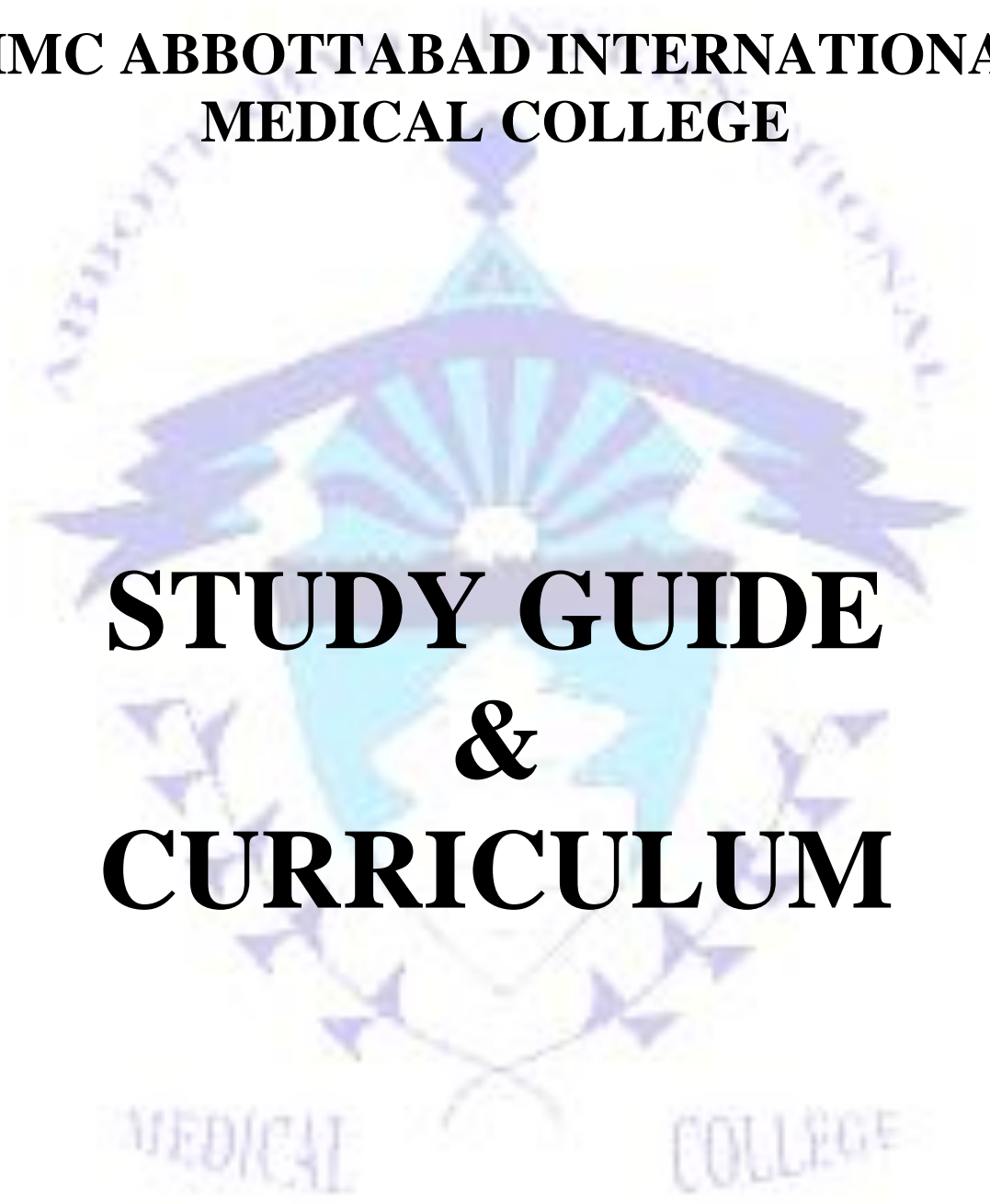


BIO CHEMISTRY DEPARTMENT

AIMC ABBOTTABAD INTERNATIONAL MEDICAL COLLEGE



STUDY GUIDE & CURRICULUM

INTRODUCTION OF BIOCHEMISTRY DEPARTMENT

Biochemistry is the rapidly expanding becoming one of the most influential areas of science combining the core tenets of Biology & Chemistry. This field place a huge role in the development of novel new scientific approaches.

Without the ongoing flurry of scientific breakthroughs made by Biochemists we would not have the precise chemical knowledge to create the vital drugs, therapies & diagnostic tools that are used everyday.

Biochemistry department is situated on the first floor of the college. It has offices & a well equipped laboratory. This laboratory contains all the basic requirements for the practical performance of 1st year MBBS, 2nd year MBBS & 1st year BDS.

The faculty consist of a Professor, Assistant Professors, Lecturers, Demonstrators, Laboratory Technician & a Laboratory Assistant.

Through Lectures, Seminars, Tutorials & Practicals we try our best to deliver the basic knowledge of Biochemistry to the students.

