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 Biotechnology**	***0510415***

Course type	Class time	Room #
☐ University Requirement ☒ Faculty Requirement ☒ Major Requirement ☐ Elective ☐ Compulsory	**9:45 -11:45, 12:45-14:15 S,T** **12:45-14:15 M, W**	**601** **610**

Instructor Information

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

Course Delivery Method

Course Delivery Method			
☒ **Physical**	☐ **Online**	☐ **Blended**	
Learning Model			
Precentage	**Synchronous**	**Asynchronous**	**Physical**
	0	**0**	**100%**

Course Description

ourse is an introductory to nucleic acid (DNA and RNA) manipulation and how genes are expressed in v
l explain the tools and methods that are used by working with nucleic acid.
course will introduce students also to techniques that are used in the diagnostic of genetic muta
etic diseases).
students will learn the technology used in preparing protein based drugs and other pharmaceu
tances used for treat and diagnose diseases.
dition, they learn how the pharmacodynamics and pharmacokinetics of protein based drugs.

يهدف هدا المساق الى تعريف الطالب ب المادة الوراثية في الخلية. كما ان هدا المساق يعرف الطالب ب كيفية تعبير الجيينات. كما سيتم شرح الطرق و الادوات البحثية التي تستخدم في الكشف عن الامراض الوراثية.
و سوف يتعلم الطالب على الطرق في انتاج الادوية البروتينية وبلاضافة الى دلك سيتعلم الطالب حركية الدواء لمثل تلك

Course Learning Outcomes

Number	Outcomes	Corresponding Program outcomes
Knowledge		
K1	Understand the principle of biotechnology, the meaning of protein based drugs	**Kp1, Kp2, Kp3**
K2	Introduce the methods of protein production and purification, and formulation of biotechnology products	**Kp1**
K3	Application of monoclonal antibodies, nucleic acid and stem cells in the therapy	**Kp1, Kp2,Kp3**
K4	Understanding of the meaning of pharmacogenetics and gene therapy	**Kp1, Kp2**
K5	Knowing the ethics in the use of biotechnology	**Kp4**
Skills		
S1	Students will have a basic understanding of the biotechnological scientific method	**Sp2, Sp3, Sp1**
S2	Students will have the opportunity to practice thinking critically and analytically and reason logically using current information and past experiences.	**Sp2**
S3	Students will have practice in assessing basic sources of information and how to evaluate and use this information.	**Sp5, Sp8**
S4	Knowing the methods used in biotech production and the impact of the protein based drug on the cell	**Sp2**
Competencies		

Learning Resources

Course textbook	**Pharmaceutical Biotechnology, third edition. Crommelin J.A., Sindelar, RD and Meibohn, B, Informa Healthcare USA New York, 2008**
Supporting References	Lehninger Principles of Biochemistry, Fourth Edition by David L. Nelson, Michael M. Cox Publisher: W. H. Freeman; 4th edition 2005 ISBN: 0716743396 Pharmaceutical Biotechnology by Groves, 2006 Taylor and Francis Pharmaceutical Biotechnology Drug Discovery and Clinical Application, 2004, Kayser and Mueller
Supporting websites	www.pubmed.org https://pixabay.com/videos/search/biotechnology/

Teaching Environment	☒**Classroom** ☐ **laboratory** ☐**Learning platform** ☐**Other**

Meetings and subjects timetable

Week	Topic	Learning Methods	Tasks	Learning Material
1 17/10/2021	Introduction 1	Lecture/video		Text book
21/10/2021	Introduction II	Lecture	Video	Text book
2 24/10/2021	DNA Replication	Lecture/video discuss a protein structure	Relation between structure and function	Text book Selected teaching material
28/10/2021	DNA transcription	Lecture, discussion of disease and protein function	Quiz	Text book Selected teaching material
3 31/10/2021	RNA translation	Lecture	Mid exam	Text book
4/11/2021	RNA transcription	Lecture	Assignments (report, one page) Mid exam	Text book Selected teaching material
4 7/11/2021	Protein	Lecture/video	Mid exam	Text book
11/11/2021	Protein production	Lecture and video	Group discussion Mid- exam	Text book Selected website
5 14/11/2021	Proteomics	Lecture and video	Mid exam Discussion the toxins	Text book
18/11/2021	Proteomics	Lecture, problem solving based learning (poisoning)	Mid exam Treatment of poisoning induvial	Text book Selected website

