COURSE SPECIFICATION

Medical Biochemistry

Faculty of Medicine– Mansoura University

(A) Administrative information

(1) Programme offering the course:	Master degree in Microbiology& Immunology Department
(2) Department offering the programme:	Medical Biochemistry Department
(3) Department responsible for teaching the course:	Medical Biochemistry Department
(4) Part of the programme:	First part
(5) Date of approval by the Department`s council	7/8/2016
(6) Date of last approval of programme specification by Faculty council	9/8/2016
(7) Course title:	Medical Biochemistry
(8) Course code:	MIC 504
(9) Biochemistry	2 hours
(10) Total teaching hours:	15 hr lectures 30 hr practical

(B) Professional information

(1) Course Aims:

Provide candidate with a basic knowledge in modern biochemistry and molecular biology necessary for an understanding of the life sciences at the molecular level in addition to a basic training in the principles of biochemistry and molecular biology techniques.

(2) Intended Learning Outcomes (ILOs):

On successful completion of the course, the candidate will be able to:

A- Knowledge and Understanding

A1	**Carbohydrate metabolism** **A1.1** Recognize digestion, absorption of CHO and glucose uptake by tissues. **A1.2** Recognize glycolysis (defination, site, function, steps, regulation and metabolic diseases) **A1.3** discuss gluconeogenesis (defination, site, importance, gluconeogenic substrates , steps, regulation) **A1.4** discuss glycogen metabolism - Glycogenesis - Glycogenolysis (definition, site and steps) - Regulation of glycogen metabolism - Glycogen storage disease **A1.5** Recognize oxidative decarboxylation of pyruvic acid **A1.6** Recognize citric acid cycle (definition, site, steps, biomedical importance, regulation and inhibitors, energetic, clinical aspects and role of vitamins) **A1.7** discuss hexose monophosphate shunt (definition, site, biomedical importance, function of NADP, regulation and clinical aspects) **A1.8** discuss uronic acid pathway (definition, site, importance, pathways of UDPG, biosynthesis of amino sugars) **A1.9** Recognize metabolism of other hexoses • Fructose metabolism (biomedical importance, conversion of fructose to glucose, conversion of glucose and inborn errors of fructose metabolism) • Galactose metabolism (biomedical importance, conversion of galactose to glucose, conversion of glucose to galactose and inborn errors of galactose metabolism) **A1.10** define Glucose homeostasis (Regulation of blood glucose)

	A1.11 discuss diabetes mellitus (def, types, metabolic changes, diagnosis and complication)
A2	**Protein general metabolism** **A2.1** Describe amino acid pool **A2.2**demonstrate catabolic pathways of amino acids (transamination-deamination-decarboxylation-transamidation) **A2.3** Recognize sources & fates of ammonia **A2.4** Recognize urea biosynthesis (steps-regulation-metabolic disorders) **A2.5** Recognize the nitrogen balance **A2.6** recognize biosynthesis of non essential amino acids **A2.7** describe catabolism of carbon skeleton of a.a.
A3	**Purine & pyrimidine chemistry & metabolism** **A3.1** Describe structure of DNA (1ry- 2ry- tertiary- DNA supercoiling).
A4	**Molecular biology & recombinant DNA** **A4.1** DNA organization • Explain structure of chromatin and chromosomes • Levels of DNA packing (nucleosomes- higher level of organization) **A4.2** Define genetic terminology (gene- genome) **A4.3** Recognize human genome project (HGP) **A4.4** Recognize DNA replication (steps , types and character of DNA polymerases, **A4.5** Recognize Types and functions of proteins responsible for DNA replication **A4.6** Define replisome and primosome **A4.7** Discuss post replication modification of DNA **A4.8** Recognize mutation (def, effect, causes, classification, clinical application) **A4.9** Recognize heamoglobinopathies (normal heamoglobin, sickle cell disease, thalassemia) **A4.10** Discuss DNA repair (mismatch repair- base excision repair- nucleotide excision repair) **A4.11** Recognize transcription (required materials- transcription unit structure, steps, post transcription modification and antibiotic inhibitors) **A4.12** Recognize post transcription modification (mRNA- tRNA- rRNA) **A4.13** define RNA polymerase enzyme, Reverse transcriptase **A4.14** Recognize telomeres and telomerase

