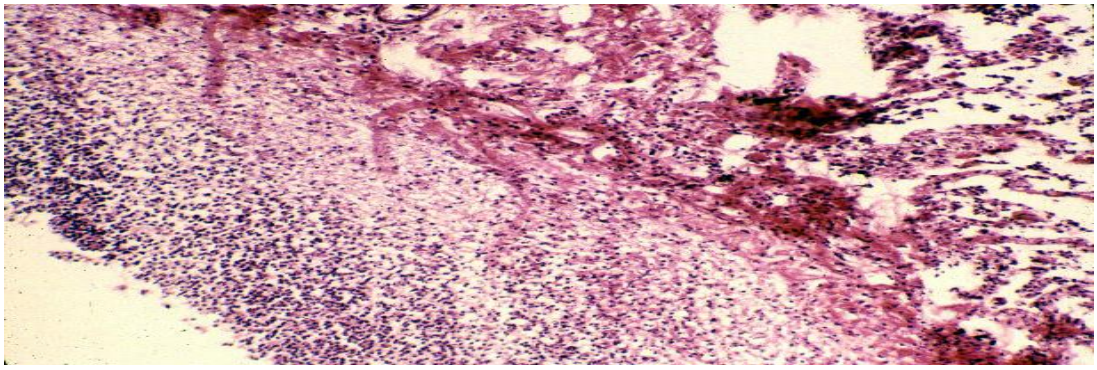
AVICENNA
MEDICAL COLLEGE

Study Guide
OF GENERAL PATHOLOGY
FOR 3RD PROFF MBBS



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, GENERAL PATHOLOGY

AVICENNA MEDICAL COLLEGE

DR. SYED SHAUKAT ALI SHAH

M.B.B.S.,M.C.P.S.,M.PHIL(MORBID ANATOMY/HISTOPATHOLOGY)

Pathology is a branch of medicine that bridges the clinical and non-clinical subjects. Pathologists are called upon to diagnose and confirm many ailments. The department has 3 labs; a Histopathology and Haematology lab, a Microbiology and Chemical pathology lab & a Clinical lab. The Clinical lab works in full coordination with the Avicenna Hospital. The labs are being supervised by professors, experienced in the related specialties. The department has a well-designed museum displaying neatly mounted specimens and several detailed and highly informative charts/ graphs. Highly qualified professors with national & international experience are supervising the pathology labs.

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WHAT IS A STUDY GUIDE?

- Inform students how student learning program has been organized according to their learning objectives.
- 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.
- Identifies the learning strategies such as lectures, small group teachings, clinical skills, demonstration, tutorial and case-based learning that will be implemented to achieve the course objectives.
- Provides a list of learning resources such as books, computer assisted learning programs, web-links, journals, 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 PATHOLOGY DEPARTMENT

The mission of Department of Pathology is to build a prestigious faculty recognized for diagnostic and teaching expertise in the fields of Chemical Pathology. Histopathology, Microbiology and Hematology. It aspires to provide quality assured Pathology services and produce community physicians with required expertise and knowledge in the subject of Pathology for the pathologists at undergraduate and post graduate level.

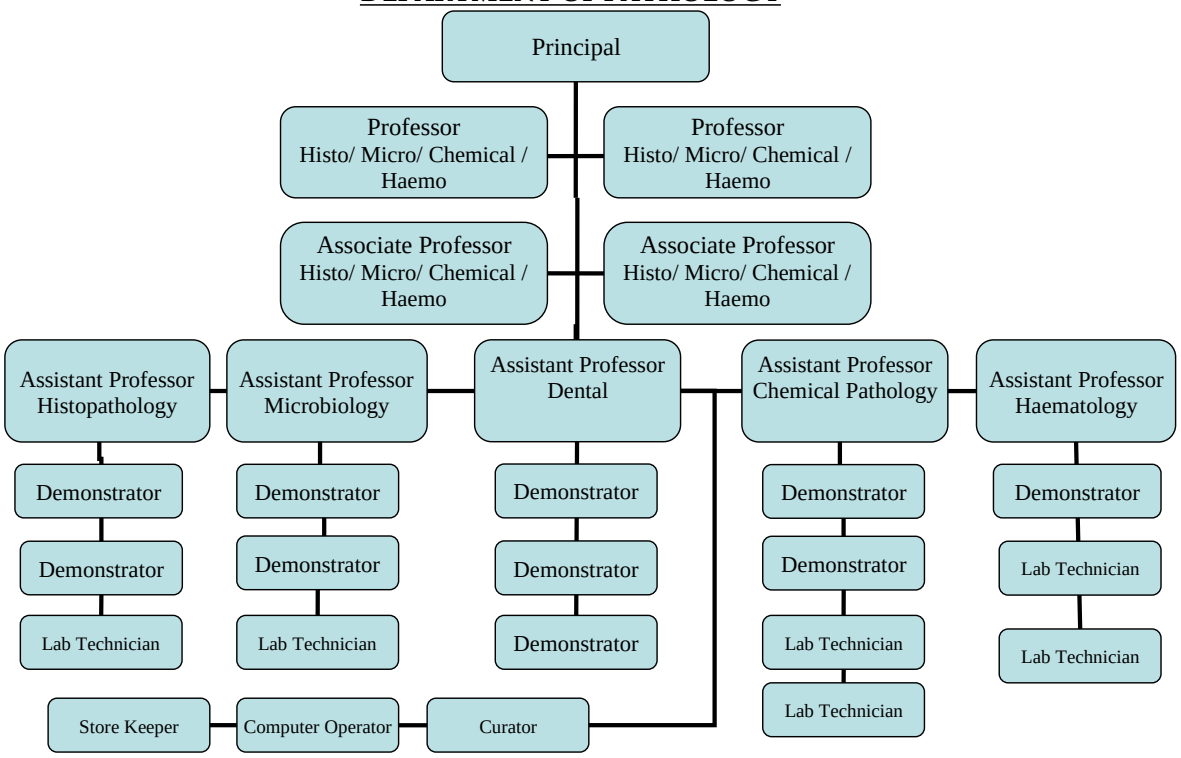
The goals of Department of Pathology is to impart quality Pathology education to the undergraduate students from 1st year to 4th year MBBS and to provide diagnostic facilities at PAF hospital labs along with safe blood transfusion and component therapy services.

Pathology is a bridging discipline between basic sciences and clinical medicine. A good liaison between clinicians and pathologists is very helpful in diagnosing and treating different diseases. Pathology, the study of disease, etiology, signs and symptoms and diagnosis, comprises of four basic disciplines Histopathology, Hematology, Chemical Pathology and Microbiology

The Department of Pathology is fully equipped with all required resources essential for teaching and learning of the undergraduate medical students. The facilities include spacious laboratories, a museum and tutorial rooms. Laboratory equipment is having latest technologies to cater for all practical work that is required for teaching.

A large number of investigations both specialized and routine in all disciplines are carried out in the hospital for patient care as well as for research purposes. All lab results are quality assured. Islamabad Blood Transfusion Authority (IBTA) approved blood bank provides services round the clock to the patient community.

DEPARTMENT OF PATHOLOGY



Avicenna Medical College

Calender 2019 - 2020

3rd Year M-17

November

	Su	Mo	Tu	We	Th	Fr	Sa	
						1	2	5
1	3	4	5	6	7	8	9	6
2	10	11	12	13	14	15	16	7
3	17	18	19	20	21	22	23	8
4	24	25	26	27	28	29	30	w.v

December

	Su	Mo	Tu	We	Th	Fr	Sa	
	1	2	3 W-1	4	5	6	7	w.v
1	8	9	10	11	12	13	14	9
2	15	16	17	18	19	20	21	10
3	22	23	24	25	26	27	28	11
4	29	30	31					12

January 2020

	Su	Mo	Tu	We	Th	Fr	Sa
				1	2	3	4
1	5	6	7	8	9	10 W-2	11
2	12	13	14	15	16	17	18
3	19	20	21	22	23	24	25
4	26	27	28	29	30	31	

SESSION START = 6 November 2019
SESSION END = 26 -Sep-2020

Winter vacations= 25 Dec 2019 To 5th Jan 2020

White Coat Ceremony: 24 Jan 2020
Farewell Final Year: 25 Jan 2020
Sports day= 31 Jan 2020
Funfare: 1 Feb 2020

Trips and Tours: 8 Feb 2020

Kashmir Holiday: 5 Feb 2020

February 2020

	Su	Mo	Tu	We	Th	Fr	Sa	
							1	17 R
13	2	3	4	5	6	7 W-3	8	18 E.S
14	9	10	11	12	13	14	15	19 E.S
15 R	16	17	18	19 ANS-I	20ANS-II	21 G.Phrma	22 CVS+D	SP.V
16 R	23 BI+NSGO	24 A+B	25 B+C	26 Law+J+Psy	27 PI+TH	28 Auto+TRA	29 FI+RI+RTA	SP.V

March 2020

	Su	Mo	Tu	We	Th	Fr	Sa	
	1 G.Tox+ Cor	2 Cell+Inj	3 AINFL	4 CHINFL +HR	5 G.Bac	6 G+V	7 G-V	SP.V
	8	9 Patho+V	10	11 BS	12	13	14 Pharma +V	20
	15	16	17 FM+V	18	19	20 W-4	21	21
	22	23	24	25	26	27	28	22
	29	30	31					23

April 2020

	Su	Mo	Tu	We	Th	Fr	Sa
				1	2	3	4
	5	6	7	8	9	10	11
	12	13	14	15	16	17 W-5	18
	19	20	21	22	23	24	25
	26	27	28	29	30		