Introduction of biochemistry subject

- Biochemistry is the study of chemical processes in the living organisms, including but not limited to the living matter. It governs all the living organisms and living processes. By controlling information flow through biochemical signaling and flow of chemical energy through metabolism. Biochemical processes give rise to incredible complexity of life.
- Over the past decade of the 20th century, biochemistry became so successful at explaining living processes that now almost all areas of life sciences from botany to medicine to genetics are engaged in biochemical research.
- Today the main focus of biochemistry is in understanding how biological molecules give rise to the process that occurs within living cells.
- Biochemistry is closely related to molecular biology. The study of molecular mechanism by which genetic information encoded in DNA is able to result on processing of life.
- Much of the biochemistry deals with the structure, function and interaction of biological molecules such as proteins, nucleic acids, carbohydrates and lipids. Which provide the structure of cell and perform many functions associated with life.
- The chemistry of life also depends on reactions between smaller molecules and ions.
- These can be inorganic for example; water and metal ions, or organic for example; amino acids which are used to synthesize proteins.

- The findings of biochemistry are applied in medicine, nutrition and agriculture.
- In medicine biochemist investigate the causes and cure of diseases through performing tests.
- In nutrition they study how to maintain health and study the effects of nutritional deficiencies



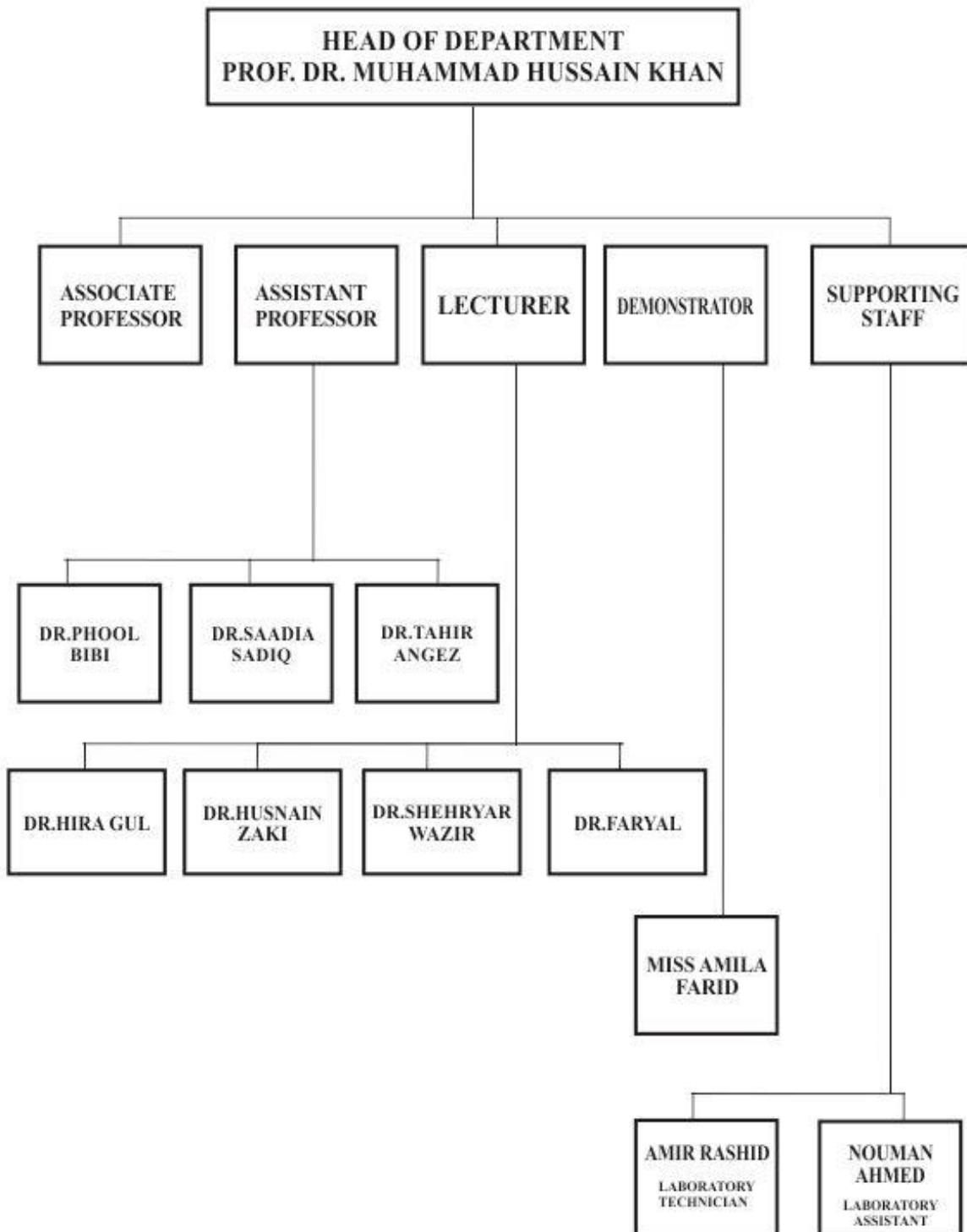
ABBOTTABAD INTERNATIONAL MEDICAL COLLEGE ABBOTTABAD

BIOCHEMISTRY DEPARTMENT

Faculty Staff of MBBS

S.No	PMDC Reg No.	Name	Designation	Qualification
1	Non Medical	Dr. M Hussain Khan	Professor	Phd
2	11840-N	Dr Saadia Sadiq	Assistant Professor	MBBS, M.Phil
3	12965-N	Dr Tahir Angez	Assistant Professor	MBBS, FCPS
4	3552-N	Dr Phool Bibi	Assistant Professor	MBBS, M.Phil
5	25758-N	Dr Hira Gul	Lecturer	MBBS
6	18135-N	Dr Hasnain Zaki	Lecturer	MBBS
7	27648-N	Dr Sheheryar	Lecturer	MBBS
8	24947-N	Dr Faryal	Lecturer	MBBS
9	Non Medical	Miss Anila Farid	Demonstrator	M.Phil

