**King Saud University**

**College of Pharmacy**

**Medicinal Chemistry-II**

**Course Syllabus**

1. **GENERAL INFORMATION**

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| **Course Number** | |  |
| **Course Title** | | PHC 312 |
| **Credit Hours** | | 2 + 0 |
| **Admission Particulars** | | Pre-requisites: PHC 221  Co-requisites: None |
| **Schedule &**  **Locations:** | | Days and time:  Male campus: Female campus: |
| **Course Director:** | 1. **Faculty Name & credentials**   **Maha Almutairi**  Office Location: B. 8, 2ed floor, room no. 65  Phone: 011 8056161  Email: malmutbiri@ksu.edu.sa  Office hours: Sun 11:00 – 01:00 pm  Thur 11:00 – 01:00 pm |

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| Participating Faculty | |
| 1. Faculty Name & credentials   Fatmah Alomary  Position  Office Location:  Phone:  Email:  Office hours: by appointment | 1. **Faculty Name & credentials**   **Huda Alsalem**  Office Location:  Phone:  Email:  Office hours: by appointment |
| 1. Faculty Name & credentials   Sara Alrashood  Position  Office Location:  Phone:  Email:  Office hours: by appointment |  |

1. **COURSE DESCRIPTION**

The course deals with the medicinal chemistry and the pharmacological aspects of biological action of neurotransmitters and other endogenous substances on the sympathetic and parasympathetic autonomic nervous system as well as drugs affecting their activity. The chemical interactions of these endogenous molecules with their specific receptors or enzymes shall be covered as well as the molecular effects of their respective agonists and antagonists. Details of the mechanisms of action, SAR, stereochemistry and metabolism of these agents shall be presented. The course also deals with cardiovascular agents and diuretics, drugs that act on the CNS such as antipsychotic agents, sedatives, hypnotics, antidepressants and general anesthetics. Antihistaminics, oral hypoglycemic agents, narcotic and non-narcotic analgesics as well as local anesthetics will also be studied.

1. **COURSE OBJECTIVES**

**At the completion of the course series, the student should be:**

1. **Gaining of knowledge that enables the students to name and synthesize various drugs that are used in the treatment of Autonomic nervous system diseases, cardiovascular diseases, Psychiatric and mental disorders, diabetes mellitus, thyroid dysfunction**
2. **Gaining of knowledge regarding the fate of the above drugs in the human body**
3. **Knowledge of the influence of the chemical structure on the above drugs activities**
4. **COURSE ABILITY OUTCOMES**

On the table below are the five NQF Learning Domains, numbered in the left column.

**First**, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table).

**Second**, insert supporting teaching strategies that fit and align with the assessment methods and intended learning outcomes.

**Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy ought to reasonably fit and flow together as an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

