Philadelphia University	PHILADELPHIA UNIVERSITY THE WAY TO THE FUTURE	**Approval date:**
Faculty: Pharmacy		**Issue: Summer**
Department: Pharmacy		**Credit hours: 3**
Academic year	**Course Syllabus**	**Bachelor**

Course information

Course#	Course title	Co /Pre-requisite
0510220	**Pharmaceutical Biochemistry**	***0510210***

Course type	Class time	Room #
☐ University Requirement ☒ Faculty Requirement ☒ Major Requirement ☐ Elective ☐ Compulsory	**9:45-11:15 M, W**	**508** **414**

Instructor Information

Name	Office No.	Phone No.	Office Hours	E-mail
Dr. Mohammad Shomali	**5th Floor**	**2318**	**11:15-12:45**	***mshomali@philadelphia.edu.jo***

Course Delivery Method

Course Delivery Method			
☒ **Physical**	☐ **Online**	☐ **Blended**	
Learning Model			
Precentage	**Synchronous**	**Asynchronous**	**Physical**

Course Description

This course provides an overview of the biomolecules structure and characteristics, such as carbohydrates, lipids, amino acids, proteins, enzymes and nucleic acids. The course is contextualized based on these biomolecules and their biological functions, in addition to their relationship with the biochemical reactions that occur in the cells to produce and store energy (bioenergetics).

يغطي هذا المساق لمحة عامة عن تركيب وخصائص الجزيئات الحيوية، مثل الكربوهيدرات، والدهون، والأحماض الأمينية والبروتينات والإنزيمات والأحماض النووية. يتم وضع السياق على أساس هذه الجزيئات الحيوية ووظائفها البيولوجية، بالإضافة إلى علاقتها مع التفاعلات الكيميائية الحيوية التي تحدث في الخلايا لإنتاج وتخزين الطاقة (الطاقة الحيوي)

Course Learning Outcomes

Number	Outcomes	Corresponding Program outcomes	Competencies
	Knowledge		
K1	Understand the basis of cellular structure, the behavior of biological macromolecules and explain the relationship between bio-molecule structure and biological function	**Kp1**	**C1**
K2	Explain the structures of amino acids, their chemical properties and their organization into polypeptides and proteins to give the protein structure	**Kp3**	**C3**
K3	Apply the knowledge from amino acids to explain the building of protein structure and how the protein gains its function (enzymes and kinetics as well as the inhibitory effects of some chemicals) to understand the pathomechanisms of some diseases and their treatments strategies. Understand the organization of human cells and the structure and function of different cellular components, such as carbohydrate and lipids.	**Kp1**	**C1**
K4	Understanding of bioenergetics (energy metabolism inside the body) and explain of some metabolic disorders.	**Kp1, Kp3**	**C1, C3**
K5	Introductory to DNA and RNA in cells and their role in cell growth, replication and control.	**Kp1, Kp3**	**C1, C3**
	Skills		
S1	Thinking and analysis skills will be developed through problem solving.	**Sp2**	**C8**
S2	Communication skills, overall discussion of some issues	**Sp3**	**C9**
S3	By the end of the program successful students who have attended regularly and completed required work will recognize the applicability of biochemistry to the careers to which they will be progressing	**Sp2**	**C8**
	Competencies		

Learning Resources

Course textbook	Lippincott Illustrated Reviews: Biochemistry (Lippincott Illustrated Reviews Series) 7th edition by Denise Ferrier (Author), Lippincott Williams and Wilkins, Jan 2017, ISBN-13: 978-1496363541
Supporting References	Lehninger Principles of Biochemistry, Fourth Edition by David L. Nelson, Michael M. Cox Publisher: W. H. Freeman; 4th edition 2005 ISBN: 0716743396
Supporting websites	https://libguides.colostate.edu/c.php?g=64892&p=418199
Teaching Environment	☒**Classroom** ☐ **laboratory** ☐**Learning platform** ☐**Other**

