250/304	5 x38= 190	1.5 x 38= 57 57 x 1=57	1.5 x 38= 57 57 x 1=57	304
3	BIOCHEMISTRY	125/171	3 x 38= 114	1.5 x 20= 30	1.5 x 18= 27	171
4	ISLAMIYAT/ PAK. STUDIES	15/ 18	45 min x 24= 18	0	0	18
5	BEH. SCIENCES	5/5	45 min x 7= 5.25	0	0	5
6	PATHOLOGY	15/ 15	45 min x 20= 15 hrs	0	0	15
7	COM.MEDICINE	25/ 25	45min x 38= 28.5	0	0	25
8	MEDICINE & ALLIED	25/ 28.5	45min x 38= 28.5	0	0	28.5
9	PAEDS	5/5	45min x 7 = 5 hrs	0	0	5
10	SURGERY & ALLIED	25 / 25	45min x 33= 25	0	0	25
11	RADIOLOGY & ORHO	5/5	45min x 7=5 hrs	0	0	5
12	OBG	10/10	45min x 13=10 hrs	0	0	10
13	EYE	5/5	45min x 7=5 hrs	0	0	5
14	ENT	5/5	45min x 7=5 hrs	0	0	5
15	SELF DIRECTED LEARNING (SDL)	500 IN 5 YEAR	0	1.5 x38= 57	0	57
	TOTAL HOURS:	765/1182	729.75	258	198	1182 hrs

# **UHS TABLE OF SPECIFICATIONS**

Topic / Chapter	No. of MCQs	No. of SEQs
Basic and Cell Physiology	02	01
Blood	09	02
Nerve and Muscle	. 09	02
Skin and Temperature Regulation	02	0.5
Cardiovascular System	14	02
Respiratory System	07	01
Human Responses in Varied Environments	02	0.5
Total	45	09

# Objectively Structured Performance Evaluation (OSPE)

(Total Marks: 90)

The structure of OSPE/ Practical/ Viva should be as follows:

# Viva Voce (35 marks)

- Internal ----- 15 marks
- External ----- 20 marks

# OSPE (25 marks)

Non-observed stations 10 of 01 marks each (2 minutes each)

Observed stations
 03 of 05 marks each (4 minutes each)

# Practical (30 marks)

Practical
 20 marks

Procedure Writing 05 marks

Yearly Workbook Assessment 05 marks

#### **INTERNAL ASSESMENT POLICY**

The assessment policy of Avicenna Medical College clearly reflect that the assessment must covers knowledge, skills and attitude to be acquired by a medical student at the end of the each Professional Year and the entire MBBS Course.

- Theoretical knowledge is assessed by means of MCQs, SEQs, Structured Viva, CBD Tutorials and Pre-Test Tutorials.
- Professional and Clinical Skills are assessed through OSPE, OSCE, Practical Exams and Long and Short Cases.
- Attitudes are assessed through OSPE, OSCE, Practical Exams, Long Cases, Short Cases and Vivas

#### **Assessment Procedures**

Performance of students will be assessed as follows:

#### a. Programmatic Assessment During Academic Year: Grand Tests and Revision Test

It will incorporate both formative and summative assessment for all academic years.

#### 1) Formative Assessments:

These are Conducted throughout the academic year. These are low stake examinations with feedback to improve student learning, leading to better performance in summative assessments and the UHS Professional Examinations. At Avicenna Medical College the formative assessment is in the form of Grand Tests, Revision Tests, Research, Tutorials, Assignments, Long Cases and Short Cases presentations etc.

#### 2) Summative Assessments:

These are conducted at the end of each term, consisting of Session Examinations conducted on the pattern of UHS annual Prof Exams. These consist of One best type of MCQs and SEQs which has two to three parts require written short essay responses from the students. The MCQs, the SEQs are mostly clinical and scenario based and designed to test the concepts.

#### b. End of Term Assessment

This will be summative carried out at the end of each academic year.

#### **Assessment Tools:**

Various tools selected are as follows according to UHS guidelines.

#### a. Written Assessment

#### 1) Multiple Choice Question (MCQ)

MCQs are extensively used for in both formative and summative assessment owing to their ability to offer a broad range of examination items that incorporate several subject areas. They are the one best type of MCQs and designed to test factual knowledge, understanding and clinical reasoning.