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| **Code**  **#** | **NQF Learning Domains**  **And Course Learning Outcomes** | **Course Teaching**  **Strategies** | **Course Assessment**  **Methods** |
| **1.0** | *Knowledge* | | |
| 1.1 | **Memorize brand names of some important over the counter drugs and drugs encountered at home.** | **Lecture**  ** Class discussions, group drug profile, quizzes, Exams and.**  ** Posters dealing with chemicals, their metabolism, degrees of toxicity and first-aid treatment.**  ** Use of internet websites as protein data bank to search for modes of drug binding to the receptors.**  ** Collection of drug pamphlets describing the composition of the pharmaceutical preparation, its uses and the brand name.** | **quizzes.**  **Mid-terms and final exams.**  **Evaluation of drug profiles.** |
| 1.2 | **Outline methods to synthesize some medicinally active drugs and application of some reactions previously studied in the organic chemistry course.** |
| 1.3 | **State pharmacological activity of drugs in terms of their structures and functional groups.** |
| 1.4 | **Describe the relationship between structure, binding to the receptors and activity.** |
| 1.5 | **Recognize about the metabolism of some important drugs.** |  |
| 1.6 | **Describe the synthesis of some medicinal compounds of various pharmacological activities.** |  |
| **2.0** | *Cognitive Skills* | | |
| 2.1 | **Compose answers to show critical thinking (answer instant questions).** | **Quizzes.**  ** Solving problems.**  ** Case industrial studies related to the course topics.**  ** Students are asked to collect data pertaining to one drug from subsidiary books, pamphlets, internet and to write a full drug profile report simulating pamphlets present in pharmaceutical preparations on the market.**  ** They are also trained for making posters for various drugs.** | **Drug profile reports.**  ** Short quizzes.**  ** Class discussion.**  ** Mid-Terms and final exams.** |
| 2.2 | **Evaluate and judge plans adequately** |
| 2.3 | **Solve problems dealing with nomenclature of important drugs, synthesis and metabolism** |
| **3.0** | *Interpersonal Skills & Responsibility* | | |
| 3.1 | **Demonstrate the ability to communicate with instructors and university staff.** | **Evaluation of the reports and seminars** | **Students will be evaluated for different assignments: Assessment of reports, oral questions, drug**  **profile assignment,** |
| 3.2 | **Illustrate chemical information in a professional way.** |
| 3.3 | **Demonstrate the ability to work independently and as a part of a team.** |
| 3.4 | **Demonstrate the ability to manage medical resources and time.** |
| 3.5 | **Use additional textbooks and references to find extra knowledge and material for** |
| **4.0** | *Communication, Information Technology, Numerical* | | |
| 4.1 | **Demonstrate the ability to respond immediately through oral questions.** | **Lectures and oral question current and future topics.**  ** Discussions.**  ** Incorporating the use and utilization of internet websites in the course requirements** | **Exams (Midterms and final), Quizzes, Drug profiles.** |
| 4.2 | **Demonstrate the ability to collect medical information from internet websites, pharmacopeias, drug handbooks and medical pamphlets.** |
| **5.0** | **Psychomotor** | | |
| **Not Applicable** | | | |

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| 5. Map course LOs with the program LOs. (Place course LO #s in the left column and program LO #s across the top.) | | | | | | | | | |
| **Course**  **LOs #** |  | **Program Learning Outcomes**  **(Use Program LO Code #s provided in the Program Specifications)** | | | | | | | |
| **1.2** | | **1.3** | **1.6** | **2.17** | **2.9** | **3.4** | **3.2** | **4.6** |
| **1.3** |  | |  |  |  |  |  |  |  |
| **1.4** |  | |  |  |  |  |  |  |  |
| **1.5** |  | |  |  |  |  |  |  |  |
| **2.1** |  | |  |  |  |  |  |  |  |
| **2.2** |  | |  |  |  |  |  |  |  |
| **3.1** |  | |  |  |  |  |  |  |  |
| **3.2** |  | |  |  |  |  |  |  |  |
| **4.1** |  | |  |  |  |  |  |  |  |

1. **RESOURCES**

* **Wilson and Gisvold’s Textbook of Organic Medicinal and Pharmaceutical Chemistry, J. N. Delgado and W. A. Remers eds., 11th edition, Lippincott-Raven, Philadelphia, (2004).**
* **Lemeke, T. L. and Williams, D. A., Foye’s Principle of Medicinal Chemistry, Lippincott Williams & Wilkins, Philadelphia, PA., 6th Edition, (2013).**
* **Burger's Medicinal Chemistry.**
* **List any other recommended resources, if applicable:**

- **C.C. Wermuth; Academic Press; (2011).**

**- An Introduction to Medicinal Chemistry; G.L. Patrick; Oxford University Press; (2011).**

**- Medicinal Chemistry: An Introduction; G. Thomas; Wiley Interscience; (2011).**

**- Drug Discovery Handbook; S.C.Gad; Wiley Interscience; (2011).**

**- Textbook of Drug Design and Discovery; P. Krogsgaard-Larsen, T. Liljefors and U. Madsen; CRC; (2011).**

**- Human Drug Metabolism: An Introduction; M. Coleman; Wiley Interscience**

1. **COURSE POLICIES**
2. **ACADEMIC DISHONESTY/PLAGIARISM**

* Students are expected to demonstrate professionalism and honesty during this course. Academic dishonesty includes, but is not limited to, cheating, plagiarizing, fabricating of information or citations, facilitating acts of academic dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with the academic work of other students. Students found in violation of such policy are subjected to disciplinary actions as per University Policy.
* Please read the manual of study and tests for undergraduate students and operational rule

(لائحة الدراسة والاختبارات للمرحلة الجامعية والقواعد التنفيذية المعتمدة) <http://dar.ksu.edu.sa/Regulations>