Meetings and subjects timetable

Week	Topic	Learning Methods	Tasks	Learning Material
1 24/10/2022	Course Introduction, water	Lecture/video		Text book
26/10/2022	Amino acids and peptides	Lecture		Text book
2 31/10/2022	Protein Structure and Properties	Lecture/video discuss a protein structure	Relation between structure and function	Text book Selected teaching material
02/11/2022	Protein Folding and Misfolding Diseases	Lecture, discussion of disease and protein fuction	Quiz	Text book Selected teaching material
3 07/11/2022	Globular Proteins	Lecture	Mid exam	Text book
09/11/2022	Fibrous Protein	Lecture	Assignments (report, one page) Mid exam	Text book Selected teaching material
4 14/11/2022	Enzymes	Lecture/video	Mid exam	Text book
16/11/2022	enzyme kinetics	Lecture and video	Group discussion Mid- exam	Text book Selected website
5 21/11/2022	Enzyme Inhibition and Inactivation	Lecture and video	Mid exam Discussion the toxins	Text book
23/11/2022	Reversible & Irreversible Enzyme Inhibitors. Regulation of Enzymes	Lecture, problem solving based learning (poisoning)	Mid exam Treatment of poisoning induvial	Text book Selected website
6 28/11/2022	Introduction to bioenergetics	Lecture	Final exam	Text book
30/11/2022	Glycolysis and gluconeogenesis	Lecture and video discussion	Quiz Final exam	Text book Selected teaching material

7 05/12/2022	Tricarboxylic acid cycle and pyruvate dehydrogenase complex	Lecture	Final exam	Text book
07/12/2022	Electron transport chain and oxidative phosphorylation	Lecture Video	Final exam	Text book Selected t
8 12/12/2022	Monosaccharides and disaccharides metabolism	Lecture	Final exam Video discussion	Text book
14/12/2022	Pentose phosphate pathway and NADPH	Lecture, video discussion	Quiz Final exam	Text book, selected teaching material
9 19/12/2022	Dietary lipid metabolism	Lecture	Final Assignment	Text book Selected teaching material
21/12/2022	Fatty acids and triacylglycerol and ketone body metabolism	Lecture	Final exam	Text book Selected teaching material
10 26/12/2022	Phospholipid and glycosphingolipid	Lecture	Final exam	Text book
28/12/2022	Eicosanoid metabolism	Lecture	Final	Selected websites Text book
11 31/12/2022	Cholesterol metabolism 1	Lecture	Final	All previous topics
02/01/2023	Cholesterol metabolism 2	Lecture	Final	Selected websites Text book
12 04/1/2023	Nitrogen disposal	Lecture	Final	Selected websites Text book
09/1/2023	urea cycle	Video/lecture discussion	Final	Text book, selected websites
13 11/1/2022	General Introduction to DNA	Lecture	Quiz, Final exam	Text book
16/1/2023	General Introduction to DNA	Lecture	Final exam	Selected websites Text book
14 18/1/2023	General Introduction to RNA	Lecture	Final exam	Text book Selected websites
23/1/2023	General Introduction to RNA	Lecture	Final exam	Text book Selected websites
15 25/1/2023	Protein biosynthesis	Video	Final exam	Text book Selected websites
30/1/2023	Protein biosynthasis	Video	Final exam	Text book Selected websites

* includes: Lecture, flipped Class, project- based learning, problem solving based learning, collaborative learning

Course Contributing to Learner Skill Development

Using Technology
Use biochemistry data-bases and platforms effectively.
Communication skills
Self-confidence during discussion scientific problems
Application of concepts learnt
Intuitive life-long learning skills

Assessment Methods and Grade Distribution

Assessment Methods	Grade Weight	Assessment Time (Week No.)	Link to Course Outcomes
Mid Term Exam	% 30	8th week	K1, K2,K3
Various Assessments *	% 30	Overall course duration	S1,S2, S3,C1,C3, C8, C9
Final Exam	% 40	16th week	K1,K2,K3, K4, K5,
Total	**%100**		

* includes: quiz, in class and out of class assignment, presentations , reports, videotaped assignment, group or individual projects.