A multiple choice item consists of a problem, known as the stem, and a list of suggested solutions, known as the choices. The choices consist of one correct or best choice, which is the

answer, and incorrect or alternatives, known as distractors. Each MCQ carries one mark. The number of MCQs vary in the Grand Tests, Revision Test and the Session Exams as needed.

# 2) Short Essay Questions (SEQs)

Written assessment formats are the most widely used assessment methods in medical education. Learning outcomes which are mainly based on cognitive domains (knowledge) can be assessed by them.

The SEQs have a statement or clinical scenario followed by two to three questions, which require application of concepts and are thought provoking.

# b. Assignments and Presentations

Every month in various departments, topics of clinical significance are given to the students for assignment and presentations for small group discussions (SGD) sessions. These will be a part of formative assessment. Clinico- Basic and Clinico-Pathological Conferences (CPC) are held for preclinical and clinical years, respectively.

## c. Practical/Clinical Assessment

## 1) Objective Structured Practical Exam (OSPE)

A formative OSPE will be held during terms and summative at the end of year. It will consist of laboratory-based and practical questions related to the learning objectives covered in the course. The students will be given feedback after formative assessment.

## 2) Objective Structured Clinical Exam (OSCE):

A formative OSCE will be held during the term and summative at the end of year. It will consist of clinical and practical questions related to the learning objectives covered in the course. The students will be given feedback after formative assessment.

## 3) Long Case

At the end of fourth and final year each subject will be assessed by a long case. Daily encountered problems will be the case scenarios for which students will be trained during formative assessment in clinics.

## 4) Structured Viva

At the end of examination an integrated viva will be taken in which relevant specialists will sit and ask questions. There will be guidelines for examiners to follow.

### 5) Log Books

In case of log books, required entries will be countersigned by observer. It will be criterion referenced whereas the students will have to fulfill the following criteria: for example assignments, case presentations in wards, departmental log books.

#### 6) Observation

### **Internal Assessment**

The progress report from teachers will have separate column about behavior and attitude of students in each term in addition to academic record with minimum pass of 50%.

## **Internal Assessment**

The progress report from teachers will have separate column about behavior and attitude of students in each term in addition to academic record with minimum pass of 50%.

The question papers are prepared in secrecy and approved by the Principal. The department then gets sufficient copies made in secrecy and submits the same to the directorate of Medical Education 24 hours before the scheduled test / exam. On the day of the examinations these papers along with the answer sheets are collected from the DME and taken straight to the examination hall where they are opened and are distributed to the students for attempting the question.

After the papers have been solved, the MCQs are marked immediately and the SEQs marked and submitted within two days (except for revision tests where the results have to be submitted within 24 hours) from here, the assessment system as envisaged in the earlier paragraphs is applied.

Every test / examination is supported by keys both for MCQs and SEQs. Adequate time is air marked for key discussion in which the member of the faculty explains to the class how in fact they should have attempted the MCQs and SEQs. This gives an opportunity to the class to make the assessment of how they have attempted the paper and what mistakes they have made and how not to repeat them in future.

Avicenna Medical College endeavors to implement the assessment system of the UHS subject based curriculum as it is in vogue at present by implementing the curriculum with the basic ingredients of assessment implementation as follows:

- a. Grand Test
- b. Revision Test
- c. Session Examinations
- d. OSPE
- e. OSCE
- f. Viva
- g. Log books / Copies
- h. Assignments
- i. Research work
- i. Tutorials
- k. Long case
- 1. Short case

### **Practical Assessments**

The regulations for the preparation and conduct of practical assessments vary between subject areas. Where regulations have not been specified they have to be put up to the Academic Committee.

