	THEORY								
No. 1	**Competency** **The student should be able to:**	**Domain K/S /A/C**	**Level K/KH/ S H/ P**	**Core (Y/ N)**	**Suggested Teaching learning method**	**Suggested Assessment method**	**Number required to certify P**	**Vertical integration**	**Horizontal Integration**
Topic: Basic Biochemistry Number of competencies: (01)									
BI 1.1	Describe the molecular and functional organization of a cell and its sub cellular Components	K	KH	Y	Lecture Small Group Discussion	MCQ / Written Assessment/ VIva Voce	----	-------	Physiology
Learning Objectives									
BI 1.1.1	At the end of the session phase 1 MBBS student must be able to describe the structural organization of a cell & its sub cellular components correctly.	K	KH	Y	Lecture Small Group Discussion	MCQ / Written Assessment/ VIva Voce	----	-------	Physiology
BI 1.1.2	At the end of the session phase 1 MBBS student must be able to discuss the functional organization of a cell correctly.	K	KH	Y	Lecture Small Group Discussion	MCQ / Written Assessment/ VIva Voce	----	-------	Physiology
BI 1.1.3	At the end of the session phase 1 MBBS student must be able to enumerate differences between Prokaryotic & Eukaryotic cell along with diagrammatic representation correctly.	K	KH	Y	Lecture Small Group Discussion	MCQ / Written Assessment/ VIva Voce	----	-------	Physiology
Topic: Enzymes Number of competencies: (07)									
BI 2.1	Explain fundamental concepts of enzyme, isoenzyme, alloenzyme ,coenzyme & co-factors. Enumerate the main classes of IUBMB nomenclature .	K	KH	Y	Lecture , Case Discussion	Written Assessment/ VIva Voce	---	-----	-----
Learning Objectives									
BI 2.1.1	At the end of the session phase 1 MBBS student must be able to define enzymes with its IUBMB classification giving appropriate examples correctly.	K	KH	Y	Lecture , Case Discussion	Written Assessment/ VIva Voce	---	-----	-----
BI 2.1.2	At the end of the session phase 1 MBBS student must be able to explain the concept of alloenzyme , isoenzyme , coenzyme , co-factors & prosthetic group correctly.	K	KH	Y	Lecture , Case Discussion	Written Assessment/ VIva Voce	---	-----	-----
BI 2.2	**Observe the estimation of SGOT & SGPT**	K	K	Y	Demonstration	VIva Voce	---	---	----
Learning Objectives									
BI 2.2.1	At the end of the session phase 1 MBBS student must be able to describe principle & method for the estimation of SGOT & SGPT correctly.	K	K	Y	Demonstration	VIva Voce	---	---	----
BI 2.2.2	At the end of the session phase 1 MBBS student must be able to interpret the result correctly.	K	K	Y	Demonstration	VIva Voce	---	---	----
BI 2.3	**Describe and explain the basic principles of enzyme activity**	K	KH	Y	Lecture , Case Discussion	Written Assessment, VIva Voce	----	----	-----
Learning Objectives									

BI 2.3.1	At the end of the session phase 1 MBBS student must be able to discuss factors affecting enzyme activity correctly.	K	KH	Y	Lecture , Case Discussion	Written Assessment, VIva Voce	----	----	-----
BI2.3.2	At the end of the session phase 1 MBBS student must be able to explain the various mechanisms of action of enzyme with Michaelis Menten Kinetics correctly.	K	KH	Y	Lecture , Case Discussion	Written Assessment, VIva Voce	----	----	-----
BI 2.3.3	At the end of the session phase 1 MBBS student must be able to discuss the regulation of enzyme activity.(Allosteric , K & V Type) correctly.	K	KH	Y	Lecture , Case Discussion	Written Assessment, VIva Voce	----	----	-----
BI 2.4	**Describe and discuss enzyme inhibitors as poisons & drugs & therapeutic enzymes.**	K	KH	Y	Lecture , Small Group Discussion	Written Assessment, VIva Voce	------	Pathology, General Medicine.	_____
	Learning Objectives								_____
BI 2.4.1	At the end of the session phase 1 MBBS student must be able to compare different types of enzymes inhibition (competitive, non-competitive, un-competitive, suicide inhibition) with appropriate examples correctly.	K	KH	Y	Lecture , Small Group Discussion	Written Assessment, VIva Voce	------		
BI 2.4.2	At the end of the session phase 1 MBBS student must be able to explain the role of enzyme inhibitors as therapeutic agents with examples correctly.	K	KH	Y	Lecture , Small Group Discussion	Written Assessment, VIva Voce	------		
BI 2.5	**Describe and discuss the clinical utility of various serum enzymes as markers of pathological conditions.**	K	KH	Y	Lecture Small Group Discussion	Written / VIva Voce	--------	Pathology, General Medicine	----------
Learning Objectives									
BI 2.5.1	At the end of the session phase 1 MBBS student must be able to describe the plasma functional and non functional enzymes correctly..	K	KH	Y	Lecture Small Group Discussion	Written / VIva Voce	--------	Pathology, General Medicine	----------
BI 2.5.2	At the end of the session phase 1 MBBS student must be able to describe the diagnostic significance of enzymes/ Isoenzymes correctly..	K	KH	Y	Lecture Small Group Discussion	Written / VIva Voce	--------	Pathology, General Medicine	----------
BI 2.5.3	At the end of the session phase 1 MBBS student must be able to illustrate enzyme pattern in various Pathological Conditions (Myocardial Infarction) correctly.	K	KH	Y	Lecture Small Group Discussion	Written / VIva Voce	--------	Pathology, General Medicine	----------
BI 2.6	**Discuss use of enzymes in laboratory investigations (Enzyme-based assays)**	K	KH	Y	Lecture Small Group Discussion	Written Assessment VIva Voce	--------	PathologyGeneral Medicine	-------
	Learning Objectives								
BI 2.6.1	At the end of the session phase 1 MBBS student must be able to discuss Enzyme based assays specifying principle of reaction involving enzymes as analytical reagents correctly..	K	KH	Y	Lecture Small Group Discussion	Written Assessment VIva Voce	--------	PathologyGeneral Medicine	-------
BI 2.7	**Interpret laboratory results of enzyme activities & describe the clinical utility of various enzymes as markers of pathological conditions.**	K	KH	Y	Lecture Small Group Discussion DOAP	Written / VIva Voce	-------	PathologyGeneral Medicine	----------
	Learning Objectives								

BI 2.7.1	At the end of the session phase 1 MBBS student must be able to list the normal range of various diagnostic enzymes correctly.	K	KH	Y	Lecture Small Group Discussion DOAP	Written / VIva Voce	-------	PathologyGeneral Medicine	----------
BI 2.7.2	At the end of the session phase 1 MBBS student must be able to identify pathological conditions from a given set of lab result correctly.	K	KH	Y	Lecture Small Group Discussion DOAP	Written / VIva Voce	-------	PathologyGeneral Medicine	----------
Topic: Chemistry & Metabolism of Carbohydrate Number of competencies: (10)									
BI 3.1	**Discuss and differentiate monosaccharides, di-saccharides and polysaccharides giving examples of main carbohydrates as energy fuel, structural element and storage in the human body.**								
	Learning Objectives								
BI 3.1.1	At the end of the session phase 1 MBBS student must be able to classify carbohydrates along with their function, (as energy fuel and structural element.) correctly.	K	KH	Y	Lecture Small Group Discussion	Written VIva Voce	--------	-------	----------
BI 3.1.2	At the end of the session phase 1 MBBS student must be able to discuss physical and chemical properties of carbohydrates correctly.	K	KH	Y	Lecture Small Group Discussion	Written VIva Voce	--------	-------	----------
BI 3.2&3.3	**Describe the processes involved in digestion and assimilation of carbohydrates and storage.** **Describe and discuss the digestion and assimilation of carbohydrates from food**.	K	KH	Y	Lecture Small Group Discussion	Written VIva Voce	--------	-------	----------
	Learning Objectives	K	KH	Y	Lecture Small Group Discussion	Written VIva Voce	--------	-------	----
BI 3.2.1& BI 3.3.1	At the end of the session phase 1 MBBS student must be able to describe enzymes and organs involved in digestion of carbohydrates correctly.								
BI 3.2.2 & BI 3.3.2	At the end of the session phase 1 MBBS student must be able to explain mechanism of absorption of monosaccharides along with role of glucose transporters correctly.	K	KH	Y	Lecture Small Group Discussion	Written VIva Voce	--------	-------	----
BI 3.2.3 & BI 3.3.3	At the end of the session phase 1 MBBS student must be able to describe biochemical and clinical features of Glut-2 deficiency correctly.	K	KH	Y	Lecture Small Group Discussion	Written VIva Voce	--------	-------	----
BI 3.2.4 & BI 3.3.4	At the end of the session phase 1 MBBS student must be able to explain biochemical basis of efficacy of ORT in Cholera correctly.	K	KH	Y	Lecture Small Group Discussion	Written VIva Voce	--------	-------	----
BI 3.2.5 & BI 3.3.5	At the end of the session phase 1 MBBS student must be able to discuss biochemical basis of lactose intolerance accurately.	K	KH	Y	Lecture Small Group Discussion	Written VIva Voce	--------	-------	----
BI 3.2.6 & BI 3.3.6	At the end of the session phase 1 MBBS student must be able to describe mechanism of assimilation of carbohydrates correctly.	K	KH	Y	Lecture Small Group Discussion	Written VIva Voce	--------	-------	----