Early Session= 10 March 2020 TO 18 Mar 2020

Spring Vacation = 22 Mar 2020 TO 5 Apr 2020

Ramadan = 24 April 2020

Mid Session = 30 May 2020 TO 1 July 2020

Eid-ul-Fitar = 22 May 2020 TO 26 May 2020

May 2020

	Su	Mo	Tu	We	Th	Fr	Sa	
23						1	2	28 R
24	3	4	5	6	7	8	9	29 R
25	10	11	12	13	14	15 W-6	16	30 R
26	17	18	19	20	21	22	23	31 M
27 R	24	25	26	27	28	29	30 Pa1	32 M
28 R	31 Pa2							

June 2020

	Su	Mo	Tu	We	Th	Fr	Sa	
		1 Pa3	2 Pa4	3 Pa5	4 Pa6	5 Pa7	6 FM1	32 M
	7 FM2	8 FM3	9 FM4	10 FM5	11 BS1	12 BS2	13 BS3	33 O
	14 Ph1	15 Ph2	16 Ph3	17 Ph4	18 Ph5	19 Ph6	20 Ph7	34
	21	22	23 Ph	24	25	26 FM	27	SU.V
	28	29 Pa	30					SU.V

July 2020

	Su	Mo	Tu	We	Th	Fr	Sa
				1 BS	2 W-7	3 O	4 O
	5	6 O	7 O	8	9	10	11
	12	13	14	15	16	17	18
	19	20	21	22	23	24	25
	26	27	28	29	30	31	

Summer Vacation = 19 July 2020 TO 2 Aug 2020

Eid-Ul-Adha: 31 July 20 - 2 Aug-20

Muharram= 28 , 29 Aug 2020

August 2020

	Su	Mo	Tu	We	Th	Fr	Sa	
							1	39 R
35	2	3	4	5	6	7 W-8	8	40 R
36	9	10	11	12	13	14	15	S. up
37	16	17	18	19	20	21 W-9	22	S. up
38 R	23	24	25	26	27	28	29	
39 R	30	31						

September 2020

	Su	Mo	Tu	We	Th	Fr	Sa	
			1	2	3	4	5	
	6	7	8	9	10	11	12	
	13	14	15	16	17	18	19	
	20	21	22	23	24	25	26	
	27	28	29	30				

October 2020

	Su	Mo	Tu	We	Th	Fr	Sa
					1	2	3
	4	5	6	7	8	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28	29	30	31

Send up Exam = 14 Sep 2020 TO 26 Sep 2020

Rabi Ul Awal Holiday: 29 Oct 20

Prof Date: 23 OCT 2020

AVICENNA MEDICAL COLLEGE

M-17	3rd YEAR	TIME TABLE 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	2:30-3:30	3:30-5:30
	MON	8:00-10:00			10.00-11.30	BREAK	TUTORIAL CASE BASED DISCUSSION PHARMA : A PATHO : B B.SCINCE : C	LECTURE PHARMACOLOGY LECTURE HALL 2	LUNCH BREAK	CLINICAL ROTATION
		GRAND TEST EXAMINATION HALL		KEY DISCUSSION & FEED BACK	PRACTICAL PHARMA : B PATHO : C FORENSIC TUTORIAL: A					
	TUE	LECTURE PHARMACOLOGY LECTURE HALL 2	LECTURE FOR.MEDICINE LECTURE HALL 2	10.00-10.45	10.45-11.30		TUTORIAL CASE BASED DISCUSSION PHARMA : B PATHO : C B.SCINCE : A	LECTURE PATHOLOGY LECTURE HALL 2		CLINICAL ROTATION
				LECTURE MEDICINE (38 LEC /ADDITIONAL 18 LEC) LECTURE HALL 2	LECTURE OBG LECTURE HALL 2					
	WED	LECTURE PATHOLOGY LECTURE HALL 2	LECTURE PHARMACOLOGY LECTURE HALL 2	10.00-10.45	10.45-11.30		PRACTICAL PHARMA : C PATHO : A FORENSIC TUTORIAL: B	LECTURE FOR.MEDICINE LECTURE HALL 2		SELF DIRECTED LEARNING
				LECTURE BEH.SCIENCE LECTURE HALL 2	LECTURE SURGERY (38 LEC) LECTURE HALL 2					
	THU	8:00-10:00			10.00-11.30		LECTURE BEH.SCIENCE LECTURE HALL 2	LECTURE COM. MEDICINE(38 LEC +ADDI 12 LEC) LECTURE HALL 2		SELF DIRECTED LEARNING
		GRAND TEST EXAMINATION HALL		KEY DISCUSSION & FEED BACK	CLINICAL ROTATION					
	FRI	LECTURE PHARMACOLOGY LECTURE HALL 2	LECTURE PATHOLOGY LECTURE HALL 2	10.00-12.00		12.00-1.00				
				TUTORIAL CASE BASED DISCUSSION PHARMA : C PATHO : A B.SCINCE : B		LECTURE PAEDS (15 LEC) / EYE (15 LEC)/ ENT (15 LEC) LECTURE HALL 2				
	SAT	LECTURE PATHOLOGY LECTURE HALL 2	LECTURE FOR.MEDICINE LECTURE HALL 2	CLINICAL ROTATION		BREAK	12.00-1.00	1.00-2.30		
							LECTURE PHARMACOLOGY LECTURE HALL 2	PRACTICAL PHARMA : A PATHO : B FORENSIC TUTORIAL: C		

Clinical Rotaion & Evening Ward Classes 3.30 Pm To 5.30 Pm On Mon & Tue.

Prepared by _____

Principal
Prof.Dr.Gulfreen Waheed_____

DEPARTMENT OF MEDICAL EDUCATION

Subject: General Pathology - 3rd Yr MBBS | **Code:**

TABLE OF SPECIFICATION | **Date: 18th Nov. 2019**

PMDC Requirement = | **AVICENNA Curriculum Hour = 266 Hours**

Sr. No.	Topic	LEARNING OBJECTIVES	KNOWLEDGE Cognitive Domain			SKILL Psychomotor Domain	ATITTUDE Effective Domain	TOTAL %	Mode of information transfer MIT				TOTAL HOURS	Lecture Topics	References	Practicals
			C1	C2	C3	P	A		Lecture	Tutorial	Practical	Clinical Rotation	Hour			
		MICROBIOLOGY							**65**							
1		**General Bacteriology**							**9**		**10**					
A	Structure of Bacterial cells	The student will be able to:														
		1. Define a prokaryotic cell and list the differences between prokaryotic and eukaryotic cell												1. Structure of Bacterial Cells		1. Study of Microscope
		2. Describe the structure of a bacterial cell and explain the function of its components														2. Sample Collection and Transport
		3. Explain why cell wall forms the basis for classification of bacteria														1. Gram Staining
		4. Describe the structure and function of the glycocalyx, flagella (types of), axial filaments, fimbriae, pili, and plasma membrane, along with their importance in bacteria														
B	Growth	The student will be able to:														
		1. Define bacterial growth, including binary fission												1. Growth (a)		1. Culture Media
		2. Compare the phases of microbial growth and describe their relation to generation time														2. Blood Culture
		3. Compare and contrast aerobic respiration, anaerobic respiration, and fermentation														3. Anaerobic Culture
		4. Define the atmospheric requirements of obligate aerobes, microaerophiles, facultative anaerobes, obligate anaerobes, and capnophilic bacteria														

C	Genetics	The student will be able to:														
		1. Briefly explain the components of DNA, and explain its functional relationship to RNA and protein												1. Genetics (b)		
		2. Define and classify mutations by type, and describe their prevention or repair														
		3. Compare the mechanisms of genetic recombination in bacteria: transformation, conjugation, and transduction.														
		4. Define the functions of plasmids and transposons.														
		5. Relate the mechanisms for genetic change (mutation and recombination) to microbial evolution (natural selection).														
D	Bacterial Classification	The student will be able to:														
		1. Describe microbial classification and apply the rules of scientific nomenclature for bacterial names												1. Classification (a)		
E	Normal Flora	The student will be able to:														
		1. Define normal, resident and transient flora												1. Normal Flora (b)		
		2. Define commensals, mutualism and parasitism.														
		3. List the human factors that determine normal flora														
		4. Describe the nature of the microbiota on the various sites of the body														
		5. Explain the useful as well as the harmful effects of the normal microbial biota on the human body														

F	Pathogenesis	The student will be able to:														
		1. Differentiate between pathogenicity and virulence.												1. Pathogenesis - 1		
		2. List the steps required in establishment of infection by bacteria												2. Pathogenesis - 2		
		3. Understand basic mechanisms by which bacteria can cause disease and the determinants of bacterial pathogenicity														
G	Host defences	The student will be able to:														
		1. Define first and second line of host defense														
		2. Describe the role of skin, mucous membranes in innate immunity.														
		3. List and describe the stages in inflammation, phagocytosis and the consequences of complement activation														
		4. Describe parts of the immune system and the role they play in the innate non-specific immunity and adaptive specific immunity														
H	Laboratory Diagnosis	The student will be able to:														
		1. List the main methods in diagnosis of infectious diseases caused by different type of microorganisms												1. Laboratory Diagnosis		1. Biochemical tests
		2. Explain the importance of these methods in diagnosis with the main advantages and disadvantages of each type of test														2. Serological Tests
		3. Ensure the type, storage and transportation of specimen in appropriate tests														

I	Antimicrobial drugs: Mechanism of action	The student will be able to:														
		1. Define broad spectrum antibiotic, bacteriostatic, and bactericidal												1. Antimicrobials - 1		
		2. List the modes of action of antimicrobial drugs.														
		3. Explain why the commonly used antimicrobial drugs are specific for bacteria.														
		4. State the mode of action of various antimicrobial agents														
J	Antimicrobial drugs: Resistance	The student will be able to:														
		1. Enlist the mechanisms of antimicrobial drug resistance												2. Antimicrobials - 2		
		2. Explain how antibiotic resistance develops. Genetic and non-genetic mechanisms														
		3. To understand the spread of resistant microbes.														
		4. To describe antibiotic susceptibility testing														
K	Bacterial Vaccines	The student will be able to														
		1. Differentiate between active and passive immunity, natural and artificial immunity												1. Bacterial Vaccines		
		2. Define booster immunization, toxoid, antitoxin, Killed, live and attenuated vaccine, Conjugated and unconjugated vaccine														
		3. Explain the principles of vaccination and the role of vaccination program in the prevention of epidemics														