	A4.15 Discuss genetic code and characteristics of genetic codons **A4.16** Discuss protein synthesis (steps, requirements steps- post translation modification and inhibitors of protein synthesis) **A4.17** Describe post translation modification **A4.18** Discuss regulation of gene expression • At the level of gene • At the level of transcription • At the level of RNA • At the level of translation **A4.19** Discuss Recombinant DNA technology= genetic engenering(mechanism, practical application) **A4. 20** Define vectors **A4.21** Describe DNA amplification techniques • DNA cloning • Polymerase chain reaction **A4.22** Describe molecular analysis of diseases **A4.23** Describe techniques in molecular biology • DNA sequencing • Blotting techniques • DNA microarray (DNA chips) **A4.24** Discuss biochemistry of cancer (carcinogenesis)

B- Intellectual skills

B1	Point-out the application of molecular biology in basic and clinical sciences.
B2	Interpret the clinical significance of determination of plasma levels of glucose, total proteins, SGOT, SGPT, bilirubin, albumin, creatinine and uric acid
B3	Diagnose the type of abnormality of pathological glucose tolerance curve

C-Professional/practical skills

C1	Identify laboratory reagents and instruments used in biochemistry laboratory
C2	Colorimetric estimation of some blood parametars (serum levels of glucose, total proteins, albumin, bilirubin, GPT, GOT, creatinine and uric acid).
C3	Urine analysis (Identify the physiological variations of physical and chemical characters of normal urine and performing chemical tests to detect abnormal constituents of urine).

D-Communication & Transferable skills

D1	To be able to work effectively in a group in lab.
D2	To respect the role of staff and co-staff members regardless of degree or occupation.
D3	To be able to use computer and IT.
D4	To be able to search in database

(3)Course content:

Subjects	NO. of hours per week	
	Lectures	Laboratory
1. Carbohydrate metabolism related to microbiology.	4	
2. Protein metabolism related to microbiology.	5	
3. DNA structure & Replication.	3	
4. Molecular biology techniques.	3	
5. laboratory reagents and instruments used in biochemistry laboratory		5
6. Colorimetric estimation of some blood parametars (serum levels of glucose, total proteins, albumin, bilirubin, GPT, GOT, creatinine and uric acid).		25
7. Urine analysis		
Total teaching hours	15 hr	30 hr

(3) Teaching methods:

4.1: Lecture

4.2: Practical class

(4) Assessment methods:

5.1:Written Examination for assessment of knowledge and intellectual ILOs

5.2:Structured Oral examination for assessment of knowledge and intellectual ILOs

5.3:OSPE Practical examination for assessment of for assessment of knowledge, practical, transferable and intellectual ILOs

5.4MCq continuous assessment **for assessment of** knowledge and intellectual ILOs

5.5: Log book for activities for assessment of : mainly for assessment of practical & transferrable skills which are accepted through attending different conferences, thesis discussions, seminars, workshops, attending scientific lectures as well as self learning.

Assessment schedule:

- after 2 semesters from MS registration (written, oral and practical exam with marks)
- Continuous MCQ assessment at the end of each semester

Percentage of each Assessment to the total mark:

- Written exam: 36 Marks
- MCQ : 9 Marks
- OSPE Practical exam: 15 MArks
- Structured Oral exam: 15 MArks

(5) References of the course:

6.1: Hand books:

- Medical biochemistry department (student book)

(7) Facilities and resources mandatory for course completion:

- Lecture rooms: available in the department
- Laboratories: The Department has 3 laboratories for research with a wide range of instrumentation that is available for training and research.
- library
- Computer laboratories with a wide range of software
- Intranet with a wide range of learning support material

Course coordinator:

Staff members of credit committee of the department

Head of the department: Prof. Dr. / Mohammad Abou El ela.

Date