ORGANOGRAM OF BIOCHEMISTRY DEPARTMENT



TIME TABLE

ABBOTTABAD INTERNATIONAL MEDICAL COLLEGE ABBOTTABAD

BIOCHEMISTRY DEPARTMENT

DUTY ROASTER OF FACULTY MEMBERS

Lecturer 2 nd Year MBBS	Replacement	Practicals 2 nd Year MBBS	Replacement
Monday: Dr M Hussain Khan Time: 11:30 to 12:30 pm	Dr Saadia Sadiq	Monday: Miss Anila Farid Time: 08:00 to 10:00 am	Dr Hassnain
Tuesday: Dr Saadia Sadiq Time: 08:00 to 09:00 am	Dr Hira Gul	Tuesday: Dr Sheheryar Time: 10:30 to 12:30 pm	Miss Anila Farid
Saturday: Dr Hira Gul Time: 08:00 to 09:00 am	Dr Saadia Sadiq	Thursday: Dr Hassnain Time: 08:00 to 10:00 am	Dr Sheheryar
Seminar / Tutorial 2 nd Year MBBS			
Dr Hira Gul Miss Anila Farid			



ACADEMIC CALENDER

Abbottabad International Medical College Abbottabad

ABBOTTABAD INTERNATIONAL MEDICAL INSTITUTE ABBOTTABAD
(ACADEMIC CALENDER) 2018-19 ACADEMIC SESSION

DME AIMI ABBOTTABAD

OCTOBER 2018		February 2019		June																
Sun	Mon	Tues	Wed	Thurs	Fri	Sat	Sun	Mon	Tues	Wed	Thurs	Fri	Sat	Sun	Mon	Tues	Wed	Thurs	Fri	Sat
	1	2	3	4	5	6														1
7	8	9	10	11	12	13								2	3	4	5	6	7	8
14	15	16	17	18	19	20								9	10	11	12	13	14	15
21	22	23	24	25	26	27								16	17	18	19	20	21	22
28	29	30	31											23	24	25	26	27	28	29
NOVEMBER 2018		March 2019		July																
Sun	Mon	Tues	Wed	Thurs	Fri	Sat	Sun	Mon	Tues	Wed	Thurs	Fri	Sat	Sun	Mon	Tues	Wed	Thurs	Fri	Sat
				1	2	3						1	2							
4	5	6	7	8	9	10	3	4	5	6	7	8	9	7	8	9				13
11	12	13	14	15	16	17	10	11	12	13	14	15	16	14	15	16	17	18	19	20
18	19	20	21	22	23	24	17	18	19	20	21	22	23	21	22	23	24	25	26	27
25	26	27	28	29	30		24	25	26	27	28	29	30	28						
31																				
DECEMBER 2018		April 2019		AUGUST 2019																
Sun	Mon	Tues	Wed	Thurs	Fri	Sat	Sun	Mon	Tues	Wed	Thurs	Fri	Sat	Sun	Mon	Tues	Wed	Thurs	Fri	Sat
						1		1	2	3	4	5	6					1	2	3
2	3	4	5	6	7	8	7	8	9	10	11	12	13	4	5	6	7	8	9	10
9	10	11	12	13	14	15	14	15	16	17	18	19	20	11	12	13	14	15	16	17
16	17	18	19	20	21	22	21	22	23	24	25	26	27	18	19	20	21	22	23	24
23	24	25	26	27	28	29	28	29	30					25	26	27	28	29	30	31
30	31																			
JANUARY 2019		MAY 2019		SEPTEMBER 2019																
Sun	Mon	Tues	Wed	Thurs	Fri	Sat	Sun	Mon	Tues	Wed	Thurs	Fri	Sat	Sun	Mon	Tues	Wed	Thurs	Fri	Sat
		1	2	3	4	5				1	2	3	4	1	2	3	4	5	6	7
6	7	8	9	10	11	12			7	8	9	10	11	8	9	10	11	12	13	14
13	14	15	16	17	18	19	12	13	14	15	16	17	18	15	16	17	18	19	20	21
20	21	22	23	24	25	26	19	20	21	22	23	24	25	22	23	24	25	26	27	28
27	28	29	30	31			26	27	28	29	30	31		29	30					
Gazette Holidays							Prep leaves							College Timings 8:00 AM to 2:00 PM (6 hours daily) Dr. Farhat Shahzad DMEI Abbottabad						
							College days/festival													
Summer vacations							Faculty Development workshops													
							Prof Exams													
							Pre-Prof Exams													

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SYLLABUS FOR STUDENTS

BIO CHEMISTRY DEPARTMENT (AIMC)
Course Distribution 2nd Year MBBS (2018-2019)