### **Clinical Assessment**

The clinical assessment is carried out in the following forms:

- a. Scenario based Clinical Oriented MCQs
- b. Scenario/Clinical based SEQs/SAQs
- c. On-Patient training viva
- d. Ward tests

- e. OSPE
- f. OSCE

## **Assessment Framework**

The framework for assessment involves the University guideline of:

- a. Pass marks 50%
- b. Equal marks for theory and for practical
- c. Internal Assessment 10% to be awarded by the college
- d. Allocation of marks as under

### **Allocation of Marks**

Sr.	Subject	Marks Theory	Marks Practical / OSPE / OSCE	Remarks
1	Anatomy	100	100	Internal assessment 10%
2	Physiology	100	100	Internal assessment 10%
3	Biochemistry	100	100	Internal assessment 10%
4	Islamiyat & Pak Studies	100	-	
5	Pathology	150	150	Internal assessment 10%
6	Pharmacology	150	150	Internal assessment 10%
7	Forensic Medicine	100	100	Internal assessment 10%
8	Community Medicine	150	150	Internal assessment 10%
9	Special Pathology	150	150	Internal assessment 10%
10	ENT	100	100	Internal assessment 10%
11	Ophthalmology	100	100	Internal assessment 10%
12	Medicine	200	300	Internal assessment 10%
13	Surgery	250	250	Internal assessment 10%
14	Gynae	150	150	Internal assessment 10%
15	Paeds	100	100	Internal assessment 10%
16	Behavioral Sciences	100	100	Internal assessment 10%

**Grand Test:** The syllabus of each subject for which the table of specification has been formulated in detail is divided into various topics and grand tests are held after the topic has been covered in theory, practical and in tutorial classes. The grand test is the first exposure of the students towards assessment of his/her knowledge and skills and is held once only for each topic covered as the syllabus goes along. The grand test has the following ingredients:

a. MCQsb. SEQsc. Viva / Copy45% marks45% marks10% marks

**Note**: The DME maintains a record of all grand tests along with the keys to the MCQs and SEQs and the results. These results are used for the calculation and assessment of each student in terms of their acquisition of knowledge and skills.

**Revision Test:** The revision tests are designed to precede every session exam and they are aimed at breaking up the syllabus and covering the same in small bits so that the students can have exhaustive study of the portion of the syllabus to be tested upon. The schedule of revision test is decided jointly by the Assessment Committee and the students' class representatives so that the student input is brought into consideration. In this case the students' representatives include the weak students, the average ones and good students. And this mix ensures that adequate time is provided to weak students to do exhaustive studies.

Depending upon the syllabus covered. 8 to 10 revision tests are held in preparation for the session exams. The contents of the revision tests are:

a.	MCQs (30)	30 marks
b.	SEQs (6)	30 marks

**Note**: The DME maintains a record of all grand tests along with the keys to the MCQs and SEQs and the results. These results are used for the calculation and assessment of each student in terms of their acquisition of knowledge and skills. Four sets of revision tests are held annually. One each before the early session, mid-session, late session and/or send-up examination.

**Session Examination:** As per the annual planner and schedule, three session exams are held every year and these are generally held in March, June and August each year. The late session examination is held in August and as an extra opportunity for the students to qualify the send-ups for the border line cases is only held one month before the prof exam. The following session exams are held:

a.	Early Session Examination	50% of syllabus
b.	Mid-Session Examination	85% syllabus
c.	Late Session Examination	100% syllabus
d.	Send-up Examination	For the very weak

The details of the session examination are as under

a. Theory - 50% marks divided as under

1) MCQs	45% of theory marks
2) SEQs	45% of theory marks
3) Log book / copy	10% of theory marks

b. OSPE/OSCE/Viva - 50% marks

**Note**: The DME maintains a record of all session exams along with the keys to the MCQs and SEQs and the results. These results are used for the calculation and assessment of each student in terms of their acquisition of knowledge and skills. Four sessions examinations are held annually.

OSPE (Objective Structured Practical Examination): This depicts the scenario based clinical setting and various stations are arranged. The student has to go from one station to the other to answer the question or to display his practical skill. This is aimed at assessing both the knowledge and skills of the student. The format and the standard of the scenario based problems/questions are in line with the standards prescribed by the University of Health Sciences.

**Note:** The DME maintains a record of all OSPEs along with the keys to the OSPE and the results. These results are used for the calculation and assessment of each student in terms of their acquisition of knowledge and skills. Sample OSPE paper is attached as **Annexure-B**. Since OSPE is a part of session exams therefore four sessions of OSPE are held each year.

