

Biochemistry II; Code: PB 503

A- Basic Information

Program(s) on which the course is given:	Bachelor of Pharmacy (Pharm D)
Department responsible for offering the course:	Department of Biochemistry
Department responsible for teaching the course:	Department of Biochemistry
Academic year:	Level three -first Semester (2021/2022)
Course title and code:	Biochemistry II; Code: (PB 503)
Credit hours:	Lecture:2 (2), Practical: 2 (1), Total: 4 (2+1)
Course Coordinator:	Prof. Dr. Nadia Hamdy

B- Professional Information

The course aim and course learning outcomes are based on that mentioned in the programme specifications, with more course-related specific details.

1 - Overall Aim of the Course

Upon successful completion of this course:

The students must be able to recognize the biological reactions that occur in the living tissue

Be able to explain several phenomena related to normal and physiological conditions of the human body.

They must be able to measure levels of different blood constituents in human blood and interpret changes in these levels related to different human pathologies.

2- Course learning outcomes:

Domain 1: Fundamental knowledge

Program key elements	Course learning outcomes
1.1.1.4. Manifest understanding of pharmacological, toxicological, clinical, and physiological sciences.	1.1.1.4.a Demonstrate understanding of knowledge of the physiological carbohydrate metabolism. 1.1.1.4.b Demonstrate comprehensive knowledge of the human lipid chemistry. 1.1.1.4.c Provide a detailed overview of protein metabolism in human biology.
1.1.2.1 Make use of genetic, microbiological & epidemiological terms in pharmacy practice.	1.1.2.1. Explain terms and basis of genetic diseases related to carbohydrate, lipids and protein metabolism
1.1.5 Retrieve knowledge from basic sciences to solve therapeutic problems.	1.1.5. Demonstrate understanding of serum as an important biological fluid for diagnostic purposes
1.1.6.1 Collect & utilize scientific information to enhance professional decision to save patient life and to prevent the spreading of infectious	1.1.6.1 Define the techniques of biochemistry lab to decide professionally the most suitable technique.

diseases.	
1.1.6.2 Interpret scientific literature to enhance professional decision in production of high quality medicine.	1.1.6.2 Illustrate different human diseases depending on data from biochemical lab.
1.1.7.2 Recognize emerging issues in patient health care.	1.1.7.2.a Define different causes of metabolic human diseases. 1.1.7.2.b Outline case studies of biochemical abnormalities in serum.

Domain 2: Professional and ethical practice

Program key elements	Course learning outcomes
2.1.1 Implement responsibilities, authorities in compliance with pharmaceutical legislations, and the role of all members of the health care professional team based on the professional structure.	2.1.1. Work as a part of the team of the health care system and understand the legal responsibilities of work.
2.1.2 Follow ethical standards of health care and pharmacy profession.	2.1.2 Adopt ethics of health care respecting patients' rights.
2.2.3.1. Implement main basics of instruments and their proper choice and employment for production and analysis of various pharmaceutical products and materials.	2.2.3.1. Implement different lab procedures for preparation and analyzation of biological samples.
2.3.1.1. Handle & dispose natural/synthetic biologic materials, biotechnology-based & radio-labeled products.	2.3.1.1.Handle and dispose biologicals and chemicals safely.
2.3.2 Follow ethical & legal guidelines for handling and disposal of biological and pharmaceutical materials safely.	2.3.2 Follow the guidelines of the disposal of hazardous biological serum and body fluids.
2.5.2 Reclaim, understand & criticize pharmaceutical information needed in pharmacy profession.	2.5.2. Retrieve evidence-based information needed to assess the patient condition.
2.5.3 Design and perform research using suitable methodologies.	2.5.3. Identify the basics of forming research team and adopt the most suitable research methodology with an approach to carefully interpret the results with regard to the final conclusion.

