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| Philadelphia University |  PHILADELPHIA UNIVERSITY THE WAY TO THE FUTURE | Approved Date: 20/10/2021 |
| Faculty: pharmacy | | Issue: 1 |
| Department:- | | Credit Hours:3 |
| Academic Year:2021/2022 | | Course Syllabus |

Course Information

| Course No. | Course Title | Prerequisite | |
|--|--------------------------------------|--|----------|
| 0510310 | Pharmaceutical Medicinal Chemistry 3 | Pharmaceutical Organic Chemistry-2 (0510210) | |
| Course Type | | Class Time | Room No. |
| <input type="checkbox"/> University Requirement <input checked="" type="checkbox"/> Faculty Requirement <input checked="" type="checkbox"/> Major Requirement <input type="checkbox"/> Elective Compulsory | | | |

Course Delivery Method

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

Course Description

The first part of the subject deals with drugs used in cancer with main emphasis on alkylating agents, platinum-based drugs, antimetabolites, antibiotics, mitotic inhibitors and combination therapy. The second part of the course will concentrate on studying anti-diabetic agents, hormones and cardiovascular drugs that are specially used in the treatment of hypertension such as ACE inhibitors, calcium channel blockers. The last part will study the design and development of diuretics, non-steroidal anti-inflammatory drugs (NSAIDs) and proton pump inhibitors (PPIs). In all the above-mentioned groups, chemical structure will be extensively studied an attempt to build a suitable SAR and try to modify structures to improve activity and minimize toxicity.

Course Learning Outcome

| Number | Outcome | Corresponding Program Outcomes | Corresponding Competencies |
|------------------|---|--------------------------------|----------------------------|
| Knowledge | | | |
| K1 | Acquire basic knowledge about the pharmacological aspect for cancer, hypertension, diabetes, inflammation and ulcer | K _p 1 | C1 |
| K2 | Outline the basic concepts for drug design and development for anticancer, cardiovascular agents, diuretics, NSAID, antidiabetic agents, and drugs used for gastric ulcer | K _p 1 | C1 |
| K3 | To comprehend the prodrug approaches for anticancer drugs and proton pump inhibitors and their value to improve pharmacokinetic and pharmacodynamic properties for corresponding drugs | K _p 1 | C1 |
| K4 | To distinguish between different classes of cardiovascular drugs, diuretics, hormones, NSAID, antidiabetics, their SAR, classes and therapeutic indications and contraindications | K _p 1 | C1 |
| K5 | To give example for the synthesis for commercially available drug, utilizing the basic principles in organic chemistry | K _p 6 | C6 |
| Skills | | | |
| S1 | Figure out the main problem in designing: anticancer, angiotensin converting enzyme inhibitors and PPIs and the main approach used to solve these problems utilizing the complementarity principle (either electronic or steric), | S _p 2 | C8 |
| S2 | Demonstrate effective written and oral communication skills, especially the ability to transmit complex technical information in a clear and concise manner. | S _p 6 | C12 |

Learning Resources

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| Course Textbook | <p>An introduction to Medicinal Chemistry by Graham L. Patrick. fifth edition, Oxford, 2018.</p> <p>Foye's principle of medicinal chemistry by David H. Williams, Thomas L. Leuke, Williams O. Foye. Lippincott William and Wilkins. Seventh edition, 2013</p> |
| Supporting References | Wilson and Gisvolds text book of organic medicinal and pharmaceutical chemistry by John H. Black and John M. Beale, jr. Twelfth edition, Lippincott Williams and Wilkins 2011 |
| Supporting Websites | www.scinecedirect.com , www.youtube.com |
| Teaching Environment | <input checked="" type="checkbox"/> Classroom <input type="checkbox"/> laboratory <input type="checkbox"/> Learning Platform <input type="checkbox"/> Other |

Meetings and Subjects Time Table

| Week | Topic | Learning Method* | Task | Learning Material |
|----------|--|---|------------|---|
| 1 | Introduction to medicinal chemistry-III Anticancer agents An introduction Alkylating agents | Lecture problem solving based learning, | Case study | Vision and Mission of faculty of pharmacy Course syllabus Graham Patrick, chapter 21 |
| 2 | Anticancer agents Alkylating agents | Lecture | | Graham Patrick, chapter 21 |
| 3 | Platinum based drugs Antimetabolites | Lecture | | Graham Patrick, chapter 21 |
| 4 | Antibiotics Plant extracts (mitotic inhibitors and topoisomerase inhibitors) Combination therapy | Lecture | Quiz | Graham Patrick, chapter 21 |
| 5 | Diuretics Carbonic anhydrase inhibitors (CAIs) | Lecture | Case study | Graham Patrick, chapter 21 |
| 6 | Loop diuretics Thiazide and thiazide-like diuretics Potassium-sparing diuretics Osmotic diuretics | Lecture | Quiz | Foys, Chapter 22 |