**OSCE** (Objective Structured Clinical Examination): This depicts the scenario based clinical setting and various stations are arranged. The student has to go from one station to the other to answer the question or to display his clinical skills. This is aimed at assessing both the knowledge and skills of the student. The format and the standard of the scenario based problems/questions are in line with the standards prescribed by the University of Health Sciences.

**Note:** The DME maintains a record of all OSCEs along with the keys to the OSCE and the results. These results are used for the calculation and assessment of each student in terms of their acquisition of knowledge and skills. Sample OSCE paper is attached as **Annexure-C**. Since OSCE is a part of session exams therefore four sessions of OSCE are held each year.

**Viva:** This is an oral examination to which the student is subject to be examined by two members of the Faculty one acting as the internal examiner and the other acting as the external examiner. The student is grilled in these oral questioning sessions. The student is asked on various clinical aspects to ascertain his knowledge.

**Note:** The DME maintains a record of all Viva and the results. These results are used for the calculation and assessment of each student in terms of their acquisition of knowledge and skills. Since Viva is a part of session exams therefore four sessions are held each year.

Copies and Log Books: Whereas copies are maintained in 1<sup>st</sup> 2<sup>nd</sup> and 3<sup>rd</sup> year of the basic sciences, the log books are maintained for the 4<sup>th</sup> year and the final year for the clinical subjects. The completion of the copies and the log books is mandatory and these have to be produced before the internal and the external examiner on all session examinations and annual Prof exam. Copies and log books carry 10 marks and are a valid record for the purpose of assessment besides being a record of the students' clinical exposure.

**Assignments:** These are normally generated by the Community Medicine and the Department of Medicine in which the departments give assignments for the students to be completed in their own time. Assignments are included as a part of practical assessment and left to the discretion of the Head of Department.

**Research work:** The Department of Community Medicine as a part of its Curriculum train the students in carrying out research. These research projects are covered in Standard 12 – Research & Scholarship and research records are available in the Department of Community Medicine. Research works are included as a part of practical assessment and left to the discretion of the Head of Department.

**Tutorials:** These are held before every grand test to clear the concepts of the students on the subject. The performance of the students in the tutorials is included in the viva assessment.

**Long Case and Short Case:** This system of OSPE and OSCE is to ascertain the clinical acumen of the student. These are held with the session examinations and form of a part of the practical/clinical assessment.

#### **Notification of Results**

The Assessment Committee will display result on notice board as well as the results are sent through SMS to the father of the student.

Results as hard copy will also be sent to parents after each term.

### **Conducting Examinations and Assessments**

Conducting Examinations and Assessments According to University of Health Sciences Guidelines. In all examinations and assessments, the conditions underpinning the examination or assessment shall be displayed on concerned department notice boards to students prior to the examination or assessment taking place.

**Note:** Any requests for special assistance example reader/writer are to be made prior to the examination or assessment.

g. Introducing students to the system of simulated and standardized patients

### **Response to Parents:**

Parents are kept informed about the result of each student. The results are dispatched as follows:

a.	Grand Test:	by SMS
b.	Revision Test:	by SMS

c. Session Examinations: as a report containing the results of all grand tests

of all subjects for that class. Three session exam

reports are sent. Reports of each session for each class are

attached as Annexure-I.

d. OSPE
e. OSCE
f. Viva
g. Log books / Copies
Included in the session result
Included in the session result
Included in the session result

h. Assignments Included in the session result
i. Research work Included in the session result
j. Tutorials Included in the session result