BI 3.4 **BI 3.5** **BI 3.7** **BI 3.8**	**Define and differentiate the pathways of carbohydrate metabolism, (glycolysis, gluconeogenesis, glycogen metabolism, HMP shunt**). **Describe and discuss the regulation, functions and integration of carbohydrate along with associated diseases/disorders** .**Describe the common poisons that inhibit crucial enzymes of carbohydrate metabolism (eg; fluoride, arsenate** **Discuss and interpret laboratory results of analytes associated with metabolism of carbohydrates**	K ‘’ ‘’ ‘’’	KH ‘’’ ‘’’ ‘’’	Y ‘’ ” ‘’’	Lecture Small Group Discussion ‘’’ „ ‘’’	Written VIva Voce ‘’’ ‘’’’ ‘’	-------- ‘’’ ‘’’ ‘’’’	General Medicine ---------- --------- Path , General medicine	---------- -------- Physic ------
Learning Objectives									**At ce**
BI 3.4.1	**Glycolysis** At the end of the session phase 1 MBBS student must be able to describe glycolsis with its cellular/tissue localization, purpose, enzymes, coenzymes, inhibitors along with its energetic correctly.	K ‘’ ‘’ ‘’’	KH ‘’’ ‘’’ ‘’’	Y ‘’ ” ‘’’	Lecture Small Group Discussion ‘’’ „ ‘’’	Written VIva Voce ‘’’ ‘’’’ ‘’	-------- ‘’’ ‘’’ ‘’’’	General Medicine ---------- --------- Path , General medicine	---------- -------- Physic ------
BI 3.4.2	At the end of the session phase 1 MBBS student must be able to explain different mechanisms of regulations of Glycolysis correctly.	K ‘’ ‘’ ‘’’	KH ‘’’ ‘’’ ‘’’	Y ‘’ ” ‘’’	Lecture Small Group Discussion ‘’’ „ ‘’’	Written VIva Voce ‘’’ ‘’’’ ‘’	-------- ‘’’ ‘’’ ‘’’’	General Medicine ---------- --------- Path , General medicine	---------- -------- Physic ------
BI 3.4.3	At the end of the session phase 1 MBBS student must be able to explain the clinical consequences of deficiency of rate limiting enzymes of glycolysis (Hemolytic Anemia in erythrocyte PK deficiency) correctly.	K ‘’ ‘’ ‘’’	KH ‘’’ ‘’’ ‘’’	Y ‘’ ” ‘’’	Lecture Small Group Discussion ‘’’ „ ‘’’	Written VIva Voce ‘’’ ‘’’’ ‘’	-------- ‘’’ ‘’’ ‘’’’	General Medicine ---------- --------- Path , General medicine	---------- -------- Physic ------
BI 3.4.4	At the end of the session phase 1 MBBS student must be able to differentiate the role of Hexokinase and Glucokinase in blood glucose regulation accurately.	K ‘’ ‘’ ‘’’	KH ‘’’ ‘’’ ‘’’	Y ‘’ ” ‘’’	Lecture Small Group Discussion ‘’’ „ ‘’’	Written VIva Voce ‘’’ ‘’’’ ‘’	-------- ‘’’ ‘’’ ‘’’’	General Medicine ---------- --------- Path , General medicine	---------- -------- Physic ------

BI 3.4.5	At the end of the session phase 1 MBBS student must be able to differentiate between aerobic and anaerobic glycolysis with reference to lactic acidosis correctly.	K ‘’ ‘’ ‘’	KH ‘’’ ‘’’ ‘’’	Y ‘’ ” ‘’’	Lecture Small Group Discussion ‘’’ ‘’’ ‘’’	Written VIva Voce ‘’’ ‘’’’ ‘’	-------- ‘’’ ‘’’ ‘’’’	General Medicine ---------- --------- Path , General medicine	---------- -------- Physic ------
BI 3.4.6 3.5, 3.7, 3.8	**Gluconeogenesis:** At the end of the session phase 1 MBBS student must be able to describe gluconeogenesis, with its bypass and reversible reactions correctly.	K ‘’	KH ‘’’ ‘’’ ‘’’	Y ‘’ ” ‘’’	Lecture Small Group Discussion ‘’’ ‘’’ ‘’’	Written VIva Voce ‘’’ ‘’’’ ‘’	-------- ‘’’ ‘’’ ‘’’’	General Medicine ---------- --------- Path , General medicine	---------- -------- Physic ------
BI 3.4.7 3.5, 3.7, 3.8	At the end of the session phase 1 MBBS student must be able to describe different substrates for gluconeogenesis and evaluate the relative importance of these substrates in fed, fasting & exercise state correctly.	K ‘’ ‘’ ‘’	KH ‘’’ ‘’’ ‘’’	Y ‘’ ” ‘’’	Lecture Small Group Discussion ‘’’ ‘’’ ‘’’	Written VIva Voce ‘’’ ‘’’’ ‘’	-------- ‘’’ ‘’’ ‘’’’	General Medicine ---------- --------- Path , General medicine	---------- -------- Physic ------
BI 3.4.8 3.5, 3.7, 3.8	At the end of the session phase 1 MBBS student must be able to discuss different mechanisms of regulation of gluconeogenesis correctly.	K ‘’ ‘’ ‘’	KH ‘’’ ‘’’ ‘’’	Y ‘’ ” ‘’’	Lecture Small Group Discussion ‘’’ ‘’’ ‘’’	Written VIva Voce ‘’’ ‘’’’ ‘’	-------- ‘’’ ‘’’ ‘’’’	General Medicine ---------- --------- Path , General medicine	---------- -------- Physic ------
BI 3.4.9 3.5, 3.7, 3.8	At the end of the session phase 1 MBBS student must be able to explain the effect of Alcohol Ingestion on gluconeogenesis correctly.								
BI 3.4.10 3.5, 3.7, 3.8	**Glycogen metabolism:** At the end of the session phase 1 MBBS student must be able to discuss Glycogensis correctly.	K ‘’ ‘’ ‘’’	KH ‘’’ ‘’’ ‘’’	Y ‘’ ” ‘’’	Lecture Small Group Discussion ‘’’ ‘’’ ‘’’	Written VIva Voce ‘’’ ‘’’’ ‘’	-------- ‘’’ ‘’’ ‘’’’	General Medicine ---------- --------- Path , General medicine	---------- -------- Physic ------

BI 3.4.11 3.5, 3.7, 3.8	At the end of the session phase 1 MBBS student must be able to explain Glycogenolysis correctly.	K ‘’ ‘’ ‘’’	KH ‘’’ ‘’’ ‘’’	Y ‘’ ” ‘’’	Lecture Small Group Discussion ‘’’ ”’ ‘’’	Written VIva Voce ‘’’ ‘’’’ ‘’	-------- ‘’’ ‘’’ ‘’’’	General Medicine ---------- --------- Path , General medicine	---------- --------- Physic
BI 3.4.12 3.5, 3.7, 3.8	At the end of the session phase 1 MBBS student must be able to explain different type of regulation of glycogensis & glycogenolysis correctly.	K ‘’ ‘’ ‘’’	KH ‘’’ ‘’’ ‘’’	Y ‘’ ” ‘’’	Lecture Small Group Discussion ‘’’ ”’ ‘’’	Written VIva Voce ‘’’ ‘’’’ ‘’	-------- ‘’’ ‘’’ ‘’’’	General Medicine ---------- --------- Path , General medicine	---------- -------- Physic
BI 3.4.13 3.5, 3.7, 3.8	At the end of the session phase 1 MBBS student must be able to discuss Glycogen storage diseases , enumerating enzyme deficiencies, biochemical and clinical manifestations and treatment correctly.	K ‘’ ‘’ ‘’’	KH ‘’’ ‘’’ ‘’’	Y ‘’ ” ‘’’	Lecture Small Group Discussion ‘’’ ”’ ‘’’	Written VIva Voce ‘’’ ‘’’’ ‘’	-------- ‘’’ ‘’’ ‘’’’	General Medicine ---------- --------- Path , General medicine	---------- -------- Physic ------
BI 3.4.14 3.5, 3.7, 3.8	**HMP Shunt** At the end of the session phase 1 MBBS student must be able to describe oxidative and non oxidative phrases of HMP Shunt correctly.	K ‘’ ‘’ ‘’’	KH ‘’’ ‘’’ ‘’’	Y ‘’ ” ‘’’	Lecture Small Group Discussion ‘’’ ”’ ‘’’	Written VIva Voce ‘’’ ‘’’’ ‘’	-------- ‘’’ ‘’’ ‘’’’	General Medicine ---------- --------- Path , General medicine	---------- -------- Physic ------
BI 3.4.15 3.5, 3.7, 3.8	At the end of the session phase 1 MBBS student must be able to explain the biological significance of HMP Shunt correctly.	K ‘’ ‘’ ‘’’	KH ‘’’ ‘’’ ‘’’	Y ‘’ ” ‘’’	Lecture Small Group Discussion ‘’’ ”’ ‘’’	Written VIva Voce ‘’’ ‘’’’ ‘’	-------- ‘’’ ‘’’ ‘’’’	General Medicine ---------- --------- Path , General medicine	---------- -------- Physic ------