Domain 3: Pharmaceutical care

Program key elements	Course learning outcomes
3.1.1 Integrate the basis of body physiology and genomics in health and disease states for various disorders management.	3.1.1. Apply the principles of cellular structure, cover the basis of body metabolism in health and handle disease states to manage different abnormalities.
3.1.4.1. Relate the cause, spreading, pathological data and lab diagnosis of infections to pharmacotherapeutic approaches.	3.1.4.1 Report laboratory diagnosis and their pharmacotherapeutic approaches.
3.1.4.2 Correlate the etiology, pathophysiology, diagnosis, and clinical presentation of diseases to their pharmacotherapeutic approaches.	3.1.4.2.a State pathophysiology and the clinicopathological features of various human states. 3.1.4.2.b Relate etiology with the clinical features of the diseases.

Domain 4: Personal practice

Program key elements	Course learning outcomes
4.1.1 Reveal healthcare team performance responsibility and evaluate team members showing time management skills	4.1.1 Organize team work and learn time management skills.
4.1.2 Analyze data, solve problems, and work efficiently in a team.	4.1.2 Retrieve data and learn problem solving.
4.1.3 Create entrepreneurial skills within activated entrepreneurial system.	4.1.3 Demonstrate creativity in assigned activities and apply entrepreneurial skills.
4.2.1 Communicate orally and in-writing with healthcare team, patients, and communities.	4.2.1 Demonstrate effective verbal skills and practice non-verbal communication abilities.
4.2.2 Utilize modern technologies & media to acquire good presentation skills.	4.2.2 Demonstrate effective presentation skills using recent technological methods.
4.3.1 Apply professional self-assessment to enhance personal competencies.	4.3.1 Perform self-assessment and self-evaluation to enhance professional and personal capacities.
4.3.2 Practice independent learning needed for continuous professional development.	4.3.2 Practice independent learning needed for continuous professional development.

Course Contents

Week	Lectures		Practical	
	Topic	Credit hrs. (2)	Topics	Credit hrs. (1)
1	Glycolysis	2	Introduction to blood	2
2	Citric acid cycle	2	Determination of hemoglobin	2
3	HMP shunt Electron transport chain	2	Investigation of renal function and serum creatinine	2
4	Glycogen metabolism	2	Determination of serum urea	2
5	Protein metabolism	2	Determination of serum uric acid	2
6	Midterm			
7	Urea cycle & Biosynthesis of nonessential amino acids (protein metabolism)	2	Determination of serum glucose	2
8	Synthesis of specialized products	2	Determination of plasma proteins	2
9	Fatty acid synthesis	2	Determination of serum phosphorus	2
10	Beta oxidation of fatty acids	2		
11	cholesterol metabolism	2	Practical exam	
12			Practical exam	
13	Written exam			
14	Written exam			

4- Teaching and Learning Methods:

- 4.1. Lectures (Recorded videos and face to face lectures)
- 4.2. Practical sessions (Tools: lab glassware, chemical reagents)
- 4.3. Blended learning tools (videos, dry labs, case study, discussions)
- 4.4. All lectures and practical labs will be recorded and posted on Moodle.

5- Assessment

Written Midterm exam	To assess	The ability of students to follow-up the course subjects.
Practical exam and assessment of semester work (class activities)	To assess	The ability of students to apply and practice scientific knowledge
Written final exam	To assess	Knowledge and understanding and intellectual skills.
Oral exam	To assess	Knowledge and understanding and intellectual skills

Assessment Schedule

Assessment 1	Periodic exams	Week 6
Assessment 2	Practical exam	Week 10, 11
Assessment 3	Oral exam	Week 13
Assessment 4	Final written exam	Week 13

Weighting of Assessments

Periodical examination	13.3%
Final-term Examination	50 %
Oral Examination	10%
<u>Practical Examination</u>	<u>26.7%</u>
Total	100%

6-List of References

- Course notes: Lecture notes prepared by the instructor.
- Recommended books:
 - Nalini Chandar, Lippincott Illustrated Reviews: cell and molecular biology (Lippincott Illustrated Reviews Series) Second edition, Philadelphia: Wolters Kluwer 2019, ISBN: 978146348500
 - Denise Ferrier; Lippincott Illustrated Reviews: Biochemistry (Lippincott Illustrated Reviews Series) Seventh, North American Edition ISBN-13: 978-1496344496, ISBN- 10: 1496344499
 - Gerald Carp. 2010. Cell and Molecular Biology Concepts and Experiments, sixth edition, John Wiley and sons Inc.
 - O'Connor, C. M. & Adams, J. U. Essentials of Cell Biology. 2010. Cambridge, MA: NPG Education.
- ThemedicalBiochemistrypage.org