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|----|---|---------|---------------------|--|
| 7 | Loop diuretics Thiazide and thiazide-like diuretics Potassium-sparing diuretics Osmotic diuretics | Lecture | Midterm Exam | Foys, Chapter 22 |
| 8 | Cardiovascular drug development Antihypertensive agents-An introduction Angiotensin converting enzyme inhibitors (ACE inhibitors) | Lecture | Midterm Exam | Wilson and Gisvold, Chapter 19 |
| 9 | Cardiovascular drug development Antihypertensive agents-An introduction Angiotensin converting enzyme inhibitors (ACE inhibitors) Angiotensin II receptor antagonists | Lecture | Quiz | Wilson and Gisvold, Chapter 18 |
| 10 | Cardiovascular drug development Calcium channel blockers Vasodilator | Lecture | | Wilson and Gisvold, Chapter 19 |
| 11 | Insulin and antidiabetic agents | Lecture | | Wilson and Gisvold, , chapters 19 & 20 |
| 12 | Insulin and antidiabetic agents | Lecture | | Wilson and Gisvold, , chapters 19& 20 |
| 13 | Non-steroidal anti-inflammatory drugs | Lecture | | Wilson and Gisvold, , chapters 24 |
| 14 | Non-steroidal anti-inflammatory drugs | Lecture | Quiz | Wilson and Gisvold, , chapters 24 |
| 15 | Gastric drug development Design and development of proton pump inhibitors (PPIs) | Lecture | | Graham Patrick, chapter 25 |
| 16 | Final Exam | | | |

*Includes: lecture, flipped Class, project-based learning, problem-based learning, collaboration learning.

Course Contributing to Learner Skill Development

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| Using Technology |
| Using Microsoft programs (word, power point), YouTube videos, Google and scientific websites, ChemBiodraw software. |
| Communication Skills |
| Videos and home works discussion |
| Application of Concept Learnt |
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Assessment Methods and Grade Distribution

| Assessment Methods | Grade | Assessment Time (Week No.) | Course Outcomes to be Assessed |
|--------------------|-------------|----------------------------|--------------------------------|
| Mid Term Exam | % 30 | 6 th | K(1, 2, 3, 7) and S (1&2) |
| Term Works* | % 30 | Continuous | |
| Final Exam | % 40 | 16 th | All |
| Total | %100 | | |

* Include: quizzes, in-class and out of class assignment, presentations, reports, Videotaped assignment, group or individual project.

Alignment of Course Outcomes with Learning and Assessment Methods

| Number | Learning Outcomes | Corresponding Competencies | Learning Method* | Assessment Method** |
|------------------|--|----------------------------|------------------|----------------------------------|
| Knowledge | | | | |
| K1 | Acquire basic knowledge about the pharmacological aspect for cancer, hypertension, diabetes, inflammation and ulcer | C1 | Lecture | Quizzes Exam |
| K2 | Outline the basic concepts for drug design and development for anticancer, cardiovascular agents, diuretics, NSAID, antidiabetic agents, and drugs used for gastric ulcer | C1 | Lecture | Quizzes Exam |
| K3 | To comprehend the prodrug approaches for anticancer drugs and proton pump inhibitors and their value to improve pharmacokinetic and pharmacodynamic properties for corresponding drugs | C1 | Lecture | Quizzes Exam |
| K4 | To distinguish between different classes of cardiovascular drugs, NSAID, antidiabetics, their SAR, classes, therapeutic indications and contraindications | C1 | Lecture | Quizzes Exam Group project |
| K5 | To give example for the synthesis for commercially available drug, utilizing the basic principles in organic chemistry | C6 | Lecture | Quizzes Exam |

| Skills | | | | |
|-----------|---|-----|--------------------------------|-----------------|
| S1 | Figure out the main problem in designing: anticancer agents, angiotensin converting enzyme inhibitors and PPI and the main approach used to solve these problems utilizing the complementarity principle (either electronic or steric). | C8 | problem solving based learning | Quizzes Exam |
| S2 | Demonstrate effective written and oral communication skills, especially the ability to transmit complex technical information in a clear and concise manner. | C12 | collaboration learning. | Quizzes Exam |

*Include: lecture, flipped class, project based learning, problem solving based learning, collaboration learning.

** Include: quizzes, in-class and out of class assignments, presentations, reports, videotaped assignments, group or individual projects.

Course Polices

| Policy | Policy Requirements |
|---------------------------|---|
| Passing Grade | The minimum pass for the course is (50%) and the minimum final mark is (35%). |
| Missing Exams | <ul style="list-style-type: none"> • Anyone absent from a declared semester exam without a sick or compulsive excuse accepted by the dean of the college that proposes the course, a zero mark shall be placed on that exam and calculated in his final mark. • Anyone absent from a declared semester exam with a sick or compulsive excuse accepted by the dean of the college that proposes the course must submit proof of his excuse within a week from the date of the excuse's disappearance, and in this case, the subject teacher must hold a compensation exam for the student. • Anyone absent from a final exam with a sick excuse or a compulsive excuse accepted by the dean of the college that proposes the material must submit proof of his excuse within three days from the date of holding that exam. |
| Attendance | The student is not allowed to be absent more than (15%) of the total hours prescribed for the course, which equates to six lecture days (n t) and seven lectures (days). If the student misses more than (15%) of the total hours prescribed for the course without a satisfactory or compulsive excuse accepted by the dean of the faculty, he is prohibited from taking the final exam and his result in that subject is considered (zero), but if the absence is due to illness or a compulsive excuse accepted by the dean of the college that The article is introduced, it is considered withdrawn from that article, and the provisions of withdrawal shall apply to it. |
| Academic Integrity | 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, intellectual property rights. |

Program Learning Outcomes to be assessed in this Course

| Number | Learning Outcome | Course Title | Assessment Method | Targeted Performance level |
|--------|------------------|--------------|-------------------|----------------------------|
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Description of Program learning Outcomes Assessment Method

| Number | Detailed Description of Assessment |
|--------|------------------------------------|
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Assessment Rubric of the Program Learning Outcomes

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