BI 3.4.16 3.4.15 3.5, 3.7, 3.8	At the end of the session phase 1 MBBS student must be able to explain the significance of the products from HMP Shunt correctly.	K ‘’ ‘’ ‘’’	KH ‘’’ ‘’’ ‘’’	Y ‘’ ” ‘’’	Lecture Small Group Discussion ‘’’ ,,, ‘’’	Written VIva Voce ‘’’ ‘’’’ ‘’	-------- ‘’’ ‘’’ ‘’’’	General Medicine ---------- --------- Path , General medicine	---------- -------- Physic ------
BI 3.4.17 3.4.15 3.5, 3.7, 3.8	At the end of the session phase 1 MBBS student must be able to explain the biochemical & clinical consequence of G- 6- PD and Transketolase deficiency accurately.	K ‘’ ‘’ ‘’’	KH ‘’’ ‘’’ ‘’’	Y ‘’ ” ‘’’	Lecture Small Group Discussion ‘’’ ,,, ‘’’	Written VIva Voce ‘’’ ‘’’’	-------- ‘’’ ‘’’ ‘’’’	General Medicine ---------- --------- Path , General medicine	---------- -------- Physic
BI 3.6	**Describe and discuss the concept of TCA cycle as a amphibolic pathway and its regulation.**	K ‘’ ‘’ ‘’’	KH ‘’’ ‘’’ ‘’’	Y ‘’ ” ‘’’	Lecture Small Group Discussion ‘’’ ,,, ‘’’	Written VIva Voce ‘’’ ‘’’’ ‘’	-------- ‘’’ ‘’’ ‘’’’	General Medicine ---------- --------- Path , General medicine	---------- -------- Physic ------
Learning Objectives									
Bl 3.6.1	At the end of the session phase 1 MBBS student must be able to discuss PDH complex with its coenzymes & its regulations correctly.	K	KH	Y	Lecture Small Group Discussion	Written / VIva Voce	--------	--------	
BI 3.6.2	At the end of the session phase 1 MBBS student must be able to compare PDH complex with alpha- Ketoglutarate dehydrogenase and branched chain alpha- Ketoacid Dehydrogenase correctly.	K	KH	Y	Lecture Small Group Discussion	Written / VIva Voce	--------	--------	
BI 3.6.3	At the end of the session phase 1 MBBS student must be able to describe TCA cycle, its energetics and regulation accurately.	K	KH	Y	Lecture Small Group Discussion	Written / VIva Voce	--------	--------	
BI 3.6.4	At the end of the session phase 1 MBBS student must be able to explain central role of TCA cycle in connecting glycolysis, gluconeogensis, ,oxidative ,phosphorlyation, fatty acid and amino acid metabolism correctly.	K	KH	Y	Lecture Small Group Discussion	Written / VIva Voce	--------	--------	

BI 3.6.5	At the end of the session phase 1 MBBS student must be able to discuss TCA cycle intermediates as sources of substrates for biosynthetic processes correctly.	K	KH	Y	Lecture Small Group Discussion	Written / VIva Voce	--------	--------	
BI 3.9	**Discuss the mechanism and significance of blood glucose regulation in health and disease**								
Learning Objectives									
BI 3.9.1	At the end of the session phase 1 MBBS student must be able to explain the effect of Insulin and Glucagon on metabolic pathways involved in maintaining blood glucose level correctly.	K	KH	Y	Lecture Small Group Discussion	Written / VIva Voce	--------	General medicine	
BI 3.9.2	At the end of the session phase 1 MBBS student must be able to compare & contrast the characteristics of Insulin dependent and non-insulin dependent glucose transporters correctly.	K	KH	Y	Lecture Small Group Discussion	Written / VIva Voce	--------	General medicine	
BI 3.9.3	At the end of the session phase 1 MBBS student must be able to compare & contrast the effect of Insulin on the metabolic events which follows glucose uptake in liver, muscle and adipose tissue correctly.	K	KH	Y	Lecture Small Group Discussion	Written / VIva Voce	--------	General medicine	
BI 3.9.4	At the end of the session phase 1 MBBS student must be able to discuss the role of glucagon Linked peptide 1 & 2 & other hormones in the regulation of glucose levels correctly.	K	KH	Y	Lecture Small Group Discussion	Written / VIva Voce	--------	General medicine	
BI 3.10	**Interpret the results of blood glucose levels and other laboratory investigations related to disorders of carbohydrate metabolism.**								
Learning Objectives									
BI 3.10.1	At the end of the session phase 1 MBBS student must be able to compare and contrast Type I & II DM with respect to incidence, age of onset, metabolic alterations and clinical features correctly.	K	KH	Y	Lecture Small Group Discussion	Written / VIva Voce	--------	General Medicine	
BI 3.10.2	At the end of the session phase 1 MBBS student must be able to discuss clinical presentation, diagnostic criteria, and therapeutic options for Type-1 DM correctly.	K	KH	Y	Lecture Small Group Discussion	Written / VIva Voce	--------	General Medicine	
BI 3.10.3	At the end of the session phase 1 MBBS student must be able to discuss Type II DM with emphasis on the life style factors, diagnostic criteria and the therapeutic options correctly.	K	KH	Y	Lecture Small Group Discussion	Written / VIva Voce	--------	General Medicine	
BI 3.10.4	At the end of the session phase 1 MBBS student must be able to explain the biochemical basis of short term and long term complications affecting various organ & tissues due to poorly controlled blood glucose levels correctly.	K	KH	Y	Lecture Small Group Discussion	Written / VIva Voce	--------	General Medicine	

BI 3.10.5	At the end of the session phase 1 MBBS student must be able to describe the classical presentation and treatment of a patient with Diabetic Ketoacidosis along with the metabolic derangements leading to this condition correctly.	K	KH	Y	Lecture Small Group Discussion	Written / VIva Voce	--------	General Medicine	
BI 3.10.6	At the end of the session phase 1 MBBS student must be able to define metabolic syndrome & insulin resistance correctly.	K	KH	Y	Lecture Small Group Discussion	Written / VIva Voce	--------	General Medicine	
BI 3.10.7	At the end of the session phase 1 MBBS student must be able to explain the biochemical indices of diabetic control with reference to glycated Hb & micro albumin correctly.	K	KH	Y	Lecture Small Group Discussion	Written / VIva Voce	--------	General Medicine	
BI 3.10.8	At the end of the session phase 1 MBBS student must be able to discuss causes and implications of hypoglycemia correctly.	K	KH	Y	Lecture Small Group Discussion	Written / VIva Voce	--------	General Medicine	
BI 3.10.9	At the end of the session phase 1 MBBS student must be able to explain Glucose Tolerance test in detail along with interpretation of different types of curves obtained correctly.	K	KH	Y	Lecture Small Group Discussion	Written / VIva Voce	--------	General Medicine	
Topic: Chemistry & Metabolism of Lipids Number of competencies: (07)		K	KH	Y	Lecture Small Group Discussion	Written / VIva Voce	--------	General Medicine	
BI 4.1	**Describe and discuss main classes of Lipids (Essential/non essential fatty acids , cholesterol and hormonal steroids, triglycerides, major phospholipids and sphingolipids) relevant to human system and their major functions.**								
Learning Objectives									
BI 4.1.1	At the end of the session phase 1 MBBS student must be able to discuss the main classes of lipids, along with their properties and general functions correctly.								
BI 4.1.2	At the end of the session phase 1 MBBS student must be able to discuss in detail the functions of different classes of lipids. (Essential/non essential fatty acids , cholesterol , TG , phospholipids , glycolipids and hormonal steroid) correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written t VIva Voce	------	**General Medicine**	----------
BI 4.2	**Describe the processes involved in digestion and absorption of dietary lipids and also the key features of their metabolism.**	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written t VIva Voce	------	**General Medicine**	----------
Learning Objectives									
BI 4.2.1	At the end of the session phase 1 MBBS student must be able to discuss the digestion and absorption of dietary lipids correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written VIva Voce	------	**General Medicine**	------
BI 4.2.2	At the end of the session phase 1 MBBS student must be able to discuss the types of oxidation of fatty acids along with the associated disorders correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written VIva Voce	------	**General Medicine**	------