k. Long casel. Short caseIncluded in the ward test / clinical test

						Avicenna Medical Co	llege			
					1st Term Test S	chedule 1st Year MBE	SS M- 19			
Week	No. Of Test	Date	Day	Time	Subject	Test	Topic	Refrence		
0		23-Jan-19	Mon	8.00-10.00		]	Beginning of 1st Year MBBS			
					Winter Vacation	: 25-Dec-19 T	o 5-Jan-20			
1st		6-Jan-20	Mon	8.00-10.00	All Subject	Time divided	Lecture			
1st		9-Jan-20	Thu	8.00-10.00	All Subject	Time divided	Lecture			
2nd		13-Jan-20	Mon	8.00-10.00	All Subject	Time divided	Lecture			
2nd		16-Jan-20	Thu	8.00-10.00	All Subject	Time divided	Lecture			
3rd	1	20-Jan-20	Mon	8.00-10.00	Gross. Anatomy	Grand Test	Terminologies & Bones of upper limb			
3rd	2	23-Jan-20	Thur	8.00-10.00	Bio chemistry-1	Grand Test	Biochemistry of Cell	Cell Notes		
4th	3	27-Jan-20	Mon	8.00-10.00	Physiology-1	Grand Test	Cell physiology & Transport	Guyton ch : 1,2,3, 4 Ganong ch : 1,2		
4th	4	30-Jan-20	Thur	8.00-10.00	Bio chemistry-2	Grand Test	Nucleotide Chemistry	Harper 31 ed, Ch=32,34		
5th	5	3-Feb-20	Mon	8.00-10.00	Anatomy SS-1	Grand Test	Upper Limb: SS1 ( Pectoral region Axilla+ Brachial plexus ,Breast, SC & AC Joints)	KLM PG.: 673-676,688,697-730 794-796,813		
5th		6-Feb-20	Thu	8.00-10.00	All Subject	Time divided	Lecture			
6th	6	10-Feb-20	Mon	8.00-10.00	Physiology-2	Grand Test	Blo od -1	Guyton ch :33, 34		
6th	7	13-Feb-20	Thur	8.00-10.00	Gen. Anatomy-1	Grand Test	Skin ,Fascia ,Bone, Cartilage, Joints	Ganong ch : 32 Tassdaq Hussain PG: 1-51		
7th	8	17-Feb-20	Mon	8.00-10.00	Anatomy SS-2	Grand Test	Upper Limb: SS2 (Post-Post Axioappendicular region, humerus, scepula, flexor & Extensor Compartment Of Arm, Cubital fossa, Shoulder Joint)	KLM PG.: 676-677,731- 743,796,814,815		
7th	9	20-Feb-20	Thur	8.00-10.00	Histology-1	Grand Test + Viv a	Cell + Epithelium + Mammary gland	Laiq Hussain CH.: 2,3,22		
8th	10	24-Feb-20	Mon	8.00-10.00	Bio chemistry-3	Grand Test	Carbohydrate Chemistry	Lippincot Ch: 7 Harper Ch: 15		
8th	11	27-Feb-20	Thur	8.00-10.00	Physiology-3	Grand Test	Blood -2	Guyton ch :35,36,37 Ganong ch : 3,31		
9th	12	2-Mar-20	Mon	8.00-10.00	AnatomySS-3	Grand Test	Upper Limb: (Radius, Ulma, Flexor Compartment of Forearm, Fascia of Hand, Muscles of Hand, Elbow joint, proximal & distal radioulnar joint)	KLM PG: 677-679,744-767,800- 808		
9th	13	5-Mar-20	Thur	8.00-10.00	Bio chemistry-4	Grand Test-4	Protein Chemistry	Lippincot Ch;1,2 Harper Ch: 3,4,5,52		
10th	14	9-Mar-20	Mon	8.00-10.00	Embryology-1	Grand Test	Embryology-1	CH.: 1-4		
10th	15	12-Mar-20	Thur	8.00-10.00	AnatomySS-4	Grand Test	Upper Limb: (Bones of hand, Venous & Lymphatic drainage, Cutaneous nerve supply, Hand, wrist joint, joints of hand	KLM PG.: 679-680,688-696,771 792,809-818		
11th	16	16-Mar-20	Mon	8.00-10.00	Anatomy-Final Stage	Grand Test	Upper Limb final Stage	FULL COURSE		
11th	17	19-Mar-20	Thur	8.00-10.00	Physiology-4	Grand Test	Nerve+Muscle	Guyton ch : 5-8 Ganong ch : 4,5,6		
					Spring Vacation	ns: 22 -Mar-20 To	5-Aril-20			
12th		6-Apr-20	Mon	8.00-10.00	All Subject	Time divided	Lecture			
12th	18	8-Apr-20	Wed	8.00-10.00	Bio chemistry-5	Grand Test	ECM + Water + PH+ Buffer	Lippincot Ch: 1,4,14 Harper ch: 50 Chatter Jee Ch: 40,41		
					Early Session Exam: 25	Apr 2020 - 29 Apr 2	020			
14th	1	25-Apr-20	Tue	8.00-11.00	ESE	ANATOMY	ANATOMY Entire Syllabus Covered			
15th	2	27-Apr-20	Thur	8.00-11.00	ESE	PHYSIOLOGY	Entire Syllabus Covered			
15th	3	29-Apr-20	Wed	8.00-11.00	ESE	BIOCHEMISTRY	Entire Syllabus Covered			