L	Sterilization and Disinfection	The student will be able to														
		1. Define Sterilization, Disinfection and Antisepsis.												1. Sterilization		1. Sterilizaton and Disinfection
		2. Describe the physical and chemical methods of sterilization and disinfection commonly used in the microbiology laboratory and the hospital.														
		3. Compare and contrast moist and dry heat in terms of the time of treatment and suitable applications														
		4. Describe how microorganisms are mechanically removed by filtration														
		5. Explain how radiation kills cells														
2	**Gram Positive Cocci/ Rods**	The student will be able to:							**8**							
		1. Describe the morphology and cultural characteristics of the following Gram Positive Bacteria:												1. Staphylococcus		[Done with Biochemical Tests]
		A. Staphylococcus												2. Streptococcus		
		B. Streptococcus Pyogenes												3. Group B Streptococcus, Viridans		
		C. Group B Streptococcus and Streptococcus viridans												4. Streptococcus pneumoniae		
		D. Streptococcus pneumoniae												5. Bacillus anthracis, cerus		
		E. Bacillus anthracis and cereus												6. Clostridium species - 1		
		F. Clostridium Species												7. Clostridium species - 2		
		G. Lysteria and Cornybacterium												8. Listeria, Corynebacterium, Actinomycetes		
		H. Actinomyces														
		2. Explain the pathogenesis, clinical presentation, Laboratory diagnosis, and prevention of Gram Positive bacteria														
		3. State the different classification of Streptococcus														
		4. Explain Post Streptococcal disease														

3	**Gram Negative PART 1**	The student will be able to: 1. Describe the morphology and cultural characteristics of the following Gram Negative Bacteria: A. Neisseria B. E. coli C. Salmonella D. Shigella/Klebsiella E. Vibrio/proteus F. Campylobacter/ Helicobacter G. Pseudomonas H. Haemophilus I. Brodetella/ Legionella 2. Explain the pathogenesis, clinical presentation, Laboratory diagnosis, and prevention of Gram Negitive bacteria 3. Discuss the significance of Gram Negative Bacteria associated with Meningitis and UTIs 4. Discuss the pathogenesis of Typhoid fever							**10**		**1**			1. Neisseria - 1 2. Neisseria - 2 3. E. coli 4. Salmonella 5. Shigella/ Klebsiella 6. Vibrio/ Proteus 7. Campylobacter/ Helicobacter 8. Pseudomonas 9. Haemophilus 10. Bordetella/ Legionella		1. Widal Test
4	**Gram Negative PART 2**	The student will be able to: 1. Descibe the Morphology, cultural characteristics, pathogenesis, laboratory diagnosis, and prevention of the following Gram Negative Bacteria: A. Brucella/Francisella B. Yersinia/Pasterurella C. Tuberculosis D.Mycobacterium Leprae E. Mycoplasma F. Spirochetes G. Chlamydia H. Rickettsiae 2. Explain the importance of the Acid fast/ Tuberculin test 3. Explain the significance of Ghon lesions/ Ghon Focus 4. Differentiate between tuberculous and leproid leprosy 5. Detail the classification and life cycle of Chlamydia							**10**		**1**			1. Brucella/ Francisella 2. Yersinia/ Pasteurella 3. Tuberculosis - 1 4. Tuberculosis - 2 5. Leprae 6. Mycoplasma 7. Spirochetes - 1 8. Spirochetes - 2 9. Chlamydia 10. Rickettsiae		1. Zeihl-Neelsen (ZN-Staining)

5	MYCOLOGY	The student will be able to:							5							
		1. Differentiate between bacteria and fungus												1. Basic Mycology		
		2. Detail the structure of Fungi												2. Dermatophytes		
		3. State the classification of fungi												3. Candida, Cryptococcus		
		4. Detail laboratory tests for diagnosis of fungal presence												4. Aspergillus, Mucor/Rhizopus		
		5. Detail the morphology and cultural characterists for the following fungi:												5. Systemic fungi		
		A. Dermatophytes														
		B. Candida, Cryptococcus														
		C. Aspergillus, Mucor/Rhizopus														
		6. Classify dermatophytes														
		7. Explain the concept of Opportunistic fungi, along with their names														
		8. State the general properties of systemic fungi														
		9. State the cultural charcteristics, pathogenesis, and laboratory diagnosis of systemic fungi														
6		**Parasitology**							**12**							
A	Intestinal and Urogenital Protozoa	The student will be able to:														
		1. Name the common intestinal and urogenital protozoa that infect humans												1. Entamoeba		1. Examination of Urine
		2. Outline the life cycle of Entamoeba histolytica, Giardia, Cryptosporidium, and Trichomonas indicating the stages that cause pathogenic effects and are of diagnostic importance												2. Giardia/ Cryptosporidium/ Trichomonas		2. Examination of Stool
		3. Identify points in Life cycle where preventive measures are applicable														
		4. Describe the mechanism of pathogenesis, clinical features, mode(s) of transmission, prevention and control														
		5. Describe the laboratory methods of diagnosis of these organisms														

B	Blood and Tissue Protozoa	The student will be able to:														
		1. Enlist the blood and tissue protozoa												1. Plasmodium malariae - 1		1. Blood film for Malarial Parasite
		2. Describe the morphology of each type of blood and tissue protozoa.												2. Plasmodium malariae - 2		
		3. Explain the epidemiology and distribution of blood and tissue protozoa.												3. Trypanasoma		
		4. Describe the life cycle, pathogenesis and clinical manifestations of each type of blood and tissue protozoa												4. Leishmania, Toxoplasma		
		5. Describe the diagnosis of each of them														
C	Cestodes	The student will be able to:														
		1. State the general characteristics of the phylum Platyhelminthes.												1. Cestodes - 1		
		2. Classify Cestodes.												2. Cestodes - 2		
		3. Describe the general morphology of an adult cestode.														
		4. Describe the epidemiology, life cycle, pathogenesis and clinical manifestations of each type of cestode														
		5. State the methods of diagnosis used to identify cestode infections.														
D	Trematodes	The student will be able to														
		1. Enumerate trematodes.												1. Trematodes		
		2. Detail the general features, species and life cycle of Genus Schistosoma.														
		3. Briefly describe the clinical spectrum, lab diagnosis and management of Schistosomiasis.														

E	Nematodes	The student will be able to:														
		1. Classify Nematodes.												1. Nematodes - 1		
		2. Describe the morphology of various nematodes												2. Nematodes - 2		
		3. Describe the epidemiology, life cycle, pathogenesis and clinical manifestations of each type of nematodes.												3. Nematodes - 3		
		4. Describe the methods of diagnosis used in the identification of nematodes														
7		**Virology**							**11**							
A	Structure/ classification	The student will be able to:														
		1. State the basic structure of viruses												1. Structure/ classification		
		2. Explain the symmetry of viruses														
		3. State the importance of the envelope														
		4. Classify DNA and RNA viruses														
B	Replication/lab diagnosis	The student will be able to:														
		1. Explain how viruses replicate in host cell												1. Replication/ Lab Diagnosis		
		2. Enumerate the steps of replication														
		3. Explain the difference of replication between different viruses														
		4. Laboratory diagnosis of viruses														

C	Herpesvirus	The student will be able to:														
		1. Differentiate herpesviruses												1. Herpesvirus - 1		
		2. Understand Herpes simplex virus/ varicella zoster virus/ CMV/ EBV												2. Herpesvirus - 2		
		3. State pathogenesis and important features of Herpesvirus														
D	Influenza	The student will be able to:														
		1. State the importance of influenza virus												1. Influenza		
		2. Understand the difference between Antigenic shift and antigenic drift														
		3. Detail important characterisnts of Swine flu and bird flu														
		4. State the prevention of influenza epidemic														
E	Measles, mumps, rubella	The student will be able to:														
		1. State the viruses which spread through respiratory tract												1. Measles/ Mumps/ Rubella		
		2. Explain the pathogenesis of measles, mumps, and rubella														
		3. State the preventive measures for these viruses														
		4. State any associated complications of contracting the virus														
F	Polio and Rabies	The student will be able to:														
		1. Detail the modes of transmission												1. Polio / Rabies		
		2. Explain the pathogenesis														
		3. State the preventive measures being taken worldwide and especially in Pakistan														
		4. State important properties														

G	Hepatitis A, D, E	The student will be able to:															
		1. Differentiate hepatitis viruses													1. Hepatitis A, D, E		
		2. State important properties of Hepatitis A and E															
		3. Ennumerate important viral markers															
		4. State the pathogenesis															
H	Hepatitis B, C	The student will be able to:															
		1. State important properties of hepatitis B, and C													2. Hepatitis B, C		
		2. Ennumerate viral markers of hepatitis B															
		3. State the pathogenesis															
		4. Give preventive measures															
I	Arbovirus (dengue)	The student will be able to:															
		1. Discuss the nature of arboviruses													1. Arbovirus (Dengue)		
		2. Explain the characteristics of Dengue fever and dengue hemmoraghic fever															
		3. State the Laboratory diagnosis for dengue fever/ NS-1															
J	HIV	The student will be able to:															
		1. State the important properties of HIV													1. HIV		
		2. Explain the process of replication of HIV															
		3. Explain the pathogenesis															
		4. State the laboratory diagnosis and preventive measures of AIDS															