BI 4.2.3	At the end of the session phase 1 MBBS student must be able to discuss the energetic of β-oxidation correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written VIva Voce	------	**General Medicine**	------
BI 4.2.4	At the end of the session phase 1 MBBS student must be able to describe synthesis and degradation of ketone bodies along with its regulation correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written VIva Voce	------	**General Medicine**	------
BI 4.2.5	At the end of the session phase 1 MBBS student must be able to explain the process of fatty acid synthesis along with its regulation correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written VIva Voce	------	**General Medicine**	------
BI 4.2.6	At the end of the session phase 1 MBBS student must be able to describe synthesis and hydrolysis of TAG correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written VIva Voce	------	**General Medicine**	------
BI 4.2.7	At the end of the session phase 1 MBBS student must be able to discuss hormonal regulation of adipose tissue correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written VIva Voce	------	**General Medicine**	------
BI 4.2.8	At the end of the session phase 1 MBBS student must be able to explain lipid storage diseases along with their characteristics correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written VIva Voce	------	**General Medicine**	------
BI 4.2.9	At the end of the session phase 1 MBBS student must be able to discuss the process involved in maintaining plasma cholesterol levels and its haemostastis. .	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written VIva Voce	------	**General Medicine**	------
BI 4.2.10	At the end of the session phase 1 MBBS student must be able to discuss the factors leading to hyper cholesterolemia and its treatment correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written VIva Voce	------	**General Medicine**	------
BI 4.2.11	At the end of the session phase 1 MBBS student must be able to explain metabolism of bile acids and bile salts correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written VIva Voce	------	**General Medicine**	------
BI 4.3 & BI 4.4	Explain the regulation of lipoprotein metabolism and associated disorders. Describe the structure and functions of lipoproteins, their functions, interrelations & relations with atherosclerosis.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written VIva Voce	------	**General Medicine**	------
Learning Objectives									
BI 4.3.1 & BI 4.4.1	At the end of the session phase 1 MBBS student must be able to compare and contrast the metabolic cycle of various lipoproteins and their functions correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written VIVA VOCE	------	**General Medicine**	-----
BI 4.3.2 & BI 4.4.2	At the end of the session phase 1 MBBS student must be able to categorize different Dyslipoproteinemias correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written VIVA VOCE	------	**General Medicine**	-----
BI 4.3.3 & BI 4.4.3	At the end of the session phase 1 MBBS student must be able to discuss the factors leading to fatty liver correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written VIVA VOCE	------	**General Medicine**	-----
BI 4.3.4 & BI 4.4.4	At the end of the session phase 1 MBBS student must be able to describe the risk factors contributing to atherorsclerosis its pathogenesis, consequences and management correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written VIVA VOCE	------	**General Medicine**	-----
BI 4.5 & BI 4.7	**Interpret laboratory results of analytes associated with metabolism of lipids.** ---------- do----------								

Learning Objectives									
BI 4.5.1 & BI 4.7.1	At the end of the session phase 1 MBBS student must be able to enlist the parameters done in lipid profile with their normal values accurately.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written Assessment Vlva Voce	------	**General Medicine**	**-----**
BI 4.5.2 & BI 4.7.2	At the end of the session phase 1 MBBS student must be able to discuss the disorders related to deranged lipid profile correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written Assessment Vlva Voce	------	**General Medicine**	**-----**
BI 4.5.3 & BI 4.7.3	At the end of the session phase 1 MBBS student must be able to interpret the results of the given sets of parameters of lipid profile (DM, Obesity and Atherosclerosis) accurately.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written Assessment Vlva Voce	------	**General Medicine**	_____
BI 4.6	**Describe the therapeutic uses of prostaglandins and inhibitors of eicosanoid synthesis**	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written Assessment Vlva Voce	------	**General Medicine**	_____
Learning Objectives									
BI 4.6.1	At the end of the session phase 1 MBBS student must be able to enumerate biological significance of PGs, Tx, Leucotrienes, Lipoxins correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / Vlva Voce	**------**	**General Medicine**	
BI 4.6.2	At the end of the session phase 1 MBBS student must be able to describe therapeutic uses of prostaglandins and eicosanoids correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / Vlva Voce	**------**	**General Medicine**	
CHEMISTRY & METABOLISM OF PROTEIN	**Number of competencies: (05)**								
BI 5.1	**Describe and discuss structural organization of proteins.**								
	Learning Objectives								
BI 5.1.1	At the end of the session phase 1 MBBS student must be able to describe all types of classification of amino acids along with their physical & chemical properties correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / Vlva Voce	**------**	----------	----------
BI 5.1.2	At the end of the session phase 1 MBBS student must be able to explain the structural organization of proteins in detail correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / Vlva Voce	**------**	----------	----------
BI 5.1.3	At the end of the session phase 1 MBBS student must be able to discuss the classification of proteins with their physical and chemical properties correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / Vlva Voce	**------**	----------	----------
BI 5.1.4	At the end of the session phase 1 MBBS student must be able to discuss biologically important peptides correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / Vlva Voce	**------**	----------	----------
BI 5.2	**Describe & discuss functions of protein and structural function relationship in relevant areas e.g. Hb & selected Hemoglobinopathies.**	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / Vlva Voce	**------**	----------	----------
Learning Objectives									

BI 5.2.1	At the end of the session phase 1 MBBS student must be able to explain in detail various plasma proteins with their functions correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	Pathology, General Medicine	Physiology
BI 5.2.2	At the end of the session phase 1 MBBS student must be able to describe their structure, types, and derivatives of Hb correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	Pathology, General Medicine	Physiology
BI 5.2.3	At the end of the session phase 1 MBBS student must be able to discuss the various Hemoglobinopathies (thalassaemia , sickle cell anemia) correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	Pathology, General Medicine	Physiology
BI 5.3	**Describe the digestion and absorption of dietary proteins.**	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	Pathology, General Medicine	Physiology
Learning Objectives									
BI 5.3.1	At the end of the session phase 1 MBBS student must be able to explain the digestion and absorption of dietary proteins correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	Pediatrics.	---------
BI 5.4	**Describe common disorders associated with protein metabolism.**.								
	Learning Objectives								
BI 5.4.1	At the end of the session phase 1 MBBS student must be able to discuss the sources and utilization of amino acid pool correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	Pediatrics.	---------
BI 5.4.2	At the end of the session phase 1 MBBS student must be able to describe formation, transport, and disposal of NH3 with its related disorders correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	Pediatrics.	
BI 5.4.3	At the end of the session phase 1 MBBS student must be able to explain metabolism of individual amino acids with their related disorders correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	Pediatrics.	
BI 5.4.4	At the end of the session phase 1 MBBS student must be able to enlist the specialized products of amino acids with their biological significance correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	Pediatrics.	
BI 5.5	**Interpret laboratory results of analytes associated with metabolism of proteins**.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	Pediatrics.	
Learning Objectives									
BI 5.5.1	At the end of the session phase 1 MBBS student must be able to : Already covered in practical competency 11.8 and 11.21 (protein, Albumin, Urea).	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	General Medicine	----------
Topic: Metabolism & Homeostasis	**Number of competencies: (15)**								
BI 6.1	**Discuss the metabolic processes that take place in specific organs in the body in the fed and fasting states.**								
	Learning Objectives								
BI 6.1.1	At the end of the session phase 1 MBBS student must be able to explain various metabolic processes that take place in liver, adipose tissue, skeletal muscle and brain in fed state and its regulation correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	General Medicine	----------