Prof Dr. M.Hussain

(2nd Year MBBS lectures)

- Introduction to Metabolism
- Metabolism of carbohydrates
- Nutrition
- Gastrointestinal Tract

Dr. Sadia Sadiq

(2nd Year MBBS lectures)

- Bioenergetics
- Electron transport chain
- Metabolism of Purina bases
- Metabolism of pyrimidine bases

Dr. Hira Gul

(2nd Year MBBS lectures)

(2nd Year MBBS Practical's)

- Endocrinology
- Metabolism of lipids
- Genetics

Miss Anila

(2nd Year MBBS Practical's)

(Seminars/Tutorials)

- Urea, Uric acid, glucose, creatinine, plasma, Proteins, Albumin, Bilirubin, ALP

BIO CHEMISTRY DEPARTMENT
DEPARTMENTAL CALENDER FOR THE SESSION (2018-2019)
2nd Year MBBS Lectures

S#	TOPIC	DATE	Lecturer
1	Introduction to Metabolism	12-11-2018	Dr. M Hussain
2	Biological oxidation Definitions	13-11-2018	Dr. Saadia Sadiq
3	(Classification) Endocrinology	17-11-2018	Dr. Hira Gul
4	Introduction to Metabolism	19-11-2018	D.M Hussain
5	Biological oxidation (Definitions)	20-11-2018	Dr. Saadia Sadiq
6	Endocrinology (Pituitary gland)	24-11-2018	Dr. Hira Gul
7	Metabolism of CHO (Introduction)	26-11-2018	Dr. M Hussain
8	Electron transport chain (Introduction)	27-11-2018	Dr Saadia
9	Endocrinology (Thyroid Gland)	1-12-2018	Dr. Hira
10	Metabolism of CHO (Glycolysis)	3-12-2018	Dr. Hussain
11	ETC (Site)	4-12-2018	Dr. Saadia
12	Endocrinology (Adrenal Medulla)	8-12-2018	Dr. Hira
13	Metabolism of CHO (Glycolysis)	10-12-2018	Dr. Hussain
14	Complex of ETC (Detail)	11-12-2018	Dr. Saadia
15	Endocrinology (Growth hormone)	15-12-2018	Dr. Hira
16	Metabolism of CHO (Kreb's cycle)	17-12-2018	Dr. Hussain
17	Inhibitors of ETC	18-12-2018	Dr. Saadia
18	Endocrinology (O Sex hormones)	22-12-2018	Dr. Hira
19	Class Test	24-12-2018	Whole Staff present
20	Quid's Day	OFF	
21	Metabolism of CHO	29-12-2018	Dr. Hira
22	Metabolism of CHO (Krebs cycle)	31-12-2018	Dr. Hussain
23	Introduction to Protein Metabolism	4-12-2018	Dr. Hussain
24	ATD formation (Oxidative Phosphorylation)	5-03-2019	Dr. Saadia
25	Metabolism of lipids (Introduction)	9-03-2019	Dr. Hira
26	Metabolism of Individual amine acids	11-03-2019	Dr. Hussain
27	High energy compound (ATP)	12-03-2019	Dr. Saadia
28	Metabolism of lipids (Ketogenesis)	16-03-2019	Dr. Hira
29	Metabolism of individual amino acids)	18-03-2019	Dr. Hussain
30	Inhibitors of ETC	19-03-2019	Dr. Sadia
31	23rd March OFF		
32	Metabolism of individual amino acids	25-03-2019	Dr. Hussain
33	High energy compounds	26-03-2019	Dr. Sadia
34	Metabolism of lipids (Biosynthesis of Tally acids	30-03-2019	Dr. Hira
35	2 nd class Test	1-04-2019	Whole staff present
36	High energy compounds (Detail)	2-04-2019	Dr. Saadia
37	Lipid Metabolism Acylglycerol & sphingolipids	6-04-2019	Dr. Hira
38	Phenyketonuria & Alkaptonuria	8-04-2019	Dr. Hussain
39	MCQ,s practice in Bioenergetics	9-04-2019	Dr. Saadia
40	Lipid Metabolism cholesterol synthesis	13-04-2019	Dr. Hira
41	MCQ,s in protein Metabolism	15-04-2019	Dr. Hussain
42	Nucleic acid Metabolism (Cholesterol synthesis)	16-04-2019	Dr. Saadia
43	Lipid Metabolism (Cholesterol synthesis)	20-04-2019	Dr. Hira