		GENERAL PATHOLOGY							**50**							
1	**Cell Injury**	The student will be able to: 1. Define "pathology" and explain its four basic pillars 2. State different cellular responses of injury and draw a flow chart to explain stages of cellular response to stress 3. Define adaptations; briefly discuss its types along with their definitions and mechanisms, with examples 4. Discuss types of cell injury 5. Differentiate between reversible and irreversible injury 5. Elaborate on different causes of cell injury 6. Explain sequential development of morphologic and biochemical changes in cell injury 7. Describe the biochemical and morphological aspects of Reversible injury 8. Describe necrosis according to following headings: definition, types, morphology 9. Discuss basic principles of cell injury 10. Discuss how ATP depletion causes cell injury 11. Describe cell injury caused by Mitochondrial damage 12. Describe the cell injury caused by Influx of calcium 13. Describe cell injury caused by Oxygen derived free radicals 14. Explain cell injury due to defects in membrane permeability 15. Explain cell injury due to DNA and protein damage 16. Explain different Mechanisms of ischemic cell injury 17. Explain Mechanisms of chemical injury 18. Explain Ischemia-reperfusion injury 19. Define apoptosis 20. State the causes of apoptosis 21. Explain Morphologic and biochemical changes in apoptosis 22. Detail clinicopathological correlations of apoptosis 23. Explain following in detail: Lipids, proteins, hyaline change, glycogen and pigments 24. Define calcification 25. Differentiate between pathologic and metastatic calcification							**9**					1. Overview: Cellular Responses to Stress, Noxious Stimuli, Adaptations of Cellular Growth, Differentiation 2. Overview of Cell Injury and Cell death; Causes of cell Injury 3. Morphologic Alterations in Cell Injury 4. Mechanisms of Cell Injury 5. Clinicopathologic Correlations: Selected Examples of Cell Injury 6. Necrosis 7. Apoptosis 8. Intracellular Accumulations 9. Pathological Calcification		1. Necrosis 2. Gangrene 3. Congestion and Infarction 4. Pigmentation 5. Calcification

		The student will be able to														
		1. Define inflammation												1. Overview of Inflammation: Definitions and General Features		1. Acute Inflammation
		2. Discuss and compare Acute and chronic inflammation, with examples												2. Acute Inflammation - 1		2. Chronic Inflammation
		3. State the causes of inflammation												3. Acute Inflammation - 2		
		4. Discuss the recognition of microbes and dead cells inflammation												4. Acute Inflammation - 3		
		5. Detail the events of acute inflammation												5. Chronic Inflammation - 1		
		6. Explain different reactions of blood vessels in acute inflammation												6. Chronic Inflammation - 2		
		7. Discuss Leukocytes recruitment to site of inflammation												7. Systemic Effects of Inflammation		
		8. Explain leukocyte infiltration														
		9. Explain Phagocytosis and clearance of offending agent														
2	**Inflammation**	10. Discuss Termination of acute inflammatory response							**7**							
		11. Explain Morphologic patterns of acute inflammation														
		12. Enumerate General characteristics of mediators of acute inflammation														
		13. Detail principle mediators of acute inflammation														
		14. State the outcomes of acute inflammation														
		15. Define chronic inflammation														
		16. Enlist causes of chronic inflammation														
		17. Explain Morphology of chronic inflammation														
		18. Discuss cells of chronic inflammation (macrophages, lymphocytes, other cells)														
		19. Explain Mediators of chronic inflammation														
		20. Describe Granuloma and granulomatous inflammation														
		21. Understand the significance of Fever, acute phase proteins, and leukocytosis in inflammation														

3	**Repair**	The student will be able to							**3**							
		1. Define repair and regeneration												1. Tissue Repair and regeneration. Factors influencing wound healing		
		2. Describe Cell types according to proliferation during tissue regeneration												2. Healing by first and second intention		
		3. Explain Mechanisms of tissue repair and liver regeneration												3. Wound contraction, complication of wound healing, formation of granulation tissue		
		4. Explain the process of Repair by connective tissue deposition														
		5. State the steps of Scar formation														
		6. Explain Angiogenesis; deposition and remodeling of connective tissue														
		7. Enlist Factors that influence tissue repair														
		8. Describe Healing of skin wounds: primary and secondary intention														
		9. Discuss abnormalities in tissue repair														
4	**Haemodynamic Disorders**	The student will be able to							**7**							
		1. Define edema and effusions												1. Edema and effusions		1. Thrombosis
		2. Explain the Pathophysiological categories of edema												2. Hyperemia and Congestion		
		3. Discuss Morphology of edema												3. Hemostasis, Hemorrhagic Disorders - 1		
		4. Briefly explain definition and morphology of hyperemia and congestion												4. Hemostasis, Hemorrhagic Disorders - 2		
		5. Explain hemostasis												5. Hemostasis, Hemorrhagic Disorders, and Thrombosis		
		6. Discuss the Role of platelets in hemostasis												6. Embolism		
		7. Discuss the Role of coagulation cascade in hemostasis												7. Shock		
		8. Discuss the Role of endothelium in coagulation														
		9. Explain the Factors that limit coagulation														
		10. Detail Hemorrhagic disorders														
		11. Explain Thrombosis; give details of Virchow's triad, HIT syndrome, and antiphospholipid antibody syndrome														
		12. Explain the morphology and fate of thrombus														
		13. Discuss clinical features of thrombosis														
		14. Define embolism														
		15. Enlist types of embolism														
		16. Define and explain Infarction, along with morphologic features														
		17. Define and classify Shock														
		18. Describe pathogenesis of septic shock with the help of a flow chart														
		19. Explain morphology of shock														

5		Diseases of the Immune System							10							
A	Immunity: introduction, definitions	1. Understand the organization of the immune system												1. Immunity: Introduction, definitions		[Done with Serological Tests]
		2. Explain the role of the lymphatic system in the immune response														
		3. Distinguish between innate and acquired immunity														
		4. Distinguish between: a. antigens and antibodies b. antigen and epitope c. B lymphocytes and T lymphocytes d. antibodies and B cell receptors e. primary and secondary immune responses														
		5. Discuss acquired immunity														
		6. Explain specific antigen recognition by B lymphocytes and T lymphocytes														
		7. Compare the production and functions of class I MHC and class II MHC molecules														
		8. Distinguish between the variable (V) and constant (C) regions of an antigen receptor														
B	Innate Immunity	Student should be able to:														
		1. Know the different barriers that constitute the immune system												1. Innate and Acquired immunity		
		2. Know the pattern recognition receptors														
		3. Explain the effector mechanisms of the innate immune cells														
		4. Enlist the important inflammatory mediators, cytokines and explain their role in immunity														
C	Adaptive immunity : Lymphocyte Antigen Receptors	Student should be able to:														
		1. Explain lymphocyte receptor diversity												1. Cytokines, mechanism of humoral and cell mediated immunity		
		2. Differentiate between different types of B and T cells, and their receptors														
		3. Detail the structure of Antibodies														
		4. Explain clonal selection theory and class switching														

D	Adaptive immunity : T cell Mediated Immunity	Student should be able to:														
		1. Explain activation of T cells												[Covered with Adaptive Immunity: Lymphocte Antigen		
		2. State the T cell effector functions														
		3. Details the tests for the evaluation of cell-mediated immunity														
E	Adaptive immunity : B cells and Antibodies	Student should be able to:														
		1. Explain the process of B cell maturation and activation												1. Antibody structure, types, functions		
		2. Differentiate between primary and secondary immune response														
		3. Detail the structure, functions and properties of various antibodies												[Covered with Adaptive Immunity: Lymphocte Antigen Receptors]		
		4. Describe monoclonal antibodies														
		5. Detail the tests for evaluation of B cell mediated immunity and antibodies														
F	Major Histocompatibility Complex and Transplantation	Student should be able to:														
		1. Describe MHC, along with its structure, classes and function														
		2. Discuss the role of MHC in immune response												2. Rejection of Tissue Transplants		
		3. Compare and contrast the functional aspects of MHC classes I and II														
		4. Discuss the role of MHC in transplantation and graft rejection – explain the importance of HLA typing in transplantation														
G	Complement	Student should be able to :														
		1. Discuss activation and regulation of complement												[Covered with Inflammation]		
		2. Discuss the biological effects of complement														
		3. Discuss the clinical effects of complement														
H	Antigen-Antibody Reactions in the Laboratory	Student should be able to :														
		1. Enlist the various serological tests, along with their major uses												2. Laboratory diagnosis of Immunological diseases		
		2. State the principles of each test, explain how it is performed, and deatil the interpretation of their results														
		3. Explain Rh status and Hemolytic disease of the newborn														
I	Hypersensitivity	Student should be able to:														
		1. Define hypersensitivity and enlist the types of hypersensitivity reactions												1. Hypersensitivity: Type I, II, III, IV		
		2. Describe type 1,2,3, and 4 hypersensitivity reactions and associated diseases														
		3. Discuss the role of T lymphocytes and antibody as mediators of hypersensitivity														
J	Tolerance and Autoimmune Disease	Student should be able to:														
		1. Describe tolerance, and distinguish between B and T cell tolerance												1. Basis of autoimmunity		
		2. Describe autoimmunity												2. Immunotolerance		
		3. Describe the mechanism of development of autoimmune diseases														
K	Tumor Immunity	Student should be able to :														
		1. Define tumor immunity												[Covered with Tolerance]		
		2. Describe the mechanism of tumor immunity														
L	Immunodeficiency	Student should be able to :														
		1. Define Immunodeficiency												1. Classification of Immunodeficiency Syndromes		
		2. Enlist important congenital immunodeficiencies, with their examples														
		3. Enlist important acquired immunodeficiencies with examples of each														