BI 6.1.2	At the end of the session phase 1 MBBS student must be able to discuss the metabolic process in various organs during different stages of starvation and its regulation correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	General Medicine	----------
BI 6.2	**Describe and discuss the metabolic processes in which nucleotides are involved.**								
	Learning Objectives								
BI 6.2.1	At the end of the session phase 1 MBBS student must be able to enumerate the type of purines and pyrimidines with their general structure correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	----------	--------
BI 6.2.2	At the end of the session phase 1 MBBS student must be able to enumerate the biologically important nucleotides and their synthetic analogues with their function correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	----------	--------
BI 6.2.3	At the end of the session phase 1 MBBS student must be able to give an overview of purines synthesis, salvage pathway with its regulation correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	----------	--------
BI 6.2.4	At the end of the session phase 1 MBBS student must be able to discuss the degradation of purine nucleotides correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	----------	--------
BI 6.2.5	At the end of the session phase 1 MBBS student must be able to give an overview of pyrimidines synthesis, catabolism, and its regulation correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	----------	--------
BI 6.3 & BI 6.4	**Describe the common disorders associated with nucleotide metabolism** **Discuss the laboratory results of analytes associated with Gout & Lesch Nyhan syndrome.**	**K** K	**KH** KH	**Y** Y	Lecture Small Group Discussion Lecture Small Group Discussion	Written / VIva Voce Written / VIva Voce	------ -------	-------- Genral Medicine	**Physiology** -------
Learning Objectives									
BI 6.3.1 & BI 6.4.1	At the end of the session phase 1 MBBS student must be able to describe biochemical basis and clinical features of disorders of purine metabolism (Gout , SCID , Lesch Nyhan Syndrome) correctly.								
BI 6.3.2 & BI 6.4.2	At the end of the session phase 1 MBBS student must be able to discuss biochemical basis and clinical features of disorders of pyrimidine metabolism correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	----------	--------
BI 6.3.3 & BI 6.4.3	At the end of the session phase 1 MBBS student must be able to interpret the results of a given set of parameters to identify the disorders of purine metabolism accurately. (case study)	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	----------	--------
BI 6.5	**Describe the biochemical role of vitamins in the body and explain the manifestations of their deficiency.**	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	----------	--------
Learning Objectives									
BI 6.5.1	At the end of the session phase 1 MBBS student must be able to classify vitamins with their, RDA and biochemical role correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	General Medicine	----------

BI 6.5.2	At the end of the session phase 1 MBBS student must be able to describe the deficiency features of each vitamin along with their biochemical basis correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	General Medicine	----------
BI 6.5.3	At the end of the session phase 1 MBBS student must be able to discuss the features of hypervitaminosis correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	General Medicine	----------
BI 6.6	**Describe the biochemical processes involved in generation of energy in cells**								
	Learning Objectives								
BI 6.6.1	At the end of the session phase 1 MBBS student must be able to enumerate high energy compounds highlighting significance of ATP correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written/ VIva Voce	------	----------	----------
BI 6.6.2	At the end of the session phase 1 MBBS student must be able to discuss the biological significance of various components and complexes of ETC correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written/ VIva Voce	------	----------	----------
BI 6.6.3	At the end of the session phase 1 MBBS student must be able to differentiate between substrate level and oxidatative phosphorlyation correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written/ VIva Voce	------	----------	----------
BI 6.6.4	At the end of the session phase 1 MBBS student must be able to differentiate between inhibitors and uncouplers correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written/ VIva Voce	------	----------	----------
BI 6.6.5	At the end of the session phase 1 MBBS student must be able to write the importance of biological shuttles correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written/ VIva Voce	------	----------	----------
BI 6.7 & BI 6.8	**Describe the processes involved in maintenance of normal pH, water & electrolyte balance of body fluids and the derangements associated with these.** **Discuss and interpret results of Arterial Blood Gas (ABG) analysis in various disorders.**	**K** K	**KH** KH	**Y** Y	Lecture Small Group Discussion Lecture Small Group Discussion	Written / VIva Voce Written / VIva Voce	------ ------	General Medicine General Medicine	Physiology Physiology
Learning Objectives									
BI 6.7 .1 & BI 6.8.1	At the end of the session phase 1 MBBS student must be able to enumerate the systems involved in regulation of water and electrolyte balance correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written/ VIva Voce	------	----------	----------
BI 6.7 .2 & BI 6.8.2	At the end of the session phase 1 MBBS student must be able to explain the biochemical basis & clinical features associated with water and electrolyte imbalance correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written/ VIva Voce	------	----------	----------

BI 6.7 .3 & BI 6.8.3	At the end of the session phase 1 MBBS student must be able to identify the disorders associated with the given clinical feature and biochemical parameters (case history) accurately.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written/ VIva Voce	------	----------	----------
BI 6.7 .4 & BI 6.8.4	At the end of the session phase 1 MBBS student must be able to discuss the systems involved in the maintenance of blood pH correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written/ VIva Voce	------	----------	----------
BI 6.7 .5 & BI 6.8.5	At the end of the session phase 1 MBBS student must be able to explain the biochemical basis of disorder of acid base balance correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written/ VIva Voce	------	----------	----------
BI 6.7 .6 & BI 6.8.6	At the end of the session phase 1 MBBS student must be able to interpret the results of a given ABG report (case history) accurately.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written/ VIva Voce	------	----------	----------
	Describe the functions of various minerals in the body, their metabolism, and homeostasis.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	General medicine	Physiology
BI 6.9	**Learning Objectives**								
BI 6.9.1	At the end of the session phase 1 MBBS student must be able to enumerate the various minerals, with their requirement, & biochemical functions correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	General medicine	Physiology
BI 6.9.2	At the end of the session phase 1 MBBS student must be able to discuss the various factors / processes involved in their homeostasis correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	General medicine	Physiology
BI 6.10	**Enumerate and describe the disorders associated with mineral metabolism**	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written/ VIva Voce	------	General medicine	----------
Learning Objectives									
BI 6.10.1	At the end of the session phase 1 MBBS student must be able to explain the biochemical basis of disorders associated with various minerals correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written/ VIva Voce	------	General medicine	----------
BI 6.10.2	At the end of the session phase 1 MBBS student must be able to interpret the results of a given set of parameters and clinical findings to identify the associated disorder correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written/ VIva Voce	------	General medicine	----------
BI 6.11	**Describe the functions of haem in the body and describe the processes involved in its metabolism and describe porphyrin metabolism.**	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	**Pathology,General Medicine**	**Physiology**
Learning Objectives									

BI 6.11.1	At the end of the session phase 1 MBBS student must be able to explain porphyrin synthesis & its associated disorders (porphyrias.) correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / Vlva Voce	------	**Pathology, General Medicine**	**Physiology**
BI 6.11.2	At the end of the session phase 1 MBBS student must be able to discuss the degradation of haem & its associated disorders (Jaundice) correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / Vlva Voce	------	**Pathology, General Medicine**	**Physiology**
BI 6.12	**Describe the major types of haemoglobin and its derivatives found in the body and their physiological/ pathological relevance**.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / Vlva Voce	------	**Pathology General Medicine**	**Physiology**
	Learning Objectives								
BI 6.12.1	At the end of the session phase 1 MBBS student must be able to discuss the function of haemoglobin specifying the role of 2, 3-BPG correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / Vlva Voce	------	**Pathology General Medicine**	**Physiology**
BI 6.12.2	At the end of the session phase 1 MBBS student must be able to types and derivatives of Hb covered in 5.2	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / Vlva Voce	------	**Pathology General Medicine**	**Physiology**
BI 6.13	**Describe the functions of the kidney, liver, thyroid, and adrenal glands.**	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written Assessment Vlva Voce	------	Pathology General Medicine	Physiology. Human Anatomy
Learning Objectives									
BI 6.13.1	At the end of the session phase 1 MBBS student must be able to enumerate & elaborate on the functions of kidney, liver, thyroid and adrenal glands correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written Assessment Vlva Voce	------	Pathology General Medicine	Physiology .Human Anatomy
BI 6.13.2	At the end of the session phase 1 MBBS student must be able to (Will be covered by physiology **)**	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written Assessment Vlva Voce	------	Pathology General Medicine	Physiology. Human Anatomy
BI 6.14	**Describe the tests that are commonly done in clinical practice to assess the functions of these organs (kidney, liver, thyroid, and adrenal glands).**	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / Vlva Voce	------	Pathology General Medicine	Physiology .Human Anatomy
	Learning Objectives								
BI 6.14.1	At the end of the session phase 1 MBBS student must be able to enumerate the various parameters for analyzing the functions of kidney, liver, thyroid, and adrenal glands correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / Vlva Voce	------	PathologyGeneral Medicine	Physiology. Human Anatomy
BI 6.14.2	At the end of the session phase 1 MBBS student must be able to discuss the importance of tests used to assess renal glomerular and renal tubular functions correctly. (Urea and Cr. clearance)	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / Vlva Voce	------	PathologyGeneral Medicine	Physiology. Human Anatomy
BI 6.14.3	At the end of the session phase 1 MBBS student must be able to discuss the diagnostic significance of tests used to assess the excretory, synthetic, metabolic, and detoxifying unctions of liver correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / Vlva Voce	------	Pathology General Medicine	Physiology .Human Anatomy

