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| Philadelphia University |  PHILADELPHIA UNIVERSITY THE WAY TO THE FUTURE | Approval date: |
| Faculty: Pharmacy | | Issue: <u>Summer</u> |
| Department: Pharmacy | | Credit hours: 3 |
| Academic year 22/23 | | Course Syllabus |

Course information

| Course# | Course title | Co /Pre-requisite |
|---|------------------------------|-------------------|
| 0510220 | Pharmaceutical Biotechnology | 0510513 |
| Course type | | Class time |
| <input type="checkbox"/> University Requirement <input checked="" type="checkbox"/> Faculty Requirement <input checked="" type="checkbox"/> Major Requirement <input type="checkbox"/> Elective <input type="checkbox"/> Compulsory | | Room # |

Instructor Information

| Name | Office No. | Phone No. | Office Hours | E-mail |
|------|------------|-----------|--------------|--------|
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Course Delivery Method

| Course Delivery Method | | | |
|--|---------------------------------|----------------------------------|----------|
| <input checked="" type="checkbox"/> Physical | <input type="checkbox"/> Online | <input type="checkbox"/> Blended | |
| Learning Model | | | |
| Percentage | Synchronous | Asynchronous | Physical |
| | 0 | 0 | 100% |

Course Description

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| <p>course 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 mutation (ge ses). tudents will learn the technology used in preparing protein based drugs and other pharmaceutical substa for treat and diagnose diseases. dition, they learn how the pharmacodynamics and pharmacokinetics of protein based drugs. يهدف هذا المساق الى تعريف الطالب ب المادة الوراثية في الخلية. كما ان هذا المساق يعرف الطالب ب كيفية تعبير الجينات. 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 ذلك سيتعلم الطالب حركية الدواء لمثل تلك</p> |
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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 | | |
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Learning Resources

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| Course textbook | Pharmaceutical Biotechnology, third edition. Crommelin J.A., Sindelar, RD and Meibohn, B, Informa Healthcare USA New York, 2008 |
| Supporting References | <p>Lehninger Principles of Biochemistry, Fourth Edition by David L. Nelson, Michael M. Cox Publisher: W. H. Freeman; 4th edition 2005 ISBN: 0716743396</p> <p>Pharmaceutical Biotechnology by Groves, 2006 Taylor and Francis</p> <p>Pharmaceutical Biotechnology Drug Discovery and Clinical Application, 2004, Kayser and Mueller</p> |
| Supporting websites | <p>www.pubmed.org</p> <p>https://pixabay.com/videos/search/biotechnology/</p> |
| Teaching Environment | <input checked="" type="checkbox"/> Classroom <input type="checkbox"/> laboratory <input type="checkbox"/> Learning platform <input type="checkbox"/> Other |

Meetings and subjects timetable

| Week | Topic | Learning Methods | Tasks | Learning Material |
|----------------------------------|---------------------------------|---|---|---|
| 1 23-24/10/2022 | Introduction I | Lecture/video | | Text book |
| 25-26/10/2022 | Introduction II | Lecture | Video | Text book |
| 2 30-31/10/2022 | DNA Replication | Lecture/video discuss a protein structure | Relation between structure and function | Text book Selected teaching material |
| 01-02/11/2022 | DNA transcription | Lecture, discussion of disease and protein function | Quiz | Text book Selected teaching material |
| 3 06-07/11/2022 | RNA translation | Lecture | Mid exam | Text book |
| 08-09/11/2022 | RNA transcription | Lecture | Assignments (report, one page) Mid exam | Text book Selected teaching material |
| 4 13-14/11/2022 | Protein | Lecture/video | Mid exam | Text book |
| 15-16/11/2022 | Protein production | Lecture and video | Group discussion Mid- exam | Text book Selected website |
| 5 20-21/11/2022 | Proteomics | Lecture and video | Mid exam Discussion the toxins | Text book |
| 22-23/11/2022 | Proteomics | Lecture, problem solving based learning (poisoning) | Mid exam Treatment of poisoning indivial | Text book Selected website |
| 6 27-28/11/2022 | Formulation of biotech products | Lecture | Final exam | Text book |

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| 29-30/11/2022 | Formulation of biotech products | Lecture and video discussion | Quiz Final exam | Text book Selected teaching material |
| 7 04-05/12/2022 | Interleukins | Lecture | Final exam | Text book |
| 06-07/12/2022 | Interferons | Lecture Video | Final exam | Text book Selected t |
| 8 11-12/12/2022 | Immunogenicity of biotech products | Lecture | Final exam Video discussion | Text book |
| 13-14/12/2022 | Immunogenicity of biotech products | Lecture, video discussion | Quiz Final exam | Text book, selected teaching material |
| 9 18-19/12/2022 | Pharmacokinetics and Pharmacodynamics of Peptide and Protein based Drugs | Lecture | Final Assignment | Text book Selected teaching material |
| 20-21/12/2022 | Pharmacokinetics and Pharmacodynamics of Peptide and Protein based Drugs | Lecture | Final exam Video | Text book Selected teaching material |
| 10 25-26/12/2021 | Monoclonal Antibodies and Therapy | Lecture | Final exam | Text book |
| 27-28/12/2022 | Eicosanoid metabolism | Lecture | Final exam | Selected websites Text book |
| 11 02/1/2023 | Immunization and Vaccines | Lecture | Final exam | All previous topics |
| 03-04/1/2023 | Immunization and Vaccines | Lecture | Final exam | Selected websites Text book |
| 12 08-09/1/2023 | Nucleic Acids and Gene Therapy | Lecture | Final exam | Selected websites Text book |
| 10-11/1/2023 | Nucleic Acids and Gene Therapy | Video/lecture discussion | Final exam | Text book, selected websites |
| 13 15-16/1/2023 | Medical Biotechnology | Lecture | Quiz, Final exam | Text book |
| 17-18/1/2023 | Medical Biotechnology | Lecture | Final exam | Selected websites Text book |
| 14 22-23/1/2023 | Pharmacogenetics | Lecture | Final exam | Text book Selected websites |
| 24-25/1/2023 | Pharmacogenetics | Lecture | Final exam | Text book Selected websites |
| 15 29-30/1/2023 | Microbial and Animal Biotechnology | Video | Final exam | Text book Selected websites |
| 31-01/01-02/2022 | Revision | Discussion | All the material | |

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

Course Contributing to Learner Skill Development

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| Using Technology |
| Use biotechnology 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 | 8 th week | K1, K2,K3 |
| Various Assessments * | % 30 | Overall course duration | S1,S2, S3, C1,C2 |
| Final Exam | % 40 | 16 th 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 thinking critically and analytically and reason | collaborative learning lecture | Homework, quiz |

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| | logically using current information and past experiences. | | |
| 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 | <ul style="list-style-type: none"> • 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 % of students has more than 75 of 100 |
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Description of Program Learning Outcome Assessment Method

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