7- Facilities Required for Teaching and Learning

Modern libraries, audio-visual tools, chemicals, cooperative assistants, glassware and instruments

Course Coordinator: Associate. Dr. Marwa omar

Course members:

Date: 8/2021

Head of Biochemistry Department:
Prof. Dr. Nadia Hamdy



Course Plan & Matrices

Course Contents		Program Key Elements	Course learning outcomes	Teaching and Learning Methods	Student Assessment Methods
Week # 1	Glycolysis	1.1.1.4 1.1.2.1 1.1.7.2 2.5.2 2.5.3 3.1.1 3.1.4.1 3.1.4.2 4.1.1 4.1.2 4.2.1 4.2.2. 4.3.1 4.3.2	1.1.1.4.c 1.1.7.2.a 3.1.4.2.a 3.1.4.2.b	Lectures videos, case study, discussions	Written, Oral Practical
	Introduction to blood	1.1.5 1.1.6.1 1.1.6.2 1.1.7.2 2.1.1 2.1.2 2.2.3.1 2.3.1.1. 2.3.2 2.5.2 2.5.3 3.1.4.1. 3.1.4.2 4.1.2 4.1.3 4.2.1 4.2.2. 4.3.1 4.3.2	1.1.7.2.a 1.1.7.2.b		
Week # 2	Citric acid	1.1.1.4 1.1.2.1 1.1.7.2 2.5.2 2.5.3	1.1.1.4.c 1.1.7.2.a 3.1.4.2.a 3.1.4.2.b	Lectures videos, case study, discussions	Written, Oral Practical

	Determination of haemoglobin	3.1.1 3.1.4.1 3.1.4.2 4.1.2 4.2.1 4.2.2. 4.3.1 4.3.2 1.1.5 1.1.6.1 1.1.6.2 1.1.7.2 2.1.1 2.1.2 2.2.3.1 2.3.1.1. 2.3.2 2.5.2 2.5.3 3.1.4.1. 3.1.4.2 4.1.2 4.1.3 4.2.1 4.2.2. 4.3.1 4.3.2	1.1.7.2.a 1.1.7.2.b		
Week # 3	HMP shunt Investigation of renal function and serum creatinine	1.1.1.4 1.1.2.1 1.1.7.2 2.5.2 2.5.3 3.1.1 3.1.4.1 3.1.4.2 4.1.2 4.2.1 4.2.2.	1.1.1.4.a 1.1.7.2.a	Lectures videos, case study, discussions	Written, Oral Practical

		<p>4.3.1 4.3.2</p> <p>1.1.1.4 1.1.5 1.1.6.1 1.1.6.2 1.1.7.2 2.1.1 2.1.2 2.2.3.1 2.3.1.1 2.3.2 2.5.2 2.5.3 3.1.4.1 3.1.4.2 4.1.2 4.1.3 4.2.1 4.2.2. 4.3.1 4.3.2</p>	<p>1.1.1.4.c 1.1.7.2.a 1.1.7.2.b 3.1.4.2.a 3.1.4.2.b</p>		
Week # 4	Glycogen	<p>1.1.1.4 1.1.2.1 1.1.7.2 2.5.2 2.5.3 3.1.1 3.1.4.1 3.1.4.2 4.1.2 4.2.1 4.2.2. 4.3.1 4.3.2</p> <p>1.1.1.4</p>	<p>1.1.1.4.a 1.1.7.2.a</p> <p>1.1.1.4.c</p>	<p>Lectures videos, case study, discussions Assignments,</p>	<p>Written, Oral Practical (including activities)</p>