Avicenna Medical College											
	2nd Term Test Schedule 1st Year MBBS M- 19										
Week	No. Of Test	Date	Day	Time	Subject	Test	Topic	Reference			
16th	19	4-May-20	Mon	8.00-10.00	Physiology-5	Grand Test	Heart - 1	Guyton ch : 9,10 Ganong ch : 30,31			
16th	20	7-May-20	Thur	8.00-10.00	Gen. Anatomy-2	Grand Test	Whole syllabus of Gen. Anatomy	Whole syllabus			
17th	21	11-May-20	Mon	8.00-10.00	Gross Anatomy-1	Thorax 1st Substage	Thoracic wall, pleura, Lungs,Breast	KLM pg: 72-127			
17th		14-May-20	Thur	8.00-10.00	All Subject	Time divided					
18th	22	18-May-20	Mon	8.00-10.00	Biochemistry-6	Grand Test	Lipid Chemistry	CH: 17 pg: 201-203,208,209,210,213,21			
L8th	23	21-May-20	Thur	8.00-10.00	Physiology-6	Grand Test	Heart - 2	Guyton ch : 9-13 Ganong ch : 29,30			
				E	id-ul-Fitar Hol	lidays: 22	-May -20 To 26-May-20				
19th		28-May-20	Thur	8.00-10.00	All Subject	Time divided	Lecture				
20th	24	1-Jun-20	Mon	8.00-10.00	Biochemistry-7	Grand Test	Enzymes	Lippincot Ch;5 Harper Ch 7,8,9			
20th	25	4-Jun-20	Thur	8.00-10.00	Gen. Embryology-2	Grand Test	4th-8th week, Fetal Period, Placenta and Fetal membranes	KLM CH. : 5, 6, 7			
21st	26	8-Jun-20	Mon	8.00-10.00	Physiology-7	Grand Test	Circulation-1	Guyton ch : 14, 15, 16 Ganong ch : 31,32			
21st	27	11-Jun-20	Thur	8.00-10.00	Gross Anatomy-2	Thorax 2nd Substage	Mediastinum, Heart, Great vessels	KLM p: 127-179			
22nd	28	15-Jun-20	Mon	8.00-10.00	Gross Anatomy-3	Final Stage	THORAX Whole Syllabus	KLM pg: 291-403			
2nd	29	18-Jun-20	Thur	8.00-10.00	Biochemistry-8	Grand Test	Heme & porphyria	Lippincot Ch;3,21 Harper Ch. 6 ,31			
23rd	30	22-Jun-20	Mon	8.00-10.00	Gen Histology-2	Grand Test	CVS, Muscle, Connective Tissue, Respiratory	Laiq p: 5,6,7,8,10,13,17 Janqeiara: 96-153, 179-84, 182-202			
23rd	31	25-Jun-20	Thur	8.00-10.00	Physiology-8	Grand Test	Circulation-2	Guyton ch: 17, 18,19 Ganong ch:32			
24th	32	29-Jun-20	Mon	8.00-10.00	Gross Anatomy-4	LL 1st Substage	Ant & Med Comp of Thigh, Hip bone, Femur	KLM p: 666-676,684-685,691,704-721			
24th		2-Jul-20	Thur	8.00-10.01	All Subject	Time divided	Lecture				
25th	33	6-Jul-20	Mon	8.00-10.00	Biochemistry-9	Grand Test	Vitamins	Lippincot Ch;28 Harper Ch; 44			
25th	34	9-Jul-20	Thur	8.00-10.00	Physiology-9	Grand Test	Circulation-3 : Cardiac Failure, Heart valve, Shock, Exercise	Guyton ch : 20,21,22 Ganong ch : 32			
26th	35	13-Jul-20	Mon	8.00-10.00	Gross Anatomy-5	LL 2nd Substage	Ghtteal region, Post Thigh, Hip Joint, Popliteal fossa	KLM pg :721-743,744-746,763,785- 792,818-820			
26th	36	16-Jul-20	Thur	8.00-10.00	Physiology-10	Grand Test	Respiration 1 : Pulmonary circulation, Pulmonary Ventilation	Guyton ch : 23,24,38 Ganong ch : 34			
					Summer Va	cation : 19	July 20 To 2-Aug-20				
27th		3-Aug-20	Mon	8.00-10.01	All Subject	Time divided	Lecture				
27th	37	4-Aug-20	Tue	8.00-10.00	Gen Embryology-3	Grand Test	Skeletal, Muscular, Development of limbs	KLM Embryo: Chapter 14, 15, 16			
27th	38	6-Aug-20	Thur	8.00-10.00	General Histology-3	Grand Test	Nervous System, Integumentary System, Lymphoid	Laiq:ch: 11,14,15 Janqeuara: 226-48, 161-74, 182, 185-7, 316-31			
Mid Session Exam: Start From 28-Aug-20 to 3-Sep-20											
30th	1	27-Aug-20	Thur	8.00-11.00	MSE	ANATOMY	/IY Entire Syllabus Covered				
	2	31-Aug-20	Mon	8.00-11.00	MSE	BIOCHEMISTRY	Y Entire Syllabus Covered				
31st	3	- 1			MSE	PHYSIOLOGY	Entire Syllabus Co				