		The student will be able to:														
		1. Draw and explain different stages of cell cycle. Also discuss the regulation of cell cycle.												1. Growth factors and receptors		1. Benign Epithelial Tumors
		2. Explain role of growth factors and signal transduction on cell proliferation												2. Cell cycle		2. Malignant Epithelial Tumors
		3. Define neoplasia												3. Nomenclature, Characteristics of Benign and Malignant Neoplasms		3. Benign Mesenchymal Tumors
		4. Differentiate between benign and malignant neoplasm												4. Epidemiology of Cancer		4. Malignant Mesenchymal Tumors
		5. Understand the nomenclature of benign and malignant neoplasm												5. Molecular Basis of Cancer: Role of Genetic and Epigenetic Alterations		
		6. Detail the different characteristics of benign and malignant tumors												6. Carcinogenic Agents and their cellular Interactions		
		7. Discuss the global impact of cancer												7. Grading and staging of Neoplasia		
		8. Tabulate different occupational cancers along with their occurrence												8. Tumor markers used in diagnosis and management of cancer		
		9. Discuss evidence-based role environmental factors, age, chronic disorders and genetic predisposition in carcinogenesis												9. Cancer screening		
		10. Describe the basic principles of carcinogenesis												10. Radiation and its effects on tissues		
		11. Discuss the role of genetic and epigenetic alterations in carcinogenesis														
		12. Describe cellular and molecular hallmarks of cancer														
		13. Explain how self-sufficiency in growth signals contribute to carcinogenesis														
6	**Neoplasia**	14. Define oncogenes, proto-oncogenes and oncoproteins, with their examples							**10**		**4**					
		15. Explain how insensitivity to growth inhibition contributes to carcinogenesis														
		16. Define and give examples of tumor suppressor genes														
		17. Describe Warburg effect with the help of a diagram														
		18. Explain the molecular events in the process of metastasis														
		19. Explain the steps involved in chemical carcinogenesis														
		20. Ennumerate direct and indirect acting carcinogens														
		21. Explain radiation carcinogenesis														
		22. Explain with help of a prototype organism different steps of microbial carcinogenesis														
		23. Define and explain the mechanism of cancer cachexia														
		24. Describe different paraneoplastiic syndromes														
		25. Describe the grading and staging of tumors														
		26. Explain the uses and application of the following methods for diagnosis of cancer:														
		a. Histologic and cytologic methods														
		b. Immunohistochemistry														
		c. Flow cytometry														
		d. Molecular and cytogenetics diagnostics														
		27. Describe the nature and application of different tumor markers														
		28. Describe the role of different tumor antigens in carcinogenesis														
		29. Describe how tumor cells escape the immune surveillance mechanisms														

7	**Genetic Disorders**	The student will be able to: 1. Define "mutation" and describe its types 2. Enlist autosomal dominant and autosomal recessive disorders 3. Describe the pattern of inheritance in genetic disorders 4. Tabulate different X-linked disorders 5. Discuss the pattern of inheritance of X-linked disorders 6. Describe the molecular and biochemical basis of following disorders: a. Marfan syndrome b. Familial hypercholesterolemia c. Ehlar-Danlos syndrome d. Lysosomal storage diseases e. Sickle cell anemia f. Thalassemia's g. Hemophilia h. Down syndrome i. Klinefelter syndrome j. Turner syndrome 7. Discuss the following diagnostic methods and indications for testing: a. PCR and detection of DNA sequence alterations b. molecular analysis of genomic alterations c. polymorphic markers and molecular diagnosis d. RNA analysis and next generation sequencing							**5**					1. Common genetic mutations 2. Autosomal recessive and autosomal dominant disorders 3. Common sex-linked disorders 4. Diseases associated with consanguineous marriages 5. Molecular biology techniques		

CURRICULUM AND LEARNING OBJECTIVES

General Pathology:

THEME: CELLULAR RESPONSES TO STRESS and TOXIC INSULTS: ADAPTATION, INJURY AND DEATH

SUB THEME: Cellular Adaptation

1. Define with examples
   a. Hyperplasia
   b. Hypertrophy
   c. Atrophy
   d. Metaplasia
2. Describe the mechanism of above adaptations.

SUB THEME: Cell injury

3. Define cell injury. Enlist causes of cell injury.
4. Differentiate between reversible and irreversible injury.
5. Describe morphological alterations in cell injury.
6. Describe mechanisms of cell injury and its clinicopathological correlations.

SUB THEME: Necrosis, Apoptosis & Necroptosis.

7. Define Necrosis and brief discussion of caseous, liquefactive, coagulative and gangrenous necrosis.
8. Define apoptosis and name its pathways.
9. Differentiate between necrosis and apoptosis.
10. Describe the mechanism of apoptosis.
11. Define necroptosis and its mechanism.

SUB THEME: Autophagy

12. Define autophagy with examples
13. Describe its steps

SUB THEME: Intracellular Accumulations & Pigmentations

14. Name the types of accumulations in cells with examples.
15. Define pigmentation and its types along with examples.
16. Differentiate between exogenous and endogenous pigmentation.

SUB THEME: Calcification

17. Define calcification
18. Name the types along with examples of types of calcification.
19. Differentiate between metastatic and dystrophic calcification. SUB THEME: Aging
20. Define aging.
21. Name mechanisms of aging.

THEME: INFLAMMATION AND REPAIR
SUB THEME: Acute Inflammation
At the end of the session, students will be able to:
1. Define acute inflammation and discuss briefly its vascular events and cellular events and enlist the chemical mediators of acute inflammation.

2. Describe morphological patterns and outcomes of acute inflammation. SUB THEME: Chronic Inflammation

1. Define granulomatous and non-granulomatous chronic inflammation with examples.
2. Describe morphological features of chronic inflammation
3. Describe the cells and mediators of chronic inflammation.
4. Tabulate the causes of granulomatous inflammation.
5. Describe the role of macrophages in inflammation & repair
6. Enlist systemic effects of inflammation.

<u>SUB THEME</u>: Tissue Repair

9. Define repair, regeneration and scar formation.
10. Enumerate the types of cells involved in regeneration according to their proliferative capacity.
11. Describe the mechanism of tissue regeneration with example of liver.
12. Enlist the steps of scar formation alongwith its main components and growth factors involved.
13. Describe the factors affecting wound healing.
14. Define healing by primary and secondary intention.
15. Differentiate between primary and secondary healing.
16. Enlist pathological aspects of repair.

THEME : HEMODYNAMIC DISORDERS, THROMBOEMBOLIC

DISEASES, AND SHOCK
SUB THEME: Edema and Effusion

At the end of the session, students will be able to:

1. Define edema and tabulate pathophysiological categories of edema
2. Illustrate with diagram mechanism of systemic edema in heart failure.

SUB THEME: Hyperemia & congestion

3. Define hyperemia and congestion and differentiate between the two.

SUB THEME: Hemostasis, hemorrhagic disorders and thrombosis

4. Define thrombosis and Virchow's triad.
5. Tabulate primary and secondary hypercoagulable states.
6. Describe morphology of arterial and venous thrombi and differentiate between two
7. Differentiate between antemortem and postmortem clot.
8. Enlist the fate of thrombus.

SUB THEME: Embolism

9. Define embolism and briefly describe its types alonwith mechanisms.

SUB THEME: Infarction

10. Define infarction.
11. Describe the morphology of red and white infarct
12. Enumerate the factors that influence the development of an infarct

SUB THEME: Shock

13. Define shock and briefly describe three types.
14. Illustrate with the help of diagram the pathogenesis of septic shock
15. Give a brief account of stages of shock.

THEME : GENETIC DISORDERS

At the end of the session, students will be able to:

1. Define mutation
2. Describe the features and examples of the following
    - Autosomal dominant disorders
    - Autosomal recessive disorders
    - X-linked disorders
3. Give brief account of
    - Marfan syndrome
    - Ehlers-Danlos syndrome
    - Down syndrome
    - Klinefelter syndrome
    - Turner syndrome
4. Give brief account of steps of PCR.

THEME : DISEASES OF IMMUNE SYSTEM

SUB THEME: The normal immune response

At the end of the session, students will be able to:

1. Define innate and adaptive immunity along with their features
2. Describe MHC

SUB THEME: Hypersensitivity

3. Define and briefly describe the four types of hypersensitivity reactions along with examples

SUB THEME: Autoimmune diseases

1. Define autoimmunity and give its examples
2. Briefly describe immunologica tolerance
3. Briefly describe HIV and Amyloidosis

THEME : NEOPLASIA

At the end of the session, students will be able to:

1. Define the following with examples
   Neoplasia
   Oncogenes
   Proto-oncogenes
   Oncoproteins
2. Give an account of nomenclature of benign and malignant tumors.
3. Enlist the pathways of spread of tumor.
4. Tabulate the differences between benign and malignant tumors with examples.
5. Tabulate the differences between carcinoma and sarcoma.
6. Enlist cellular and molecular hall marks of cancer.
7. Describe tumor suppressor genes and their examples

2. Define chemical carcinogenesis along with examples and enlist steps involved
3. Define microbial carcinogenesis along with examples.
4. Define and give examples of paraneoplastic syndromes
5. Define grading and staging of cancer and differentiate between two
6. Describe laboratory diagnosis of cancer
7. Define tumor markers along with examples

UHS SYLLABUS

GENERAL PATHOLOGY

CELL INJURY

1. Necrosis, Ischemia, Hypoxia, Infarction and Gangrene Oncosis and Autolysis.

2. Sequence of the ultrastructural and biochemical changes which occur in the cell in response to the following:
   - Ischemia
   - Immunological injury, e.g., Asthma / SLE / Anaphylactic reaction
   - Physical agents, e.g., Radiation
   - Genetic defects, e.g., Thalassemia / Hemophilia
   - Nutritional deficiency, e.g., Kwashiorkor
   - Infectious agents
   - Viruses, e.g., Hepatitis
   - Bacteria, e.g., Staphylococcus aureus
   - Fungi, e.g., Candida
   - Parasites, e.g., Malaria
   - Nutritional deficiency

3. Irreversible and reversible injury
4. Apoptosis and its significance.
5. Necrosis and its types
6. Exogenous and endogenous pigmentation.
7. Dystrophic and metastatic calcification along with clinical significance.
8. Metabolic disorders
   - Lipid disorders, Steatosis of liver, Hyperlipidemia
   - Protein disorders
   - Carbohydrate disorders

INFLAMMATION, MEDIATORS OF INFLAMMATION

1. Role of inflammation in the defense mechanisms of the body.

2. Vascular changes of acute inflammation and their relation to morphological and tissue effects.
3. Process of Chemotaxis, Opsonization and Phagocytosis.
4. Role of cellular components in inflammatory exudate.
5. Exudates and transudate.
6. Important chemical mediators of inflammation.
7. Pathway of Arachidonic Acid metabolism.
8. Role of products of Arachidonic acid metabolism in inflammation.
9. Mechanism for development of fever, with reference to exogenous and endogenous pyrogens.
10. Chronic inflammation including Granulomas.
11. Granuloma and its types along with causes.
12. Systemic effects of acute and chronic inflammation and their possible outcomes.
13. Significance of ESR.
14. Induced hypothermia in medicine.
15. Healing in specialized tissue.