6 21/11/2021	Formulation of biotech products	Lecture	Final exam	Text book
25/11/2021	Formulation of biotech products	Lecture and video discussion	Quiz Final exam	Text book Selected teaching material
7 28/11/2021	Interleukins	Lecture	Final exam	Text book
2/12/2021	Interferons	Lecture Video	Final exam	Text book Selected t
8 5/12/2021	Immunogenicity of biotech products	Lecture	Final exam Video discussion	Text book
9/12/2021	Immunogenicity of biotech products	Lecture, video discussion	Quiz Final exam	Text book, selected teaching material
9 12/12/2021	Pharmacokinetics and Pharmacodynamics of Peptide and Protein based Drugs	Lecture	Final Assignment	Text book Selected teaching material
16/12/2021	Pharmacokinetics and Pharmacodynamics of Peptide and Protein based Drugs	Lecture	Final exam Video	Text book Selected teaching material
10 19/12/2021	Monoclonal Antibodies and Therapy	Lecture	Final exam	Text book
23/12/2021	Eicosanoid metabolism	Lecture	Final exam	Selected websites Text book
11 26/12/2021	Immunization and Vaccines	Lecture	Final exam	All previous topics
30/12/2021	Immunization and Vaccines	Lecture	Final exam	Selected websites Text book
12 2/1/2022	Nucleic Acids and Gene Therapy	Lecture	Final exam	Selected websites Text book
6/1/2022	Nucleic Acids and Gene Therapy	Video/lecture discussion	Final exam	Text book, selected websites
13 9/1/2022	Medical Biotechnology	Lecture	Quiz, Final exam	Text book
13/1/2022	Medical Biotechnology	Lecture	Final exam	Selected websites Text book
14 16/1/2022	Pharmacogenetics	Lecture	Final exam	Text book Selected websites
20/1/2022	Pharmacogenetics	Lecture	Final exam	Text book Selected websites
15 23/1/2022	Microbial and Animal Biotechnology	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 biotechnolgy 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,C2
Final Exam	% 40	16th week	K1,K2,K3, K4, K5, S1, S2, S3, S4
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 principle of biotechnology, the meaning of protein based drugs	Lecture, and Videos	**Exam and evaluation sheet**
K2	Introduce the methods of protein production and purification, and formulation of biotechnology products	Lecture, discussion , video presentation	**Exam Homework discussion**
K3	Application of monoclonal antibodies, nucleic acid and stem cells in the therapy	Lecture, , video	**Exam, discussion**
K4	Understanding of the meaning of pharmacogenetics and gene therapy	Lecture, video	**Exam,**
K5	Knowing the ethics in the use of biotechnology	Lecture, video	**Exam, discussion**
Skills			
S1	Students will have a basic understanding of the biotechnological scientific method Students will have a basic understanding of the biotechnological scientific method	Lecture, , video presentation collaborative learning	**Exam and assignments**
S2	Students will have the opportunity to practice	collaborative	**Homework,**

	thinking critically and analytically and reason logically using current information and past experiences.	learning lecture	**quiz**
S3	Students will have practice in assessing basic sources of information and how to evaluate and use this information.	collaborative learning discussion lecture	**Quiz**
Competencies			
C1	Apply effective scientific communication and other skills to be able for working in scientific research field.	lecture	**In class assignment Exam**
C2	Participate in building of the problem solving skills	Lecture	**Exam**

* 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
Kp6	To be familiar with protein based drugs and their usages.	Pharmaceutical Biotechnology	Objective and Exams	More than 70 % od students has more than 75 of 100

Description of Program Learning Outcome Assessment Method

Number	Detailed Description of Assessment
Kp6	Final exam, MCQ or assay questions

Assessment Rubric of the Program Learning Outcome

10 MCQ will be given 1 point per question, or 4 assay question each 2.5 points
General understanding the biotech-products 2.5 points
Specific problems with producing of biotech products 2 points
Application of biotech-products in treatment 2. points
Quality control 2.5 points