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44	Synthesis of amino acids	22-04-2019	Dr. Hussain
45	Metabolism of Purine bases	23-04-2019	Dr. Saadia
46	Lipid Metabolism (MCQ,s)	27-04-2019	Dr. Hira
47	Synthesis of amino acids	29-04-2019	Dr. Hussain
48	Purine Metabolism De-Novo-Pathway	30-04-2019	Dr. Saadia
49	Metabolism of lipids (Diseases)	04-05-2019	Dr. Hira
50	GIT (Gastric Juices Saliva)	06-05-2019	Dr. Hussain
51	Pyrimidine Metabolism	07-05-2019	Dr. Saadia
52	Genetics	11-05-2019	Dr. Hira
53	GIT (Pancreatic Juices)	13-05-2019	Dr. Hussain
54	Pyrimidine Metabolism	14-05-2019	Dr. Saadia
55	Genetics	18-05-2019	Dr. Hira
56	GIT intestinal Juices	20-05-2019	Dr. Hussain
57	Uric acid formations (Gout)	21-05-2019	Dr. Saadia
58	Genetics	25-05-2019	Dr. Hira
59	Mid Term	29-05-2019	Whole staff present
60	Digestion & absorption of CHO	01-06-2019	Dr. Hussain
61	Nutrition	10-06-2019	Dr. Saadia
62	Uric acid formation (Gout treatment)	11-06-2019	Dr. Hira
63	Genetics	15-06-2019	Dr. Hussain
64	Nutrition	17-06-2019	Dr. Saadia
65	Digestion & absorption	18-06-2019	Dr. Hira
66	MCQ,s Practice	22-06-2019	Dr. Hussain
67	MCQ,s Practice	24-06-2019	Dr. Saadia
68	Digestion & absorption of lipids	25-06-2019	Dr. Hira
69	Genetics	29-06-2019	Dr. Hussain
70	Nutrition	01-07-2019	Dr. Saadia
71	MCQ's Practice	02-07-2019	Dr. Hira
72	MCQ's Practice	06-07-2019	Dr. Hussain
73	MCQ's Practice	08-07-2019	Dr. Saadia
74	MCQ's Practice	09-07-2019	Dr. Hira
75	Pre-Prof Exam	15-07-2019	Whole staff present

BIO CHEMISTRY DEPARTMENT (AIMC)
2nd Year MBBS (Practical's) Session 2018-2019

Practical:
Estimation of:

1. Glucose in Serum
2. Glucose in Urine
3. Techniques used in bio chemistry
4. Urea in blood
5. Urea in Urine
6. Uric acid in blood
7. Uric acid in Urine
8. Serum creatinine
9. Serum ALP
10. Serum Albumin. (TPP)
11. Serum Bilirubin.
12. Serum Cholesterol

BIO CHEMISTRY DEPARTMENT
DEPARTMENTAL CALENDER FOR THE SESSION (2018-2019)
2nd Year MBBS Practical's

S#	TOPIC	Day	DATE	Lecturer
1	Techniques used in Biochemistry	Monday	12-11-2018	Miss Anila Farid
		Tuesday	13-11-2018	Dr Sheheryar
		Thursday	15-11-2018	Dr.Hasnain Zaki
2	Serum Glucose estimation (Written)	Monday	19-11-2018	Miss Anila Farid
		Tuesday	20-11-2018	Dr Sheheryar
		Thursday	22-11-2018	Dr. Hasnain Zaki
3	Estimation of serum glucose	Monday	26-11-2018	Miss Anila Farid
		Tuesday	27-11-2018	Dr Sheheryar
		Thursday	29-11-2018	Dr. Hasnain Zaki
4	Estimation of glucose in Urine (Written+Performance)	Monday	03-12-2018	Miss Anila Farid
		Tuesday	04-12-2018	Dr Sheheryar
		Thursday	06-12-2018	Dr. Hasnain Zaki
5	Estimation of serum urea (written)	Monday	10-12-2018	Miss Anila Farid
		Tuesday	11-12-2018	Dr Sheheryar
		Thursday	13-12-2018	Dr. Hasnain Zaki
6	Estimation of urea in serum performance	Monday	17-12-2018	Miss Anila Farid
		Tuesday	18-12-2018	Dr Sheheryar
		Thursday	20-12-2018	Dr. Hasnain Zaki
7	Estimation of urea in urine (Written+Perfromance)	Monday	24-12-2018	Miss Anila Farid
		Tuesday	27-12-2018	Dr Sheheryar
		Thursday	31-12-2018	Dr. Hasnain Zaki
8	Estimation of serum uric acid (written)	Monday	04-03-2019	Miss Anila Farid
		Tuesday	05-03-2019	Dr Sheheryar
		Thursday	07-03-2019	Dr. Hasnain Zaki
9	Estimation of serum uric acid performance	Monday	11-03-2019	Miss Anila Farid
		Tuesday	12-03-2019	Dr Sheheryar
		Thursday	14-03-2019	Dr. Hasnain Zaki
10	Estimation of uric acid in urine (written+performance)	Monday	18-03-2019	Miss Anila Farid
		Tuesday	19-03-2019	Dr Sheheryar
		Thursday	21-03-2019	Dr. Hasnain Zaki
11	Estimation of serum creatinine (written)	Monday	25-03-2019	Miss Anila Farid
		Tuesday	26-03-2019	Dr Sheheryar
		Thursday	28-03-2019	Dr. Hasnain Zaki
12	Estimation of serum creatinine (Performance)	Monday	01-04-2019	Miss Anila Farid
		Tuesday	02-04-2019	Dr Sheheryar
		Thursday	04-04-2019	Dr. Hasnain Zaki
		Monday	08-04-2019	Miss Anila, Dr. Saadia, Dr. Hira, Dr