* Please read the manual of students rights and duties (لائحة تأديب الطلاب بجامعة الملك سعود) <http://dar.ksu.edu.sa/Regulationss>

1. **CLASS PARTICIPATION AND PROFESSIONALISM**

* It is expected that all students come to class prepared by completing where applicable all assigned readings, online homework, and other assignments before class and ready to actively participate in classroom activities. Faculty will clarify and expand on the reading material.
* Use of phones is prohibited during class.
* Recording lectures is prohibited

1. **GUIDELINES FOR E-MAIL COMMUNICATION**

* E-mail is often perceived as an informal method of communicating, but some basic rules of style or etiquette are expected. In general, rules of common courtesy for interaction with people should be used for any situation and on the internet it is especially important where, for example, body language and tone of voice must be inferred.

1. **All emails should be sent from your KSU account** **ONLY**
2. Mail should have a **subject heading** which reflects the content of the message.
3. Your message should begin with an appropriate salutation, including the name of the person being addressed, and end with the full name of sender.
4. Use mixed case and proper punctuation.
5. Current e-mail addresses for all students must be maintained in the Blackboard system**.** Each student must edit this in the "Personal Information" section of "Tools". Faculty will not be able to contact you if your email address is not updated and you could miss important information about courses.
6. **Check your e-mail daily.** Most information and communication from instructors will come via e-mail or will be posted on Blackboard under announcements.
7. **Failure to check email/Blackboard may result in you missing important assignments and subsequently affect your grade.**
8. Direct your request to the appropriate person, as indicated below. Please note that discussion board posts are preferred whenever your questions do not involve personal matters to reduce the number of individual emails.

* **Questions concerning lecture content:**
* First, post your question on the **discussion board of Blackboard**. All faculties teaching in this course have access to blackboard and will reply to questions posted. Other students may have the same question that you have or may have the answer. Please allow adequate time for faculty to respond.
* Inquire if the faculty member teaching that lecture has office hours and try to attend.
* If neither of the above steps adequately answers your question, email the faculty member teaching that lecture.
* **General course questions or if you are unsure of where to direct questions**:
* Contact the Course Director if your question involves a personal matter. Post general course related questions on the **discussion board** dedicated to the overall course logistics.
* **DO NOT** send message to "All Instructors".

1. **ATTENDANCE AND EXCUSED ABSENCE**

* Students missing 25% or more on attendance are forbidden from setting in the final exam per University Policy.
* If a student missed a midterm exam for an **ELIGIBLE** reason, Student must submit proper documentation within (2 weeks) of scheduled exam time to the faculty member and the course coordinator.
* Beyond the above mentioned notification period, any excuse can only be approved by the Vice Dean of Academic Affair.
* In the case of a legitimate excused absence, course instructors will make all reasonable attempts to assist the student to satisfy requirements of the course.
* The faculty member has the right to determine the method for make-up exam/activity, which can be any of the following:
  + Increasing the percentage of the remaining exams to cover the missed exam
  + Assigning the final exam a higher percentage to cover the missed exam for that student
  + A make-up exam (the exam will be based on short answer questions)
  + If the final is cumulative, the section relating to the missed examination material can be used as the grade for that missed exam.

1. **EXAMINATION AND GRADING CRITERIA**
2. **EXAMS**

* Brief description for the exams, number of exams, and exam style…(example below)
* Two midterm exams and one comperensive final exam will be administered throughout this module. The final course grade will be calculated based on the total number of points earned on each examination in comparison to the total number of points available.

1. **ASSIGNEMENT & SUBMISSION**

* Late assignments/homework will be penalized by 20% reduction in grade per day.

1. **ACTIVITIES**

* The activities will be discussed and made during the class time to evaluate the students understanding of the general concepts of medicinal chemistry.

