**Course Description**

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| **Faculty** | **Pharmacy** | | | | | | |
| **Department** | Pharmaceutical Chemistry | | | **Level** | | | 7 |
| **Course** | Medicinal Chemistry I | **Code** | 1703323 | **Prerequisite** | | | 1702261 |
| **Credit hours** | 2 | **Theoretical** |  | **Practical** | | |  |
| **Coordinator** |  | **Email** |  | | | | |
| **Teachers** |  | **Emails** |  | | | | |
| **Lecture Time** |  | **Place** |  | | **Attendance mode** | Face to face | |
| **Semester** |  | **Preparation date** |  | | **Modification Date** |  | |

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| **Abstracted Course Description** |
| The medicinal chemistry program is a program that introduces to understand the physicochemical properties of medicinal agents so that the student is able to relate this information to pharmacokinetic and pharmacodynamics properties |
| **Course Goals** |
| 1. Understand the physicochemical properties of medicinal agents, such as chemical bonding, ionization, lipophilicity and stereochemistry, so that the student is able to relate this information to absorption, distribution, receptor interactions and excretion.  2. Be Familiar with the importance and limitations of the partition coefficient as a tool in drug design. Mutah University Detailed Syllabus Form  3. Understand drug-receptor/active-site interactions and the various responses these interactions can induce.  4. Understand the rationale for prodrugs or soft drugs development.  5. Recognize functional groups that should be masked to obtain specific delivery objectives.  6. Recognize structural features that provide an opportunity for inserting metabolically sensitive functional groups.  7. Know the most important pathways of drug metabolism and the enzymes involved, so that the student is able to relate this information to drug action, drug-drug interactions, and to some drug toxicities. The students should be also able to discuss role of these medicinal plants in the treatment of different disease conditions is also studied. |

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| **CILOs** | | | | | |
| **Knowledge** | | | | | |
| A.1 Define medicinal chemistry and what medicinal chemists know.  A.2 Define the major biological targets for drugs and how these drugs achieve their pharmacological effect  A.3 Understand the covalent and non-covalent interactions of the body targets with small molecules such as drugs | | | | | |
| **Skills** | | | | | |
| B.1 To differentiate the various pathways of drug receptor interactions and to reconcile these interactions with theoretical and experimental models.  B.2 To construct logical schemes for sequential movement of electrons in these processes.  B.3 To predict good and poor candidates among several | | | | | |
| **Competencies** | | | | | |
| C.1 Define drugs and their common targets, mechanism of action, pharmacodynamics and how drugs are transported and metabolized  C2 To work effectively both in team as well as separately as done during exams  C3Demonstrate written and oral communication skills via discussion. | | | | | |
| **Learning Methods** | | | | | |
| * Lectures * Oral dissection * Assignment | | | | | |
| **Evaluation Tools** | | | | | |
| **Exams**  **Quiz** | | | | | |
| **Week** | **Topics** | **Learning methods** | **Evaluation tool** | **ILOs** | **Hours** |
| **1.** | Introduction to Medicinal Chemistry | 1&2 | QUIZ | **A** | **1** |
| **2.** | trip through the Body: Absorption: oral, injection, Transdermal. Distribution: blood, membranes, blood-brain barrier, Partition coefficient. Pharmacodynamics. Metabolism and Elimination: kidneys, liver. | 1 |  | **A** | **1** |
| **3.** | Trip through the Body: Absorption: oral,  injection, Transdermal. Distribution: blood,  membranes, blood-brain barrier, Partition  coefficient. Pharmacodynamics. Metabolism  and Elimination: kidneys, liver. | 1 |  | **A** | **1** |
| **4.** | Review of organic functional groups, acidbase, chemical bonding, electron donating and withdrawing groups. | 4 |  | **A** | **1** |
| **5.** | Review of organic functional groups, acidbase, chemical bonding, electron donating and withdrawing groups | 4 |  | **B** | **1** |
| **6.** | Acid-Base Concepts (Henderson-Hasselbach equation; Estimating pKa and pKb). | 4 | Exam | **B** |  |
| **7.** | Drug-Targets interaction - Forces in Drug/Receptor complex interaction | 1 | Exam | **B** | **1** |
| **8.** | Review of Stereochemistry Related to Drug Action:Geometric isomers, optical isomers, conformational isomers, isosterism and bioisosterism | 3&4 | **C** | **1** |
| **9.** | Review of Stereochemistry Related to Drug Action:Geometric isomers, optical isomers, conformational isomers, isosterism and bioisosterism. | 3&4 | Exam | **C** | **1** |
| **10.** | Receptors as Drug Targets - Receptors: Introduction - Receptor Classification: ion channels, Gproteins, Tyr kinase, nuclear - Types of Ligands: agonists, antagonists, inverse agonists - Receptor Theories: occupancy, rate, residence time, induced-fit, macromolecular perturbation, activation-aggregation | 1 | **C** | **1** |
| **11.** | Receptors as Drug Targets - Receptors: Introduction - Receptor Classification: ion channels, Gproteins, Tyr kinase, nuclear Types of Ligands: agonists, antagonists, inverse agonists - Receptor Theories: occupancy, rate, residence time, induced-fit, macromolecular perturbation, activation-aggregation | 1 | homework | **A** | **1** |
| **12.** | Prodrugs and drug Latentiation | 3 | **C** | **1** |
| **13.** | Structure-Activity Relationships | 1 | Exam | **Abc** | **1** |
| **14.** | Health care and pharmacy practice in Jordan  Lead optimization  Drug design: optimizing access to the target | 1 | Exam |  | **1** |
| **15.** | Final exam |  |  |  |  |