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13	OSPE Test Batch wise OSPE Test			Shehryar , Dr.Hassnain
		Tuesday	09-04-2019	Miss Anila, Dr. Saadia, Dr. Hira, Dr Shehryar , Dr.Hassnain
		Thursday	11-04-2019	Miss Anila, Dr. Saadia, Dr. Hira, Dr Shehryar , Dr.Hassnain
14	Viva Batch wise	Monday	15-04-2019	Miss Anila, Dr. Saadia, Dr. Hira, Dr Shehryar , Dr.Hassnain
		Tuesday	16-04-2019	Miss Anila, Dr. Saadia, Dr. Hira, Dr Shehryar , Dr.Hassnain
		Thursday	18-04-2019	Miss Anila, Dr. Saadia, Dr. Hira, Dr Shehryar , Dr.Hassnain
15	Estimation of urea in urine (Written)	Monday	22-04-2019	Miss Anila Farid
		Tuesday	23-04-2019	Dr. Sheharyar
		Thursday	25-04-2019	Dr.Hassnain
16	Estimation of urea in urine (Performance)	Monday	29-04-2019	Miss Anila Farid
		Tuesday	30-04-2019	Dr. Sheharyar
		Thursday	02-05-2019	Dr.Hassnain
17	Estimation of Total plasma protein in serum (Written)	Monday	06-05-2019	Miss Anila Farid
		Tuesday	07-05-2019	Dr. Sheharyar
		Thursday	09-05-2019	Dr.Hassnain
18	Estimation of TPP (Performance)	Monday	13-05-2019	Miss Anila Farid
		Tuesday	14-05-2019	Dr. Sheharyar
		Thursday	16-05-2019	Dr.Hassnain
19	Serum Albumin estimation (Written)	Monday	20-05-2019	Miss Anila Farid
		Tuesday	21-05-2019	Dr. Sheharyar
		Thursday	23-05-2019	Dr.Hassnain
20	Serum Albumin (Performance)	Monday	27-05-2019	Miss Anila Farid
		Tuesday	28-05-2019	Dr. Sheharyar
		Thursday	30-05-2019	Dr.Hassnain
21	Eid Holidays	Monday	03-06-2019	
		Tuesday	04-06-2019	
		Thursday	06-06-2019	
22	Serum ALP (Written)	Monday	10-06-2019	Miss Anila Farid

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		Tuesday	11-06-2019	Dr. Sheharyar
		Thursday	13-06-2019	Dr.Hassnain
23	Serum ALP (Performance)	Monday	17-06-2019	Miss Anila Farid
		Tuesday	18-06-2019	Dr. Sheharyar
		Thursday	20-06-2019	Dr.Hassnain
24	Serum Cholesterol (Written)	Monday	24-06-2019	Miss Anila Farid
		Tuesday	25-06-2019	Dr. Sheharyar
		Thursday	27-06-2019	Dr.Hassnain
25	Serum Cholesterol (Performance)	Monday	01-07-2019	Miss Anila Farid
		Tuesday	02-07-2019	Dr. Sheharyar
		Thursday	04-07-2019	Dr.Hassnain
26	Short Viva + Copy, Checking + Copy marks	Monday	08-07-2019	Miss Anila Farid
		Tuesday	09-06-2019	Dr. Sheharyar
		Thursday	11-06-2019	Dr.Hassnain



**ABBOTTABAD INTERNATIONAL MEDICAL COLLEGE
BIO CHEMISTRY DEPARTMENT
2ND YEAR MBBS
ASSESSMENT SCHEDULE**

THEORY

1	STAGE 1	1ST APRIL 2018
2	STAGE 2	29TH APRIL 2019
3	STAGE 3	29TH MAY 2019 (MID TERM)
4	STAGE 4	15TH JULY 2019 (PRE-PROF)

PRACTICAL

OSPE 40 Marks	8TH April 2019 (Batch A) 9th April 2019 (Batch B) 11th April 2019 (Batch C)
VIVA 60 Marks	15th April 2019 (Batch A) 16th April 2019 (Batch B) 18th April 2019 (Batch C)
	Total : 100

**ABBOTTABAD INTERNATIONAL MEDICAL COLLEGE
BIO CHEMISTRY DEPARTMENT
2ND YEAR MBBS
ASSESSMENT METHODOLOGIES**

The students of all the classes' i-e, 1st year MBBS, 2nd Year MBBS & 1st Year BDS are evaluated both in written exam as well as oral / OSPE examination.

In theory examination of students are given monthly test which consist of 50% SEQ's and 50% MCQ's. The students are required to at least score 50% marks (passing marks)

Students are also assessed in their tutorial / seminar classes by assigning them various topics. The last but not the least throughout the academic year the students are given assignments periodically.