1. **GRADE DISTRIBUTION**

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| --- | --- | --- |
| **Activities/ Homework/Assignment/**  **Presentations/ in class attitude** | The purpose is to evaluate the students understanding of the general concepts of medicinal chemistry and the use of the knowledge in the practice | **10%** |
| **Midterm 1** | The purpose of the examination is to evaluate the comprehensive knowledge and understanding of the didactic material presented during the course | **25%** |
| **Midterm 2** | The purpose of the examination is to evaluate the comprehensive knowledge and understanding of the didactic material presented during the course | **25%** |
| **Final Exam** | The purpose of the final examination is to evaluate the student’s comprehensive knowledge and understanding of the academic material presented during the course. | **40%** |
| **Total** |  | **100%** |

1. **APPEAL & CONFLICT RESOLUTION:**

* Any issues related to this course teaching, examinations and grading should be resolved with the course instructor promptly to ensure healthy learning atmosphere.
* Unresolved matter should be directed to the course coordinator. If matter is not yet resolved, please direct your complaint to the department head/Vice Head.
* In the unfortunate events where the dispute is not yet resolved please direct your complaints to the academic office.

1. **CHANGE IN THE COURSE SYLLABUS OR GRADE DISTUBITION:** students will be notified with any changes to the course syllabus or grade distribution.
2. **GRADING SCALE:** grades will be earned based on KSU grading policy. the following scale:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Letter Grade | Score Achieved |  | Letter Grade | Score Achieved |
| A+ | > 95% |  | C+ | 75 - 79.99 % |
| A | 90 - 94.99 % |  | C | 70 - 74.99 % |
| B+ | 85 - 89.99 % |  | D+ | 65 - 69.99 % |
| B | 80 - 84.99 % |  | D | 60- 64.99 % |
|  |  |  | F | < 60% |

1. **COURSE SCHEDULE**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Week** | **Day** | **Date** | **Time** | **Lecture** | **Topic** | **Reading Material**  **(optional)** | **Instructor** |
| **1** |  |  |  | 1 | **Drugs acting on the autonomic nervous system**  Cholinergic agents; Acetylcholine & cholinergic receptors (nicotinic, muscarinic) |  | Dr. Maha |
|  |  |  | 2 | Acetylcholinesterase; Direct and indirect‑acting cholinergic agents |  |
| **2** |  |  |  | 3 | Cholinergic blocking agents; Ganglionic blocking agents |  |
|  |  |  | 4 | Adrenergic agents; Adrenergic receptors (alpha & beta‑receptors); |  |
| **3** |  |  |  | 5 | Direct acting adrenergics (Norepinephrine and related analogs); Indirect acting (Amphetamine, ephedrine etc.) |  |
|  |  |  | 6 | Adrenergic blocking agents; alpha‑Blockers (beta‑ Haloalkylamines, benzodioxanes, imidazolines). |  |
| **4** |  |  |  | 7 | Beta‑Blockers |  |
|  |  |  | 8 | **Cardiovascular agents**  Coronary vasodilators |  | Dr. Fatmah |
| **5** |  |  |  | 9 | Antihypertensive agents (cont.) |  |
|  |  |  | 10 | Antihypertensive agents |  |
| **6** |  |  |  | 11 | **Exam 1 (Lectures 1-8)** |  |
|  |  |  | 12 | Antiarrhythmics |  |
| **7** |  |  |  | 13 | Antihyperlipidemics |  |
|  |  |  | 14 | Anticoagulants |  |
| **8** |  |  |  | 15 | **Diuretics** |  |
|  |  |  | 16 | **Drugs acting on CNS**  **CNS Stimulants**  Analeptics |  | Dr. Huda |
| **9** |  |  |  | **17** | Antidepressants and miscellaneous CNS stimulants |  |
|  |  |  | 18 | **CNS Depressants**  General Anesthetics |  |
| **10** |  |  |  | 19 | Sedatives and Hypnotics |  |
|  |  |  | 20 | Anxiolytics |  |
| **11** |  |  |  | 21 | **Exam 2 (Lectures 9-18)** |  |
|  |  |  | 22 | Antipsychotics |  |
| **12** |  |  |  | 23 | Antiepileptic Drugs |  | Dr. Sara |
|  |  |  | 24 | **Histamine & Antihistaminics** |  |
| **13** |  |  |  | 25 | **Hypoglycemic agents** |  |
|  |  |  | 26 | **Analgesics**  Narcotic Analgesics |  |
| **14** |  |  |  | 27 | Non-Narcotic Analgesics |  |
|  |  |  | 28 | **Local Anesthetics** |  |
| **15** |  |  |  |  | **Final Exam** |  |  |
|  |  |  |  |  |