	Determination of serum urea	1.1.5 1.1.6.1 1.1.6.2 1.1.7.2 2.1.1 2.1.2 2.2.3.1 2.3.1.1 2.3.2 2.5.2 2.5.3 3.1.4.1 3.1.4.2 4.1.2 4.1.3 4.2.1 4.2.2. 4.3.1 4.3.2	1.1.7.2.a 1.1.7.2.b 3.1.4.2.a 3.1.4.2.b		
Week # 5	Protein metabolism Determination of serum uric acid	1.1.1.4 1.1.2.1 1.1.7.2 2.5.2 2.5.3 3.1.1 3.1.4.1 3.1.4.2 4.1.2 4.2.1 4.2.2. 4.3.1 4.3.2	1.1.1.4.a 1.1.7.2.a 1.1.7.2.a 1.1.7.2.b 3.1.4.2.a 3.1.4.2.b	Lectures videos, case study, discussions	Written, Oral Practical

		2.1.1 2.1.2 2.2.3.1 2.3.1.1 2.3.2 2.5.2 2.5.3 3.1.4.1 3.1.4.2 4.1.2 4.1.3 4.2.1 4.2.2. 4.3.1 4.3.2			
Week # 6					
Week # 7	Urea cycle Determination of serum glucose	1.1.1.4 1.1.2.1 1.1.7.2 2.5.2 2.5.3 3.1.1 3.1.4.1 3.1.4.2 4.1.2 4.2.1 4.2.2. 4.3.1 4.3.2 1.1.1.4 1.1.5 1.1.6.1 1.1.6.2 1.1.7.2 2.1.1 2.1.2	1.1.1.4.a 1.1.7.2.a 1.1.1.4.a 1.1.7.2.a 1.1.7.2.b 3.1.4.2.a 3.1.4.2.b	Lectures videos, case study, discussions	Written, Oral Practical

		2.2.3.1 2.3.1.1 2.3.2 2.5.2 2.5.3 3.1.4.1 3.1.4.2 4.1.2 4.1.3 4.2.1 4.2.2. 4.3.1 4.3.2			
Week # 8	Fatty acid synthesis Determination of plasma proteins	1.1.1.4 1.1.2.1 1.1.7.2 2.5.2 2.5.3 3.1.1 3.1.4.1 3.1.4.2 4.1.2 4.2.1 4.2.2. 4.3.1 4.3.2 1.1.1.4 1.1.5 1.1.6.1 1.1.6.2 1.1.7.2 2.1.1 2.1.2 2.2.3.1 2.3.1.1. 2.3.2 2.5.2	1.1.1.4.b 1.1.7.2.a 1.1.1.4.c 1.1.7.2.a 1.1.7.2.b	Lectures videos, case study, discussions Assignments,	Written Oral and practical

		2.5.3 3.1.4.1. 3.1.4.2 4.1.2 4.1.3 4.2.1 4.2.2. 4.3.1 4.3.2			
Week # 9	Beta oxidation of fatty acids and cholesterol metabolism Determination of serum phosphorus	1.1.1.4 1.1.2.1 1.1.7.2 2.5.2 2.5.3 3.1.1 3.1.4.1 3.1.4.2 4.1.2 4.2.1 4.2.2. 4.3.1 4.3.2 1.1.5 1.1.6.1 1.1.6.2 1.1.7.2 2.1.1 2.1.2 2.2.3.1 2.3.1.1. 2.3.2 2.5.2 2.5.3 3.1.4.1. 3.1.4.2 4.1.2 4.1.3	1.1.1.4.b 1.1.7.2.a 1.1.7.2.b	Lectures videos, case study, discussions	Written, Practical Oral

		4.2.1 4.2.2. 4.3.1 4.3.2			
Week # 10	Cholesterol metabolism	1.1.1.4 1.1.2.1 1.1.7.2 2.5.2 2.5.3 3.1.1 3.1.4.1 3.1.4.2 4.1.2 4.2.1 4.2.2. 4.3.1 4.3.2	1.1.1.4.a 1.1.1.4.b 1.1.1.4.c 1.1.7.2.a	Lectures	Written Oral

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