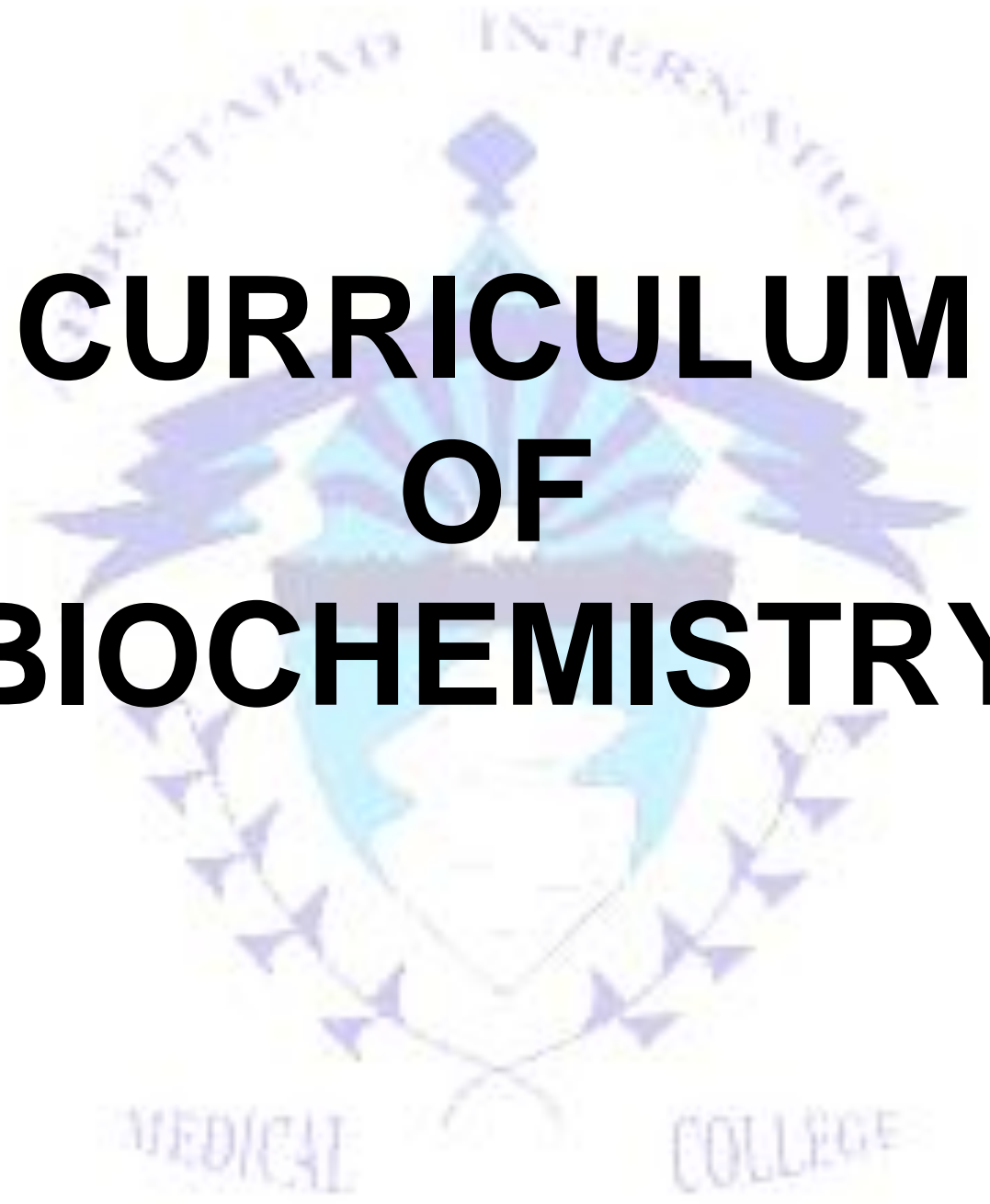
SITES OF LEARNING

The students are exposed to do their learning / teaching in the following sites.

- 1. Lecture Hall**
- 2. Laboratory / Laboratory Work**
- 3. Library: They study in the library in their free time.**

Reference Books

1. Text book of biochemistry by lehninger
2. Biochemistry by U. Satyanarayana/U. Chakrapani
3. Lippincott's Biochemistry



CURRICULUM OF BIOCHEMISTRY

PART-II

B. BIOCHEMISTRY

1. Bioenergetics and Biological Oxidation:

- A) Endergonic and exergonic reactions, their coupling through ATP
- B) Biologic oxidation and reduction, methods of electron Transferring, redox potential, enzymes and coenzymes of biologic Oxidation and reduction
- C) Respiratory chain and oxidative phosphorylation, components of Respiratory chain, electron carriers
- D) ATP synthesis coupled with electron flow, phosphorylation of ADP coupled to electron transfer
- E) The ATP-synthase, their relation to proton pump, PMF, and Active transport
- F) Uncouplers and inhibitors of oxidative phosphorylation

2. Introduction to Metabolism: Metabolism of Carbohydrates

A) Glycolysis

- Phases and reactions of Glycolysis
- Energetics of Aerobic and Anaerobic glycolysis and their Importance
- Regulation of Glycolysis
- Cori's cycle
- The fate of Pyruvate

B) The Citric Acid Cycle

C) Reactions, energetics and regulation and importance of Citric Acid cycle

- Amphibolic nature of citric acid cycle. The anaplerotic Reactions and regulations of TCA cycle

D) Gluconeogenesis

- Important three by-pass reaction of gluconeogenesis
- Entrance of amino acids and intermediates of TCA cycle And other nutrients as gluconeogenic substrates
- Significance of gluconeogenesis

E) Glycogen Metabolism

- Reactions of Glycogenesis and glycogenolysis
- Importance of UDP-Glucose
- Regulation of Glycogen Synthase and Glycogen Phosphorylase