WOUND HEALING

1. Repair and regeneration.
2. Wound healing by first and second intention.
3. Factors that influence the inflammatory reparative response.
4. Wound contraction and cicatrisation.
5. Formation of granulation tissue.
6. Complications of wound healing.

DISORDERS OF CIRCULATION

a. Thrombo-embolic disorders and their modalities

1. Etiology and pathogenesis of thrombosis.
2. Possible consequences of thrombosis
3. Difference between thrombi and clots
4. Classification of emboli according to their composition.
5. Difference between arterial and venous emboli.

b. Hemorrhage, Hyperemia and Congestion

1. Definitions of common types of Hemorrhage
2. Types of hyperemia
3. Difference between hyperemia and congestion

c. Infarction

1. Types of infarction
2. Difference between anemic and hemorrhagic infarct
3. Morphological picture of infraction in different organ systems

d. Disorders of the circulation and shock

1. Edema, ascites, hydrothorax and anasarca.
2. Pathophysiology of edema with special emphasis on CHF.
3. Pathogenesis of four major types of shock (Hypovolemic, cardiogenic, vasovagal & septic) and their causes.
4. Compensatory mechanisms involved in shock.

MICROBIOLOGY

1. Defence mechanisms of the body.
2. Microbial mechanisms of invasion and virulence.
3. Difference between sterilization and disinfection.
4. Methods of disinfection and sterilization of the following:

a. Facility where the doctor practices,
b. Examination table,
c. Any spillage e.g. sputum, vomitus, stool, urine, blood,
d. Examination tools, e.g., thermometer, nasal and ear specula and spatula,

5. Principles of aseptic techniques such as Venepuncture, urinary catheterization, bandaging, suturing and lumber puncture.

6. Universal precautions for infection control.

7. General principles of the following serological tests:

a. ELISA – Hepatitis (A,B,C,D,E,G) Rubella, CMV and HIV
b. PCR
c. Haemagglutination – TPHA
d. Western Blot –HIV Malaria.

8. Interpretation of :
a. Culture reports
b. Serological reports and
c. Microscopic reports of gram stain and ZN stain.

9. Principles of proper collection and submission of specimens for laboratory investigations

9. General characteristics and taxonomy of Bacteria, Rickettsia, Chlamydia, Viruses and Fungi.

11. Communicable, Endemic, Epidemic, and Pandemic Diseases, Carriers Pathogens, Opportunists, Commensals and Colonizers.

12. Microorganisms responsible for infection of the following organ systems:

③ Central Nervous System
③ Respiratory System
③ Gastrointestinal System
③ Genital System
③ Urinary System
③ Infections of Bones and Joints
③ Zoonosis
③ Infection of the Skin
③ Hepatic Infections

13 Pathogenesis, Treatment, Epidemiology, Prevention and Control of the following organisms:

(i) Bacteria

Staphylococcus aureus

Streptococcus pneumoniae

Beta hemolytic streptococcus group a & b Diphtheria sp.

Bordetella sp.

Bacillus anthracis

Clostridium perfrignes

Clostridium botulinum,

Clostridium difficile

Clostridium tetani

Actinomycies israelli

Nocardia asteroides

Neisseria meningitis

Neisseria gonorrhoeae

Gardenella vaginalis

Haemophilus influenzae

Mycobacterium tuberculosis

Mycobacterium leprae

E.coli

Klebsiella

Proteus

Salmonella

Shigella

Yersinia pestis

Pseudomonas

Vibrio cholera

Vibrio parahemolyticus

Campylobacter jejuni

Helicobacter pylori

Legionella

Mycoplasma pneumoniae

Chlamydia

Treponema pallidium

Leptospira Rickettsia sp.

(ii) Viruses Mumps

Herpes

Measles

Influenza,

Para influenza

RSV

Hepatitis A, B, C, D, E

Rota

CMV

EBV

Rubella

Chicken Pox

HIV

Rabies

(iii) Fungus

Cryptococcus neoformans

Candida albicans

Tinea species

(iv) Protozoa Plasmodium species

Giardia lamblia

Entamoeba histolytica Cryptosporidium

Leishmania species

Trichomonas vaginalis

Toxoplasma gondii

Pneumocyctis carinii

(v) Helminths

Ascaris lumbricoides

Ancylostoma duodenale

Trichuris trichuria

Enterobius vermicularis

Filaria species

Strongyloides stercoralis

Schistosoma species

Echinococcus species

Taenia solium

Taenia saginata

Hymenolepis nana

PRINCIPLES OF ANTI MICROBIAL ACTION.

1. Antibiotics, selective toxicity, bacteriostatic and bactericidal.
2. Host determinants in relation to selection of an antimicrobial drug for therapy.
3. Minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC)
4. Bacterial resistance and the mechanisms involved in acquiring bacterial resistance
5. Mechanisms involved in transfer of drug resistance to bacterial resistance.
6. Mode of action of various antimicrobial drug groups.
7. Superinfection and cross sensitivity.

LIST OF COMMON ORGANISMS CAUSING ORGAN SYSTEM EFFECTS

a. Common organisms causing CNS Infections

(i) Bacteria

Steptococcus pneumoniae

Beta hemolyticus srteptococcus group b

Neisseria meningitidis Haemophilis influenzae

Mycobacterium tuberculosis.

E.coli

Listeria monocytogenes

(ii) viruses Enterovirus

Mumps

Herpes

Adenovirus

(iii) fungus

Cryptococcus neoformis

(iv) protozoa Malaria

Toxoplasma

B. Common organisms causing respiratory tract infection

(i) bacteria:

Steptococcus pneumoniae

Beta hemolyticus streptococcus group b Diptheria sp.

Bordetella sp.

Hemophilus influenzae

Mycobacteriurn tuberculosis

Klebsiella Legionella

Mycoplasma pneumoniae

(ii) viruses Herpes

Adeno virus

Measles

Influenza

Para influenza

Rhinovirus

RSV

(iii) protozoa

Pneumocystic carinii

C. Organisms causing gastrointestinal tract infection / infestation

(i) Bacteria Clostridium difficile

Mycobacterium tuberculosis

Salmonella

Shigella

Vibrio cholera

Vibrio parahemolyticus

Campylobacter jejuni

Helicobacter pylori

(ii) Viruses

Hepatitis A

Rota

Astro

(iii) Fungus

Cryptococcus neoformis

(vi) Protozoa

Giardia lamblia

Entameba histolytica

Cryptosporidium

D. Common organisms causing hepatic infections

(i) Bacteria

Streptococcus species

Coliforms

Anaerobes

(ii) Viruses

Herpes

Hepatitis A, B, C, D, E

CMV

EBV

(iii) Protozoa

Entameba histolytica

Tape worms

Echinococcus granulosus

E. Common organisms causing skin infection

(i) bacteria Staphylococcus aureus

Streptococcus pyogenes

Actinomyces israelli

Nocardia asteroides

Mycobacterium tuberculosis

Mycobacterium leprae

Corynebacterium diphtheriae

(ii) viruses Herpes

Measles

Rubella,

Chicken pox

Moluscum contagiosum

(iii) fungus Candida albicans

Tinea species

(iv) arthropodes Sarcoptes scabiei

Pediculus species

Cinex lectularius

(v) helminths

Filaria species

Strongyloides stercoralis Schistosoma sp.

(vi) protozoa:

Leishmania species.

f. Common organisms causing bone and joint infection

Bacteria: Staph aureus, Streptococcus pyogenes, Haemophilus influenzae, Neisseria gonorrhoeae, Brucella melitenesis, Salmonella typhi, Strep. pneumonae, Pseudomonas sp. and Mycobacterium tuberculosis.

g. Common organisms causing genital infection

(i) Bacteria: Mycoplasma urealyticum

(ii) Viruses: Pox, Herpes, Hepatitis B, HIV

(iii) Fungus: Candida albicans

(iv) Arthropodes: Sarcoptes scabiei

(v) Protozoa: Tricomonas vaginalis

h. Common organisms causing zoonosis

(i) Viruses: Rabies,

(ii) Protozoa: Toxoplasma gondii, Leishmania sp. **(iii) Helmenthics:** Echinococcus sp.

GENETICS

1. Common sex linked, autosomal recessive and autosomal dominant disorders.
2. Common genetic mutations.

3. Diseases associated with consanguineous marriages.
4. Molecular biology techniques.

GROWTH DISORERS/NEOPLASIA

1. Atrophy and Hypertrophy, Agenesis, Dysgensis, Aplasia, Hypoplasia, Hyperplasia, Metaplasia, Dysplasia, Neoplasia, Anaplasia,.
2. Cell cycle and cell types (stable, labile, permanent) 3. Mechanisms controlling cell growth
4. Classification systems of tumors.
5. Characteristics of benign and malignant tumors
6. Difference between Carcinoma and Sarcoma.
7. Grading and staging system of tumors.
8. Biology of tumor growth
9. Process of carcinogenesis
10. Host defense against tumors.
11. Mechanism of local and distant spread.
12. Local and systemic effects of tumors.
13. Tumor markers used in the diagnosis and management of cancers.
14. Common chemical, physical agents and viruses related to human cancer.
15. Epidemiology of common cancers in Pakistan.
16. Radiation and its effects on tissues.
17. Cancer screening.