	Avicenna Medical College Prof Gulfreen Waheed											
3rd Term Test Schedule 1st Year MBBS M- 19												
Week No. Of Test Date Day Time Subject Test Topic Reference												
31st		4-Sep-20	Fri	8.00-10.00		OSPE IN 3 BATCHES						
31st		5-Sep-20	Sat	8.00-10.00		OSPE IN 3 BATCHES						
32nd		7-Sep-20	Mon	8.00-10.00		OSPE IN 3 BATCHES						
32nd		10-Sep-20	Thur	8.00-10.00	All Subject	Time divided	Lecture					
33rd	39	14-Sep-20	Mon	8.00-10.00	Gross Anatomy-6	LL 3rd Substage	Ant, post, lat. comp of Leg, Knee joint, Sup Inf TF Joints, Tibia, Fibula	KLM pg :-748-767,793-806				
33rd	40	17-Sep-20	Thur	8.00-10.00	Biochemistry-10	Grand Test	Minerals	Lippincot Ch: 29 Harper Ch: 44				
34th	41	21-Sep-20	Mon	8.00-10.00	Physiology-11	Grand Test	Respiration 11 :	Guyton ch : 39-43 Ganong ch : 34,35				
34th	42	24-Sep-20	Thur	8.00-10.00	Gross Anatomy-7	LL 4th Substage	Foot, Ankle joint, joints of foot, Cutaneous nerve supply, Venous & Lymphatic drainage of LL, Radiology, Surface anatomy	KLM pg : 681-683,688- 689,691-703,768-784,806- 817,825-827				
35th	43	28-Sep-20	Mon	8.00-10.00	Gross Anatomy-8	Final Stage LL	Whole Lower Limb	KLM p: 666-827				
35th	44	1-Oct-20	Thur	8.00-10.00	Embryology-4	Grand Test	Integumentary, Teratogenesis	KLM CH. : 19, 20				
36th	45	5-Oct-20	Mon	8.00-10.00	Physiology-12	Grand Test	varied environments + skin body tempture + sport physiology	Guyton Ch : 44,45,74,85				
36th	46	8-Oct-20	Thur	8.00-10.00	Biochemistry-11	Grand Test	Nutrition & Obesity	Lippincot Ch:26-27 Harper Ch: 43				
37th	47	12-Oct-20	Mon	8.00-10.00	General Histology-4	Grand Test	Whole syllabus of histology	Whole syllabus				
End Of Third Term												
					Late Sessi	ion Exam						
					Late Session Exam		ANATOMY	Entire Syllabus Covered				
					Late Session Exam		PHYSIOLOGY	Entire Syllabus Covered				
					Late Session Exam		BIOCHEMISTRY	Entire Syllabus Covered				
Send Up												
						Third Term f Exam						