- Glycogen phosphorylase 'a' and the blood glucose Sensor
- Disorders of Glycogen metabolism (Glycogen Storage Diseases)

20

f) Secondary pathways of carbohydrate (Hexose) metabolism

- Hexose Mono Phosphate Shunt, its reactions and importance

- Glucuronic acid pathway, its reactions and importance

g) Metabolism of Fructose, Galactose and Lactose

h) Regulation of Blood Glucose Level

- Hyperglycemia, hypoglycemia and their regulating factors
- Biochemistry of Diabetes Mellitus, its Laboratory findings and Diagnosis

3. Metabolism of Lipids:

a) Mobilization and transport of fatty acids, triacylglycerol, and sterols

b) Oxidation of fatty acids

- Activation and transport of fatty acid in the mitochondria
- β -oxidation, fate of Acetyl CoA, regulation of β -oxidation
- Other types of oxidation, i.e. α -oxidation, ω -oxidation, peroxisome oxidation, oxidation of odd number carbon containing fatty acids and Unsaturated fatty acids etc.

c) Ketogenesis

- Mechanism and utilization of Ketone bodies and significance

- Ketosis and its mechanism

d) Biosynthesis of fatty acids

e) Eicosanoids, synthesis from Arachidonic acid, their mechanism and biochemical functions

f) Triacylglycerol synthesis and regulation

g) Synthesis and degradation of phospholipids and their metabolic disorders

h) Cholesterol synthesis, regulation, functions, fate of intermediates of Cholesterol synthesis, Hypercholesterolemia, Atherosclerosis

i) Plasma Lipoproteins, VLDL, LDL, HDL, and Chylomicrons, their transport, functions and importance in health and disease

j) Glycolipid metabolism and abnormalities

4. Metabolism of Proteins and Amino Acids:

- a) Amino acid oxidation, metabolic fates of amino acid, transamination, deamination decarboxylation, deamidation and transamination
- b) Transport of amino group, role of Pyridoxal phosphate, Glutamate, Glutamine, Alanine
- c) Ammonia intoxication, Nitrogen excretion and Urea formation, Urea cycle and its regulation, genetic defects of Urea cycle
- d) Functions, pathways of amino acid degradation and genetic disorders of individual amino acids

5. Integration and regulation of Metabolic Pathways in Different Tissues:

6. Metabolism of Nucleotide:

- a) De Novo Purine synthesis
- b) Synthesis of Pyrimidine
- c) Recycling of purine and pyrimidine bases (The salvage pathway)
- d) Degradation of purine, formation of Uric acid
- e) Disorders of purine nucleotide metabolism

7. Biochemical Genetics (Informational Flow in the Cell):

- a) The structural basis of the cellular information
- b) DNA, Chromosomes, Discovery and organization of DNA in Genomes
- c) Super coiling of DNA
- d) The replication of DNA (DNA dependant DNA synthesis)
 - DNA polymerase, its components and functions
 - Initiation, elongation and termination of Replication
 - DNA Repair, Mutation and Cancers
- e) The Transcription (DNA dependant RNA synthesis)
 - RNA polymerase, its components and functions
 - Initiation, elongation and termination of transcription
 - RNA processing
 - RNA dependant synthesis of RNA and DNA
 - Reverse transcription — DNA synthesis from Viral RNA

- Retroviruses in relation to Cancer and AIDS
- f) The Translation (Protein Synthesis)
 - The genetic codes and their characteristics
 - Initiation, elongation and termination of protein synthesis
 - Post-translational modification
 - Regulation of Gene Expression
- g) Molecular biology technology
 - DNA isolation
 - DNA-recombinant technology
 - Hybridization, blotting techniques
- h) Genetic disorders

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8. Biochemistry of Endocrine System:

- a) Chemistry, Secretion, Mechanism of action, regulation and effect on Carbohydrates, Lipids, Proteins, Mineral and water metabolism and disorders of various endocrine glands

9. Biochemistry of water & Electrolyte imbalance and Acid Base Balance:

10. Nutrition:

- a) Caloric requirements of the body
- b) Balanced Diet
- c) Protein Energy Malnutrition
 - Marasmus
 - Kwashiorkor
 - Marasmic-Kwashiorkor
- d) Nutritional requirements in:
 - Pregnancy
 - Lactation
 - New born
 - In nutritional disorders

Laboratory Practicals

Introduction to use of laboratory facilities / equipments
Basic techniques and fundamental information
Preparation of solutions-Normal solution and Normal saline
Experiments on Carbohydrates qualitative analysis

Experiments on proteins-qualitative analysis

Experiments on Fats-qualitative analysis

Chemical analysis of Urine-Normal and abnormal specimens

8. The techniques and instrumentation of clinical biochemistry

a) Spectrophotometry

b) Flame photometry

c) UV Spectrophotometry

d) PH metery

e) Collection and preservation of clinical specimens

9. Estimation and clinical interpretation of:

a) Blood Glucose

b) Glucose Tolerance Test (Demonstration)

10. Determination of Amino acids in Urine by Paper Chromatography (Demonstration)

11. Estimation of various biochemical parameters in blood (urea, uric acid, creatinine, bilirubin, Protein, cholesterol and electrolytes)

12. Measurements of plasma enzymes (ALT, AST, LDH, CK, ALP and amylase)