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| |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **Plan of Course Evaluation** | | | | | | | | | | | | | **Evaluation Tools** | | **Mark** | **ILOs** | | | | | | | | | | **A1** | **A2** | **A3** | **B1** | **B2** | **B3** | **C1** | **C2** | **C3** | | **First Exam (Mid-term)** | | **30%** | \* | \* |  |  | \* |  |  |  | \* | | **Second Exam (If available)** | |  |  |  |  |  |  |  |  |  |  | | **Final Exam** | | **50%** |  |  |  |  |  | \* | \* | \* |  | | **Activities** | | **20%** |  | | | | | | | | | | **Activities Evaluation** | Homework/Tasks | 10% |  |  |  | \* | \* |  | \* |  |  | | Case Study |  |  |  |  |  |  |  |  |  |  | | Discussion and Interactions |  |  |  |  |  |  |  |  |  |  | | Group Activities |  |  |  |  |  |  |  |  |  |  | | Laboratory Exams |  |  |  |  |  |  |  |  |  |  | | Presentations |  |  |  |  |  |  |  |  |  |  | | Quizzes | 10% |  | \* |  |  | \* | \* |  |  | \* | | Others |  |  |  |  |  |  |  |  |  |  | | **Total** | | 100% |  |  |  |  |  |  |  |  |  |   **Components** | |
| **Book** | 1. An Introduction to Medicinal Chemistry, 5 rd edition; Graham L. Patrick; Oxford University Press Inc., New York, 2005  2. Foye's Principles of Medicinal Chemistry, 5th edition; David A. Williams, WilliamO. Foye, Thomas L. Lemke; Lippincott Williams & Wilkins: Philadelphia, 2002.  3. Wilson and Gisvold's Textbook of Organic Medicinal and Pharmaceutical Chemistry, 11th edition; Delgado & Remers, Eds.; Lippincott Williams & Wilkins: Philadelphia, 2004 ("W&G").  4. Organic Chemistry Paula Yurkanis Bruice, 8th Editio |
| **References** | 1. An Introduction to Medicinal Chemistry, 5 rd edition; Graham L. Patrick; Oxford University Press Inc., New York, 2005  2. Foye's Principles of Medicinal Chemistry, 5th edition; David A. Williams, WilliamO. Foye, Thomas L. Lemke; Lippincott Williams & Wilkins: Philadelphia, 2002.  3. Wilson and Gisvold's Textbook of Organic Medicinal and Pharmaceutical Chemistry, 11th edition; Delgado & Remers, Eds.; Lippincott Williams & Wilkins: Philadelphia, 2004 ("W&G").  4. Organic Chemistry Paula Yurkanis Bruice, 8th Editio |
| **Recommended Readings** |  |
| **Electronic materials** |  |
| **Other websites** |  |

**Subject Coordinator:**

**Head of Curriculum Committee:**

**Department Head:**

**Faculty Dean:**

**Last update date**