IMMUNOLOGY

1. Antigen, antibody, epitope, hapten and adhesion molecules.
2. Difference between innate and acquired immunity.
3. Structure and function of major histocompatibility complex (MHC).

4. Cytokines.
5. Mechanism of humoral and cell medicated immunity.
6. Hypersensitivity reactions, Type I, Type II, Type III and Type IV.
7. Autograft, homograft, allograft and xenograft.
8. Immunotolerance and immunoparalysis.
9. Mechanism involved in allograft rejection and steps that can be taken to combat rejection.
10. Classification of Immunodeficiency disorders
11. Basis of autoimmunity. 12. Tissue transplantation.
13. Pathology and pathogenesis of AIDS.
14. Lab diagnosis of immunological diseases.

SOURCE OF KNOWLEDGE

RECOMMENDED BOOKS

1. **Pathological Basis of Disease** by Kumar, Cortan and Robbins, latest Ed., W.B. Saunders.

2. **Medical Microbiology and Immunology** by Levinson and Jawetz, latest Ed., Mc Graw-Hill.

3. **Medical Genetics** by Jorde, latest Ed., Mosby.

4. **Clinical Pathology Interpretations** by A. H. Nagi

POLICY & GUIDELINES OF LEARNING STATERGIES & 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 STATERGIES & 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,
   - **G**enerate positive behaviours toward learning,
   - **M**ake new information meaningful to you,
   - **O**rganize and integrate new information with existing knowledge, or Re-organize existing knowledge to fit the new understanding and information.

ACADEMIC HOURS BREAKDOWN AS PER PMDC REGULATIONS

TABLE OF SPACING AND HOURS OF SUBJECTS IN MBBS COURSE

SUBJECT	1st year	2nd year	3rd year	4th year	5th year	Total Hours
BEHAVIOURAL SCIENCES	5 Hrs.	5 Hrs.	5 Hrs.	5 Hrs.	5 Hrs.	25 Hrs.
ISLAMIC & PAKISTAN STUDIES	15 Hrs.	15 Hrs.	10 Hrs.	10 Hrs.	-	50 Hrs.
ANATOMY	250 Hrs.	250 Hrs.	-	-	-	500 Hrs.
PHYSIOLOGY	250 Hrs.	250 Hrs.	-	-	-	500 Hrs.
BIOCHEMISTRY	100 Hrs.	100 Hrs.	-	-	-	200 Hrs.
PHARMACOLOGY	-	-	300 Hrs.	-	-	300 Hrs.
PATHOLOGY	15 Hrs.	25Hrs.	260 Hrs	200 Hrs	-	500 Hrs.
* FORENSIC MEDICINE	-	-	100 Hrs	-	-	100 Hrs.
** COMMUNITY MEDICINE	25 Hrs	25 Hrs	50 Hrs	150 Hrs	-	250 Hrs.
MEDICINE & Allied	25 Hrs.	30 Hrs.	120 Hrs	265 Hrs.	360Hrs	800 Hrs.
NUCLEAR MEDICINE	-	10 Hrs.	-	10 Hrs	-	20 Hrs.
EMERGENCY MEDICINE, MEDICINE ELECTIVE, *** PSYCHIATRY, DERMATOLOGY AND GENERAL PRACTICE	-	-	-	-	-	-
PAEDIATRIC MEDICINE	5 Hrs.	10 Hrs.	15 Hrs	50 Hrs	70 Hrs	150 Hrs.
SURGERY & ALLIED	25 Hrs.	30 Hrs.	120 Hrs	265 Hrs	360 Hrs	800 Hrs.
**** RADIOLOGY ORTHOPAEDICS, PAED.SURGERY, NEUROSURGERY, SURGERY ELECTIVE, EMERGENCY SURGERY & ANAESTHESIA	5 Hrs.	10 Hrs.	-	10 Hrs	15 Hrs	40 Hrs.
OBSTETRICS & GYNAECOLOGY	10 Hrs.	10 Hrs.	50 Hrs	100 Hrs	130 Hrs.	300 Hrs.
OPHTHALMOLOGY	5 Hrs.	10 Hrs.	15 Hrs	70 Hrs	-	100 Hrs.
OTORHINOLARYN-GOLOGY(E.N.T.)	5 Hrs.	10 Hrs.	15 Hrs	70 Hrs	-	100 Hrs.
CLINICO-PATHOLOGICAL CONFERENCE	-	-	-	60 Hrs	-	60 Hrs.
Total	740 Hrs	790 Hrs	1060 Hrs	1265Hrs	940Hrs	4795Hrs

* **Bioethics will be taught in the Forensic Medicine.**
** **Biostatistics will be taught in Community Medicine.**
*** **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% 5994	20% 1499

Time Allocation To the Study Design(5184)

Instructions	Self Study
80% 4795	20% 1198

Time Allocation to Site of Study(4147)

Institution Based	Community Oriented
80% 3836	20% 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

CURRICULUM 3RD YEAR MBBS M-17 ACADEMIC YEAR 2020							
S#	**SUBJECTS**	**PMDC Req. Study Hours**	**Lecture Hours**	**Tutorial Hours**	**Practical Hours**	**Clinical Rotations Hours**	**TOTAL STUDY HOURS**
1	**PHARMA**	**300/ 304**	5 x 38 = 190	1.5 x 38 = 57	1.5 x 38 = 57	0	**304**
2	**PATHO**	**260/ 266**	4 x 38 = 152	1.5 x 38 = 57	1.5 x 38 = 57	0	**266**
3	**FOR. MEDICINE**	**100/ 171**	3 x 38 = 114	1.5 x 19 = 28.5	1.5 x 19 = 28.5	0	**171**
4	**B.S**	**150/ 167**	2.25 x 38 = 85.5 45min + 90min = 2.25hrs	1.5 x 38 = 57	0	Cl Rot Morning: 1.5 x 7 = 10.5 Cl Rot Evening: 2 x 7 = 14 Total Cl Rot + 10.5+14=24.5	**167**
5	**COM. MEDICINE**	**50/ 50**	1 x 38 = 38 1 x 12 = 12 Additional Total 38+12 = 50	0	0	0	**50**
6	**MEDICINE**	**120/ 120**	45min x 38 = 28.5 1 x 18 = 18 Additional Total 28.5+18=46.5	0	0	Morning: 1.5x7=10.5x3=31.5 Evening: 2x7=14x3=42 Total Cl Rot = 31.5+42= 73.5	**120**
7	**SURGERY**	**120/ 126.5**	45min x 38 = 28.5	0	0	Morning: 1.5x7=10.5x4=42 Evening: 2x7=14x4=56 Total Cl Rot : 42+56=98	**126.5**
8	**OBG**	**50/ 53**	45min x 38 = 28.5	0	0	Cl Rot Morning: 1.5 x 7 = 10.5 Cl Rot Evening: 2 x 7 = 14 Total Cl Rot + 10.5+14=24.5	**53**
9	**PAEDS**	**15/ 15**	1 x 15 = 15	0	0	0	**15**
10	**ENT**	**15/ 15**	1 x 15 = 15	0	0	0	**15**
11	**EYE**	**15/ 15**	1 x 15 = 15	0	0	0	**15**
12	**SELF DIRECTED LEARNING (SDL)**	**500 hrs in 5 years 100/152**	0	4 x 38 = 152	0	0	**152**
	TOTAL HOURS	**1295/1454.5**	**740**	**351.5**	**142.5**	**220.5**	**1454.5**

M - 1	**M - 2**	**M - 3**	**M - 4**	**S - 1**	**S - 2**	**S - 3**	**S - 4**
Medical Unit 1	Medical Unit 2	Psychiatry & Behvioural Sciences	Emergency Medicine & Radiology	Surgical Unit 1	Surgical Unit 2	Orthopedics	Anaesthesia

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
j. Tutorials
k. Long case
l. 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. MCQs 45% marks
b. SEQs 45% marks
c. Viva / Copy 10% 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 1st 2nd and 3rd year of the basic sciences, the log books are maintained for the 4th 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	Included in the session result
e. OSCE	Included in the session result
f. Viva	Included in the session result
g. Log books / Copies	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 case	Included in the ward test / clinical test
l. Short case	Included in the ward test / clinical test