Alignment of Course Outcomes with Learning and Assessment Methods

Number	Learning Outcomes	Learning Method*	Assessment Method**
Knowledge			
K1	Understand the basis of cellular structure, the behavior of biological macromolecules and explain the relationship between bio-molecule structure and biological function	Lecture, and Videos	**Exam and evaluation sheet**
K2	Explain the structures of amino acids, their chemical properties and their organization into polypeptides and proteins to give the protein structure	Lecture, discussion , video presentation	**Exam Homework discussion**
K3	Apply the knowledge from amino acids to explain the building of protein structure and how the protein gains its function (enzymes and kinetics as well as the inhibitory effects of some chemicals) to understand the pathomechanisms of some diseases and their treatments strategies. Understand the organization of human cells and	Lecture, , video presentation	**Exam, discussion**

	the structure and function of different cellular components, such as carbohydrate and lipids.		
K4	Understanding of bioenergetics (energy metabolism inside the body) and explain of some metabolic disorders.	Lecture, video	**Exam,**
K5	Introductory to DNA and RNA in cells and their role in cell growth, replication and control.	Lecture, video	**Exam, discussion**
Skills			
S1	Thinking and analysis skills will be developed thro problem solving.	Lecture, , video presentation collaborative learning	**Exam and assignments**
S2	Communication skills, overall discussion of some issues	collaborative learning lecture	**Homework, quiz**
S3	By the end of the program successful students who have attended regularly and completed required work will recognize the applicability of biochemistry to the careers to which they will be progressing	collaborative learning discussion lecture	**Quiz**
Competencies			

* includes: Lecture, flipped Class, project- based learning , problem solving based learning, collaborative learning

** includes: quiz, in class and out of class assignment , presentations , reports, videotaped assignment, group or individual projects.

Course Polices

Policy	Policy Requirements
Passing Grade	The minimum passing grade for the course is (50%) and the minimum final mark recorded on transcript is (35%).
Missing Exams	• Missing an exam without a valid excuse will result in a zero grade to be assigned to the exam or assessment. • A Student who misses an exam or scheduled assessment, for a legitimate reason, must submit an official written excuse within a week from the an exam or assessment due date. • A student who has an excuse for missing a final exam should submit the excuse to the dean within three days of the missed exam date.
Attendance	The student is not allowed to be absent more than (15%) of the total hours prescribed for the course, which equates to six lectures days (M, W) and seven lectures (S,T,R). If the student misses more than (15%) of the total hours prescribed for the course without a satisfactory excuse accepted by the dean of the faculty, s/he will be prohibited from taking the final exam and the grade in that course is considered (zero), but if the absence is due to illness or a compulsive excuse accepted by the dean of the college, then withdrawal grade will be recorded.
Academic Honesty	Philadelphia University pays special attention to the issue of academic integrity, and the penalties stipulated in the university's instructions are applied to those who are proven to have committed an act that violates

	academic integrity, such as: cheating, plagiarism (academic theft), collusion, and violating intellectual property rights.

Program Learning Outcomes to be assessed in this Course

Number	Learning Outcome	Course Title	Assessment Method	Target Performance level
Kp1	Develop, integrate, and apply knowledge from the foundational sciences to evaluate the scientific literature, explain drug action, solve therapeutic problems, and advance population health and patient centered care.	Pharmaceutical Biochemistry	Exam, Quizzes,	70% of students have a minimum score 75 of 100

Description of Program Learning Outcome Assessment Method

Number	Detailed Description of Assessment
Kp1	30 question each in the mid and final exam (MCQ and assay)

Assessment Rubric of the Program Learning Outcome

The MCQ (25 questions) will cover the general biochemical understanding. Each question 1 points.
5 assay analysis questions each one point for the measure of the analytical skills of students