BI 6.14.4	At the end of the session phase 1 MBBS student must be able to describe the clinical significance of estimation of various enzymes in diagnosis of different liver disorders correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	PathologyGeneral Medicine	Physiology.Human Anatomy
BI 6.14.5	At the end of the session phase 1 MBBS student must be able to differentiate between the types of jaundices on the basis of biochemical features of patient correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	PathologyGeneral Medicine	Physiology.Human Anatomy
BI 6.14.6	At the end of the session phase 1 MBBS student must be able to explain the significance of estimating various analytes /hormones in diagnosis of the common disorders of thyroid gland correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	PathologyGeneral Medicine	Physiology.Human Anatomy
BI 6.14.7	At the end of the session phase 1 MBBS student must be able to discuss the adrenal function tests with their significance in diagnosis of various adrenal disorders correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	PathologyGeneral Medicine	Physiology.Human Anatomy
BI 6.14.8	At the end of the session phase 1 MBBS student must be able to explain the biochemical investigations for diagnosis of hyper functioning of adrenal gland namely Cushing's Syndrome, pheochromocytoma and Conn's Syndrome, adrenogenital syndrome correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	PathologyGeneral Medicine	Physiology.Human Anatomy
BI 6.14.9	At the end of the session phase 1 MBBS student must be able to explain the biochemical investigations required for diagnosis of hypo functioning of adrenal gland namely 1º adrenal insufficiency (Addison's disease), hypoaldosterorism correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	PathologyGeneral Medicine	Physiology.Human Anatomy
BI 6.14.10	At the end of the session phase 1 MBBS student must be able to Describe the utility of ACTH stimulation and dexamethasone suppression tests in the diagnosis of adrenal cortical functions correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	PathologyGeneral Medicine	Physiology.Human Anatomy
BI 6.15	**Describe the abnormalities of kidney, liver, thyroid, and adrenal glands.**	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	Pathology General Medicine	Physiology .Human Anatomy
Learning Objectives									
BI 6.15.1	At the end of the session phase 1 MBBS student must be able to explain the common disorders associated kidney, liver, thyroid, and adrenal correctly. (will be covered by General Medicine/Pathology) (Seminar)	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	Pathology General Medicine	Physiology .Human Anatomy
	MOLECULAR BIOLOGY (07)								
BI 7.1	**Describe the structure and function of DNA and RNA and outline the cell cycle.**	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	---------	---------
Learning Objectives									
BI 7.1.1	At the end of the session phase 1 MBBS student must be able to explain in detail the structure, functions and types of DNA correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce			
BI 7.1.2	At the end of the session phase 1 MBBS student must be able to compare and contrast the different types of RNA correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	---------	---------

BI 7.1.3	At the end of the session phase 1 MBBS student must be able to outline the steps of cell cycle correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	---------	---------
BI 7.2	**Describe the processes involved in replication & repair of DNA and the transcription & translation mechanisms.**	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	---------	---------
Learning Objectives									
BI 7.2.1	At the end of the session phase 1 MBBS student must be able to explain the mechanism of DNA replication correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	----------	----------
BI 7.2.2	At the end of the session phase 1 MBBS student must be able to discuss and differentiate between the different types of DNA repair mechanisms correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	----------	----------
BI 7.2.3	At the end of the session phase 1 MBBS student must be able to discuss in detail the steps of transcription, comparing and contrasting the process in eukaryotic and prokaryotic cells correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	----------	----------
BI 7.2.4	At the end of the session phase 1 MBBS student must be able to discuss post transcriptional processing of eukaryotic m- RNA and explain how diseases may result from alteration in the processing steps citing examples correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	----------	----------
BI 7.2.5	At the end of the session phase 1 MBBS student must be able to describe the major features of genetic code correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	----------	----------
BI 7.2.6	At the end of the session phase 1 MBBS student must be able to explain the steps of translation. Further compare and contrast these processes and their regulation in eukaryotes and prokaryotes correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	----------	----------
BI 7.2.7	At the end of the session phase 1 MBBS student must be able to describe the effects of various antibiotics on prokaryotic protein synthesis correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	----------	----------
BI 7.2.8	At the end of the session phase 1 MBBS student must be able to discuss the post translational modifications correctly.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	----------	----------
BI 7.3	**Describe gene mutations and basic mechanism of regulation of gene expression**.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written / VIva Voce	------	----------	----------
Learning Objectives									
BI.3.1	At the end of the session phase 1 MBBS student must be able to enumerate & discuss the different type of mutations that occur in DNA with their clinical significance correctly.	K	KH	Y	Lecture Small Group Discussion	Written / VIva Voce	------	Pediatrics	

BI 7.3.2	At the end of the session phase 1 MBBS student must be able to describe the mechanism of gene regulation in prokaryotes correctly.	K	KH	Y	Lecture Small Group Discussion	Written / Vlva Voce	------	Pediatrics	----------
BI 7.3.3	At the end of the session phase 1 MBBS student must be able to describe the mechanism of gene regulation in Eurokaryotes correctly.	K	KH	Y	Lecture Small Group Discussion	Written / Vlva Voce	------	Pediatrics	----------
BI 7.3.4	At the end of the session phase 1 MBBS student must be able to compare and contrast gene regulation in eukaryotes and prokaryotes correctly.	K	KH	Y	Lecture Small Group Discussion	Written / Vlva Voce	------	Pediatrics	----------
BI 7.4	**Describe applications of molecular technologies like recombinant DNA technology, PCR in diagnosis and treatment of diseases with genetic basis.**	K	KH	Y	Lecture Small Group Discussion	Written / Vlva Voce	------	Pediatrics, General Medicine	----------
Learning Objectives									
BI 7.4.1	At the end of the session phase 1 MBBS student must be able to explain Restriction enzymes with its application correctly.	K	KH	Y	Lecture Small Group Discussion	Written Assessment Vlva Voce	------	Pediatrics, General Medicine	----------
BI 7.4.2	At the end of the session phase 1 MBBS student must be able to discuss the role of cloning vectors in transferring the gene of interest to host cell correctly.	K	KH	Y	Lecture Small Group Discussion	Written Assessment Vlva Voce	------	Pediatrics, General Medicine	----------
BI 7.4.3	At the end of the session phase 1 MBBS student must be able to enumerate the differences between the two types of DNA libraries ie genomic & complementary correctly.	K	KH	Y	Lecture Small Group Discussion	Written Assessment Vlva Voce	------	Pediatrics, General Medicine	----------
BI 7.4.4	At the end of the session phase 1 MBBS student must be able to discuss the process & applications of recombinant DNA technology correctly.	K	KH	Y	Lecture Small Group Discussion	Written Assessment Vlva Voce	------	Pediatrics, General Medicine	----------
BI 7.4.5	At the end of the session phase 1 MBBS student must be able to explain the principles, methods, and clinical application of blotting techniques correctly.	K	KH	Y	Lecture Small Group Discussion	Written Assessment Vlva Voce	------	Pediatrics, General Medicine	----------
BI 7.4.6	At the end of the session phase 1 MBBS student must be able to define and explain RFLP with its clinical application correctly.	K	KH	Y	Lecture Small Group Discussion	Written Assessment Vlva Voce	------	Pediatrics, General Medicine	----------
BI 7.4.7	At the end of the session phase 1 MBBS student must be able to discuss the PCR technology in detail with its application in diagnosis and treatment of diseases correctly.	K	KH	Y	Lecture Small Group Discussion	Written Assessment Vlva Voce	------	Pediatrics, General Medicine	----------
BI 7.5	**Describe the role of Xenobiotics in disease**.	K	KH	Y	Lecture Small Group Discussion	Written Assessment Vlva Voce	------		----------
Learning Objectives									
BI 7.5.1	At the end of the session phase 1 MBBS student must be able to discuss the phase I & Phase II reactions involved in the metabolism of Xenobiotics elaborating the role of cyt P450 correctly.	K	KH	Y	Lecture Small Group Discussion	Written Assessment Vlva Voce	------		----------