Avicenna Medical College *Prof Gulfreen Waheed*

1st Term Test Schedule Updated : 13-JAN- 2020
3rd Year MBBS M- 17

Week	Total No. of Test	Date	Day	Time	Subject	Test		Topic	Refrence
1st		6-Nov-19	Wed	8.00-10.00	All subjects	Letures		Time Divided	
1st		7-Nov-19	Thur	8.00-10.00	All subjects	Letures		Time Divided	
2nd		11-Nov-19	Mon	8.00-10.00	All subjects	Letures		Time Divided	
2nd		14-Nov-19	Thur	8.00-10.00	All subjects	Letures		Time Divided	
3rd	1	18-Nov-19	Mon	8.00-10.00	Pharmacology	Grand Test-1		Pharmacokinetics	Katzung : Ch .1 & 3, 4
3rd	2	21-Nov-19	Thur	3.30-5.30	Pathology	Grand Test -1		General Bacteriology	Levinson : Ch : 1-7, 10, 11, 13
4th	3	25-Nov-19	Mon	8.00-10.00	For. Medicine	Grand Test -1		Law, Legal Procedures, Medical Jurisdiction	NRA PG: 1-22, 23-30 Parikh PG: 6.1-6.38
4th		28-Nov-19	Thur	3.30-5.30	SDL				
5th	4	2-Dec-19	Mon	8.00-10.00	Pharmacology	Grand Test -2		Pharmacodynamics	Katzung : Ch. 2
5th		3-Dec-19	Tue	10.00-11.30	WARD TEST- 1				
5th	5	5-Dec-19	Thur	3.30-5.30	Beh. Sciemces	Grand Test -1		Introduction to Beh.Science	HANDBOOK B.S M.H RANA CH. 1
6th	6	9-Dec-19	Mon	8.00-10.00	Pathology	Grand Test -2		Cell Injury	Robbins CH. 2
6th		13-Dec-19	Thur	3.30-5.30	SDL				
7th	7	16-Dec-19	Mon	8.00-10.00	For. Medicine	Grand Test -2		Medicolegal Autopsy & Exhumation	NRA 118-130 Parikh 2.3-2.9
7th	8	19-Dec-19	Thur	3.30-5.30	Pharmacology	Grand Test-3		Introduction Para Sympathetic (Ans)	Katzung : CH. 6,7,8
8th	9	23-Dec-19	Mon	8.00-10.00	Pathology	Grand Test-3		Gram +ve Bacteria	Levinson CH. 15,17
Winter Vacation : 25-Dec-2019 To 5-Jan-2020									
9th		6-Jan-20	Mon	8.00-10.00	All subjects	Letures		Time Divided	
9th	10	9-Jan-20	Thur	3.30-5.30	Beh. Sciemces	Grand Test-2		Medical Ethics Professionalism	HANDBOOK B.S M.H RANA CH. 2
9th		10-Jan-20	Fri	10.00-11.30	WARD TEST- 2				
10th	11	13-Jan-20	Mon	8.00-10.00	Pharmacology	Grand Test -4		Sympathetic system	Katzung : Ch .9,10
10th	12	16-Jan-20	Thur	8.00-10.00	Pathology	Grand Test-4		Acute Inflammation	Robbins CH. 3 PG. 69-93
11th	13	20-Jan-20	Mon	8.00-10.00	For. Medicine	Grand Test-3		Personal Identity & Thanatology	NRA PG: 31-45,91-105 Parikh PG:2.1-30,118-130
11th	14	23-Jan-20	Thur	8.00-10.00	For. Medicine	Grand Test-4		General Traumatology & RTA	NRA 46-70 Parikh 4.1-4.25, 8.3-8.38
12th	15	27-Jan-20	Mon	8.00-10.00	Pharmacology	Grand Test -5		CVS+ Diuretics	Katzung : Ch .11-15
12th	16	30-Jan-20	Thur	8.00-10.00	Pathology	Grand Test -5		Chronic Inflammation & Healing & Repair	Robbins CH: 3 PG .93-110
13th	17	3-Feb-20	Mon	8.00-10.00	Beh. Sciemces	Grand Test -3		Psychology In Medical Practice - I	HANDBOOK B.S M.H RANA SEC- C HALF
13th	18	6-Feb-20	Thur	8.00-10.00	For. Medicine	Grand Test -5		Regional Injuries + Fire Arm Injuries	NRA 71-75 Parikh : 4.9-4.12
13th		7-Feb-20	Fri	10.00-11.30	WARD TEST- 3				
14th	19	10-Feb-20	Mon	8.00-10.00	Pharmacology	Grand Test -6		Blood, NSAIDs + Gout	Katzung Ch : 33-36
14th	20	13-Feb-20	Thur	8.00-10.00	Pathology	Grand Test-6		Gram -ve Bacteria- 1	Levinson CH. 16,18
15th	21	17-Feb-20	Mon	8.00-10.00	For. Medicine	Grand Test -6		General Toxicology & Corrosive	NRA PG: 133-134 Parikh PG: 8.1 - 8.38
15th		20-Feb-20	Thur	8.00-10.00	All subjects	Letures		Time Divided	
EARLY SESSION EXAM : 19 Feb 2020 TO 17 Mar 2020									
18th	1	10-Mar-20	Tue	8.00-10.00	ESE	For. Medicine		Entire Syllabus Covered	
18th	2	13-Mar-20	Fri	8.00-10.00	ESE	Pharmacology		Entire Syllabus Covered	
19th	3	16-Mar-20	Mon	8.00-10.00	ESE	Pathology		Entire Syllabus Covered	

Avicenna Medical College

Prof Gulfreen Waheed

2nd Term Test Schedule **Date : 10-Dec- 2019**
3rd Year MBBS M- 17

Week	Total No. of Test	Date	Day	Time	Subject	Test	Topic	Refrence
19th		20-Mar-20	Fri	10.00-11.30	WARD TEST- 4			
Spring Vacations: 22 -Mar-20 To 5-April-20								
20th		7-Apr-20	Tue	8.00-10.00	For. Medicine	Grand Test- 7 VIVA	Asphyxial deaths	NRA PG: 106-115 Parikh PG: 3.35- 3.62
20th	23	9-Apr-20	Thur	8.00-10.00	Pathology	Grand Test-7	Gram -ve Bacteria- 2	Levinson CH. 16,18,19,20,21,23,24,25,26
21st	24	13-Apr-20	Mon	8.00-10.00	Beh. Sciences	Grand Test -4	Section C Psychology In Medical Practice - II	HANDBOOK B.S M.H RANA SEC- C HALF
21st	25	16-Apr-20	Thur	8.00-10.00	Pharmacology	Grand Test-7	Chemotherapy - I	Katzung Ch : 43-47
22nd	26	20-Apr-20	Mon	8.00-10.00	Pathology	Grand Test-8	Immunology	Levinson Ch : 57-68 PG. 475-580
22nd		17-Apr-20	Fri	10.00-11.30	WARD TEST- 5			
22nd	27	23-Apr-20	Thur	8.00-10.00	Pharmacology	Grand Test-8	Chemotherapy - II	Katzung Ch : 48-55
23rd	28	27-Apr-20	Mon	8.00-10.00	Pharmacology	Grand Test-9	Chemotherapy Full	Katzung Ch : 48-55
23rd	29	30-Apr-20	Thur	8.00-10.00	Beh. Sciences	Grand Test -5	Section- D : Sociology + Medical Anthropology	HANDBOOK B.S M.H RANA SEC- D
24th	30	4-May-20	Mon	8.00-10.00	Pathology	Grand Test -9	Neoplasia	Robbins CH.7
24th	31	7-May-20	Thur	8.00-10.00	For. Medicine	Grand Test -8	Sexual Offence, Criminal Abortion , Infanticide	NRA PG: 5.1-5.88 Parikh PG:76- 84
25th	32	11-May-20	Mon	8.00-10.00	Pharmacology	Grand Test-10	GIT+ Respiration	Katzung Ch . 20,62
25th	33	14-May-20	Thur	8.00-10.00	Pathology	Grand Test -10	Virology	Levinson CH. 28-46
25th		15-May-20	Fri	10.00-11.30	WARD TEST- 6			
26th	34	18-May-20	Mon	8.00-10.00	Beh. Sciences	Grand Test-6	Sec. E : Psychosocial Aspects of Health & Disease - I	HANDBOOK B.S M.H RANA SEC- E HALF
26th		21-May-20	Thur	8.00-10.00	All subjects	Letures	Time Divided	
Eid-ul-Fitar Holidays: 22-May -20 To 26-May-20								
27th	35	29-May-20	Fri	8.00-10.00	Pharmacology	Grand Test -11	CNS- I	Katzung CH. 21-26
Mid Session Exam: 30-May-20 TO 1-July -20								
31st				8.00-11.00	MSE	Pathology	Entire Syllabus Covered	
31st				8.00-11.00	MSE	Beh. Sciences	Entire Syllabus Covered	
32nd				8.00-11.00	MSE	For. Medicine	Entire Syllabus Covered	
32nd				8.00-11.00	MSE	Pharmacology	Entire Syllabus Covered	
End Of 2nd Term								

Avicenna Medical College								*Prof Gulfreen Waheed*
3rd Term Test Schedule 3rd Year MBBS M- 17							Date : 13-Dec- 2019	
Week	Total No. of Test	Date	Day	Time	Subject	Test	Topic	Refrence
32nd		2-Jul-20	Thur	10.00-11.30	WARD TEST- 7			
32nd		OSPE in 4 Batches						
33rd	36	9-Jul-20	Thur	8.00-10.00	Pathology	Grand Test -11	Haemodynamics	Robbins CH.4
34th	37	13-Jul-20	Mon	8.00-10.00	For. Medicine	Grand Test -9	SP. Toxicology etc.	NRA PG: 135-146 Parikh PG: 9.1-11.16
34th	38	16-Jul-20	Thur	8.00-10.00	Pharmacology+ VIVA	Grand Test-12	CNS - II	Katzung Ch : 27-32
EID-UL-ADHA (Summer Vacations) : 19-July-20 To 2-Aug-20								
35th		3-Aug-20	Mon	8.00-10.00	All subjects	Letures	Time Divided	
35th	39	6-Aug-20	Thur	8.00-10.00	Pathology	Grand Test -12	Parasitology	Levinson CH. : 51-56
35th		7-Aug-20	Fri	10.00-11.30	WARD TEST- 8			
36th	40	10-Aug-20	Mon	8.00-10.00	Beh. Sciences	Grand Test -7	Sec. E : (half) Psychosocial Aspects of Health & Disease - II	HANDBOOK B.S M.H RANA SEC- C HALF
36th	41	13-Aug-20	Thur	8.00-10.00	Pharmacology+ VIVA	Grand Test-13	Endocrinology	Katzung : 37-42
37th	42	17-Aug-20	Mon	8.00-10.00	Pathology	Grand Test-13	Mycology + Genetics	Levinson CH. : 47-50 Robbins CH: 5
37th	43	20-Aug-20	Thur	8.00-10.00	For. Medicine	Grand Test -10	Accident & Home Environment	NRA PG: Parikh PG:
37th		21-Aug-20	Fri	10.00-11.30	WARD TEST- 9			
SendUP Exam : 22-Aug-20 To 26-Sep-20								
40th				8.00-10.00	LSE	Pharmacology		
42nd				8.00-10.00	LSE	Pathology		
43rd				8.00-10.00	LSE	Beh. Sciences		
End Of Third Term								
Prof Exam :								