BI 7.6	**Describe the antioxidant defence systems in the body.**	K	KH	Y	Lecture Small Group Discussion	Written Assessment Viva Voce	------	----------	----------
Learning Objectives									
BI 7.6.1	At the end of the session phase 1 MBBS student must be able to discuss the sources and generation of oxygen free radicals and their role in etiology of various diseases correctly.	K	KH	Y	Lecture Small Group Discussion	Written Assessment Viva Voce	------	----------	----------
BI 7.6.2	At the end of the session phase 1 MBBS student must be able to explain the role of antioxidant defense systems in scavenging of free radicals correctly.	K	KH	Y	Lecture Small Group Discussion	Written Assessment Viva Voce	------	----------	----------
BI 7.7	**Describe the role of oxidative stress in the pathogenesis of conditions such as cancer, complications of diabetes mellitus and atherosclerosis.**	K	KH	Y	Lecture Small Group Discussion	Written Assessment Viva Voce	------	General Medicine, Pathology	----------
Learning Objectives									
BI 7.7.1	At the end of the session phase 1 MBBS student must be able to discuss the role of growth factors in causing malignant transformation of cell correctly.	K	KH	Y	Lecture Small Group Discussion	Written Assessment Viva Voce	------	General Medicine, Pathology	----------
BI 7.7.2	At the end of the session phase 1 MBBS student must be able to discuss role of oxidative stress in aetiology of cancer in detail correctly.	K	KH	Y	Lecture Small Group Discussion	Written Assessment Viva Voce	------	General Medicine, Pathology	----------
BI 7.7.3	At the end of the session phase 1 MBBS student must be able to explain DM covered in 3.10, Atherosclerosis covered in 4.4.	K	KH	Y	Lecture Small Group Discussion	Written Assessment Viva Voce	------	General Medicine, Pathology	----------
	NUTRITION (05)								
BI 8.1	**Describe the importance of various dietary components and explain the importance of dietary fibres.**	K	KH	Y	Lecture Small Group Discussion	Written Assessment Viva Voce	------	**General Medicine ,Pediatrics, Pathology**	----------
Learning Objectives									
BI 8.1.1	At the end of the session phase 1 MBBS student must be able to discuss the three energy requiring processes namely BMR, SDA & physical activity correctly.	K	KH	Y	Lecture Small Group Discussion	Written Assessment Viva Voce	------	**General Medicine ,Pediatrics ,Pathology**	----------
BI 8.1.2	At the end of the session phase 1 MBBS student must be able to enumerate & explain the nutritional l importance of various dietary components & dietary fiber accurately.	K	KH	Y	Lecture Small Group Discussion	Written Assessment Viva Voce	------	**General Medicine ,Pediatrics, Pathology**	----------
BI 8.1.3	At the end of the session phase 1 MBBS student must be able to write the benefits of dietary fibres in hypertension and diabetes correctly.	K	KH	Y	Lecture Small Group Discussion	Written Assessment Viva Voce	------	**General Medicine ,Pediatrics, Pathology**	----------

BI 8.1.4	At the end of the session phase 1 MBBS student must be able to explain parameters defining protein quality such as Biological value, Net Protein utilization, & Nitrogen balance correctly.	K	KH	Y	Lecture Small Group Discussion	Written Assessment Vlva Voce	------	**General Medicine ,Pediatrics, Pathology**	----------
BI 8.1.5	At the end of the session phase 1 MBBS student must be able to describe the increasing incidence of obesity and diabetes and its impact on atherosclerosis correctly. (Also covered in 3.10 & 4.4)	K	KH	Y	Lecture Small Group Discussion	Written Assessment Vlva Voce	------	**General Medicine ,Pediatrics, Pathology**	----------
BI 8.2	**Describe the types & causes of protein energy malnutrition and its effects**	K	KH	Y	Lecture Small Group Discussion	Written Assessment Vlva Voce	------	**General Medicine ,Pediatrics, Pathology**	----------
Learning Objectives									
BI 8.2.1	At the end of the session phase 1 MBBS student must be able to enumerate the types of protein energy malnutrition & differentiate on the basis of investigations & clinical features accurately.								
BI 8.3	**Provide dietary advice for optimal health in childhood and adult, in disease conditions like diabetes mellitus, coronary artery disease and in pregnancy.**	K	KH	Y	Lecture Small Group Discussion	Written / Vlva Voce	------	**General Medicine ,Pediatrics ,Pathology**	----------
Learning Objectives									
BI 8.3.1	At the end of the session phase 1 MBBS student must be able to explain the importance of balanced diet correctly.	K	KH	Y	Lecture Small Group Discussion	Written / Vlva Voce	------	**General Medicine,**	
BI 8.3.2	At the end of the session phase 1 MBBS student must be able to describe the balanced diet in different condition like pregnancy, childhood, DM, CAD correctly.	K	KH	Y	Lecture Small Group Discussion	Written / Vlva Voce	------	**General Medicine,**	
BI 8.3.3	At the end of the session phase 1 MBBS student must be able to discuss the rationale behind increased dietary requirement during pregnancy, Childhood, and convalescence correctly.	K	KH	Y	Lecture Small Group Discussion	Written / Vlva Voce	------	**General Medicine,**	
BI 8.4	**Describe the causes (including dietary habits), effects, and health risks associated with being overweight/ obesity.**	K	KH	Y	Lecture Small Group Discussion	Written / Vlva Voce	------	**General Medicine,**	
Learning Objectives									
BI 8.4.1	At the end of the session phase 1 MBBS student must be able to define obesity and overweight on the basis of BMI correctly.	K	KH	Y	Lecture Small Group Discussion	Written / Vlva Voce	------	**General Medicine, Pathology**	
BI 8.4.2	At the end of the session phase 1 MBBS student must be able identify the cause of obesity correctly.	K	KH	Y	Lecture Small Group Discussion	Written / Vlva Voce	------	**General Medicine, Pathology**	
BI 8.4.3	At the end of the session phase 1 MBBS student must be able discuss the impact of obesity in increasing incidence of other disorders like DM, HTN, CAD, and atherosclerosis correctly.	K	KH	Y	Lecture Small Group Discussion	Written / Vlva Voce	------	**General Medicine, Pathology**	

BI 8.4.4	At the end of the session phase 1 MBBS student must be able outline the treatment strategies along with the regulators of appetite correctly.	K	KH	Y	Lecture Small Group Discussion	Written / VIva Voce	------	**General Medicine, Pathology**	
BI 8.5	**Summarize the nutritional importance of commonly used items of food including fruits and vegetables (macromolecules and its importance).**	K	KH	Y	Lecture Small Group Discussion	Written / VIva Voce	------	**General Medicine, Pathology**	
	Learning Objectives								
BI 8.5.1	At the end of the session phase 1 MBBS student must be able to enumerate the macronutrients& micronutrients available in some commonly consumed fruit and vegetables.	K	KH	Y	Lecture Small Group Discussion	Written / VIva Voce	------	**General Medicine ,Pediatrics, Community medicine**	
BI 8.5.2	At the end of the session phase 1 MBBS student must be able to summarise importance of starch, sucrose, dietary fibers, visible and invisible fats, EFA, trans fatty acids, essential amino acids.	K	KH	Y	Lecture Small Group Discussion	Written / VIva Voce	------	**General Medicine ,Pediatrics, Community medicine**	
Topic : Extracellular Matrix Number of competencies: (03)		K	KH	Y	Lecture Small Group Discussion	Written / VIva Voce	------	**General Medicine ,Pediatrics, Community medicine**	
BI 9.1	**List the functions and components of the extracellular matrix (ECM)**	K	KH	Y	Lecture Small Group Discussion	Written / VIva Voce	------	---------	---------
Learning Objectives									
BI 9.1.1	At the end of the session phase 1 MBBS student must be able to describe the role of collagen and elastin in connective tissue emphasizing the structure- function relationship correctly.	K	KH	Y	Lecture Small Group Discussion	Written / VIva Voce	------	---------	---------
BI 9.1.2	At the end of the session phase 1 MBBS student must be able to describe the synthesis of collagen in detail highlighting the role of vitamin C in assembling and maintaining ECM correctly.	K	KH	Y	Lecture Small Group Discussion	Written / VIva Voce	------	---------	---------
BI 9.1.3	At the end of the session phase 1 MBBS student must be able to explain the effect of Vitamin C deficiency in the synthetic process of collagen correctly.	K	KH	Y	Lecture Small Group Discussion	Written / VIva Voce	------	---------	---------
BI 9.1.4	At the end of the session phase 1 MBBS student must be able to define roles of other components of ECM namely fibrillin, fibronectin, laminin & keratin correctly.	K	KH	Y	Lecture Small Group Discussion	Written / VIva Voce	------	---------	---------
BI 9.1.5	At the end of the session phase 1 MBBS student must be able to discuss the general structure; synthesis and general functions of glycoprotein with reference to their role in assembly of ECM correctly.	K	KH	Y	Lecture Small Group Discussion	Written / VIva Voce	------	---------	---------

BI 9.1.6	At the end of the session phase 1 MBBS student must be able to discuss the role of major components of basal lamina & basement membrane correctly.	K	KH	Y	Lecture Small Group Discussion	Written / Vlva Voce	------	---------	---------
BI 9.2	**Discuss the involvement of ECM components in health and disease.**	K	KH	Y	Lecture Small Group Discussion	Written / Vlva Voce	------	---------	---------
Learning Objectives									
BI 9.2.1	At the end of the session phase 1 MBBS student must be able to describe the changes in ECM molecules associated with wound healing in osteoporosis along with its treatment correctly.	K	KH	Y	Lecture Small Group Discussion	Written / Vlva Voce	------	**General medicine**	----------
BI 9.2.2	At the end of the session phase 1 MBBS student must be able to explain the features and pathogenesis of disorders associated with defective collagen synthesis namely osteogenesis imperfect, Ehlers Danlos syndrome, Scurvy, Menke's, disease, and Alport syndrome correctly.	K	KH	Y	Lecture Small Group Discussion	Written / Vlva Voce	------	**General medicine**	----------
BI 9.2.3	At the end of the session phase 1 MBBS student must be able to explain the features and pathogenesis of Marfan syndrome correctly.	K	KH	Y	Lecture Small Group Discussion	Written / Vlva Voce	------	**General medicine**	----------
BI 9.2.4	At the end of the session phase 1 MBBS student must be able to explain the rationale for the use of Chondroitin sulfate in patients who suffer from arthritis correctly.	K	KH	Y	Lecture Small Group Discussion	Written / Vlva Voce	------	**General medicine**	----------
BI 9.2.5	At the end of the session phase 1 MBBS student must be able to describe the role of Elastase and alpha 1- Antitrypsin in pathogenesis of emphysema correctly.	K	KH	Y	Lecture Small Group Discussion	Written / Vlva Voce	------	**General medicine**	----------
BI 9.3	**Describe protein targeting and sorting along with its associated disorders.**	K	KH	Y	Lecture Small Group Discussion	Written / Vlva Voce	------	**General medicine**	----------
	Learning Objectives								
BI 9.3.1	At the end of the session phase 1 MBBS student must be able to explain biomedical significance of protein targeting and sorting discussing its process in detail with emphasis on the role of signal sequence & glycosylation correctly.	K	KH	Y	Lecture Small Group Discussion	Written / Vlva Voce	------	----------	----------
BI 9.3.2	At the end of the session phase 1 MBBS student must be able to discuss the role of chaperone proteins in the folding of proteins correctly.	K	KH	Y	Lecture Small Group Discussion	Written / Vlva Voce	------	----------	----------

BI 9.3.3	At the end of the session phase 1 MBBS student must be able to summarize the important disorders related to mutations in genes of coding proteins that are involved in protein targeting and sorting , namely Zellweger syndrome, Primary Hyperoxaluria, familial hypercholesterolemia correctly.	K	KH	Y	Lecture Small Group Discussion	Written / Vlva Voce	------	----------	----------
Oncogenesis & Immunity	**Number of competencies: (05)**								
BI 10.1	**Describe the cancer initiator, promotion oncogenes and oncogenic activation. Also focus on p53 & apoptosis.**	K	KH	Y	Lecture Small Group Discussion	Written / Vlva Voce	------	----------	----------
	Learning Objectives								
BI 10.1.1	At the end of the session phase 1 MBBS student must be able to define cancer with distinctive features of cancer cells .differentially them from normal cells correctly.								
BI 10.1.2	At the end of the session phase 1 MBBS student must be able to describe etiological agents of cancer correctly.	K	KH	Y	Lecture Small Group Discussion	Written/ Vlva Voce	------	**Obstetrics & gynaecology,General surgery, Pathology**	----------
BI 10.1.3	At the end of the session phase 1 MBBS student must be able to discuss proto-oncogenes and molecular basis of their activation correctly.	K	KH	Y	Lecture Small Group Discussion	Written/ Vlva Voce	------	**Obstetrics & gynaecology,General surgery, Pathology**	----------
BI 10.1.4	At the end of the session phase 1 MBBS student must be able to explain role of p53 in apoptosis correctly.	K	KH	Y	Lecture Small Group Discussion	Written/ Vlva Voce	------	**Obstetrics & gynaecology,General surgery, Pathology**	----------
BI 10.2	**Describe various biochemical tumour markers and the biochemical basis of cancer therapy.**	K	KH	Y	Lecture Small Group Discussion	Written/ Vlva Voce	------	**Obstetrics & gynaecology, General surgery, Pathology**	----------
	Learning Objectives								
BI 10.2.1	At the end of the session phase 1 MBBS student must be able to define and classify Tumor markers correctly.	K	KH	Y	Lecture Small Group Discussion	Written Assessment Vlva Voce	------	Obstetrics & gynaecology ,General surgery, Pathology	----------
BI 10.2.2	At the end of the session phase 1 MBBS student must be able to explain role of Tumor markers in diagnosis and follow up of (cancer patients.) correctly.	K	KH	Y	Lecture Small Group Discussion	Written Assessment VIva Voce	------	Obstetrics & gynaecology, General surgery, Pathology	----------
BI 10.2.3	At the end of the session phase 1 MBBS student must be able to discuss various types of anticancer drug with their mechanism of action correctly.	K	KH	Y	Lecture Small Group Discussion	Written Assessment VIva Voce	------	Obstetrics & gynaecology, General surgery, Pathology	----------

BI 10.3	**Describe the cellular and humoral components of the immune system & describe the types and structure of antibody.**	**K**	**KH**	**Y**	**Lecture Small Group Discussion**	**Written Assessment Vlva Voce**	**------**	**Obstetrics & gynaecology,General surgery, Pathology**	**----------**
	Learning Objectives								
BI 10.3.1	At the end of the session phase 1 MBBS student must be able define cellular and humoral immunity correctly.	K	KH	Y	Lecture Small Group Discussion	Written / Vlva Voce	------	Obstetrics & gynaecology,General surgery, Pathology	----------
BI 10.3.2	At the end of the session phase 1 MBBS student must be able to describe various cellular components of immunity along with their functions namely Natural Killer cells, Lymphocytes, neutrophils, macrophages, monocytes, eosinophils and mast cells correctly.	K	KH	Y	Lecture Small Group Discussion	Written / Vlva Voce	------	Obstetrics & gynaecology,General surgery, Pathology	----------
BI 10.3.3	At the end of the session phase 1 MBBS student must be able to enlist the different types of antibodies along with their general structure, properties, and biological functions correctly.	K	KH	Y	Lecture Small Group Discussion	Written / Vlva Voce	------	Obstetrics & gynaecology,General surgery, Pathology	----------
BI 10.3.4	At the end of the session phase 1 MBBS student must be able to explain the antibody diversity and class switching correctly.	K	KH	Y	Lecture Small Group Discussion	Written / Vlva Voce	------	Obstetrics & gynaecology,General surgery, Pathology	----------
BI 10.3.5	At the end of the session phase 1 MBBS student must be able to discuss the technique used to produce monoclonal antibodies (hybridoma) with their diagnostic and therapeutic significance correctly.	K	KH	Y	Lecture Small Group Discussion	Written / Vlva Voce	------	Obstetrics & gynaecology,General surgery, Pathology	----------
BI 10.4	**Describe & discuss innate and adaptive immune responses, self/non-self recognition and the central role of T helper cells in immune responses.**	K	KH	Y	Lecture Small Group Discussion	Written / Vlva Voce	------	Obstetrics & gynaecology,General surgery, Pathology	_____
	Learning Objectives								
BI 10.4.1	At the end of the session phase 1 MBBS student must be able to describe components of innate immunity.								
BI 10.4.2	At the end of the session phase 1 MBBS student must be able to describe central role of T and B Lymphocytes in a generation of a immune response**.**	K	KH	Y	Lecture Small Group Discussion	Written / Vlva Voce	--------	General Medicine, Pathology	**Physiology**
BI 10.4.3	At the end of the session phase 1 MBBS student must be able to explain self and non self recognition.	K	KH	Y	Lecture Small Group Discussion	Written / Vlva Voce	--------	General Medicine, Pathology	**Physiology**

BI 10.4.4	At the end of the session phase 1 MBBS student must be able Discuss the molecules involved in immune response namely proteins encoded by MHC and cytokines.	K	KH	Y	Lecture Small Group Discussion	Written / Vlva Voce	--------	General Medicine, Pathology	**Physiology**
BI 10.5	**Describe antigens and concepts involved in vaccine development**	K	KH	Y	Lecture Small Group Discussion	Written / Vlva Voce	--------	General Medicine, Pathology	**Physiology**
	Learning Objectives								
BI 10.5.1	At the end of the session phase 1 MBBS student must be able to define & differentiate antigens, immunogens, haptens and adjutants.								
BI 10.5.2	At the end of the session phase 1 MBBS student must be able to discuss types of vaccine and their role in prevention of various infections.	**K**	**KH**	**Y**	Lecture Small Group Discussion	Written/ Vlva Voce	--------	Pathology, Pediatrics, Microbiology	----------