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| **1** | **Course title** | Pharmaceutical Organic Chemistry 1- Practical |
| **2** | **Course number** | 1211212 |
| **3** | **Credit hours** | 1 Credit hour |
| **Contact hours (theory, practical)** | 3 practical hours/week (1 hour online and 2 hours lab works) |
| **4** | **Prerequisites/corequisites** | 1201215 |
| **5** | **Program title** | BSc in Pharmacy & PharmD for undergraduate |
| **6** | **Program code** |  |
| **7** | **Awarding institution** | The University of Jordan |
| **8** | **School** | Faculty of Pharmacy |
| **9** | **Department** | Department of pharmaceutical sciences |
| **10** | **Level of course** | Undergraduate |
| **11** | **Year of study and semester (s)** | First semester, 2021/2022 |
| **12** | **Final Qualification** |  |
| **13** | **Other department (s) involved in teaching the course** |  |
| **14** | **Language of Instruction** | English |
| **15** | **Teaching methodology** | Blended Online |
| **16** | **Electronic platform(s)** | Moodle Microsoft Teams Skype Zoom  Others………… |
| **17** | **Date of production/revision** | 10/10/2021 |

**18 Course Coordinator:**

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| Name: Ruba Tahsin Tarawneh  Office number:107  Phone number:06 5355000 - *23343*  Email:r.tarawneh@ju.edu.jo |

**19 Other instructors:**

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| Name:Dr. Mutasem Taha  Office number:  Phone number: 06 5355000 - 23305  Email:mutasem@ju.edu.jo  Name:Dr. Khaled Tawaha  Office number:  Phone number: 06 5355000 - 23310  Email:k.tawaha@ju.edu.jo  Name:Dr. Ghadeer Suaifan  Office number:  Phone number: 06 5355000 - 23312  Email:gh.suaifan@ju.edu.jo  Name:Dr. Sana Bardaweel  Office number:  Phone number: 06 5355000 - 23318  Email:s.bardaweel@ju.edu.jo  Name:Dr. Areej AbuHammad  Office number:  Phone number: 06 5355000 - 23301  Email:A.AbuHammad@ju.edu.jo  Name:Dr. Jihad Almalaiti  Office number:  Phone number: 06 5355000 - 23321  Email:j.almlaiti@ju.edu.jo  Name:Dr. Lina Dahabiyeh  Office number:  Phone number: 06 5355000 - 23306  Email:L.Dahabiyeh@ju.edu.jo  Name:Dr. Yahya Tabaza  Office number:  Phone number: 06 5355000 - 23257  Email:y.tabaza@ju.edu.jo |

**20 Course Description:**

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| As stated in the approved study plan.  This course will cover practical applications of various methods and techniques used for the identification of functional groups of organic compounds of pharmaceutical interest, giving more attention toward chemical identification. In addition, synthesis of some organic and pharmaceutical compounds such as aspirin will be commenced. Practical sessions are meant to increase understanding of the physical-chemical properties of functional groups carried within pharmaceutical drugs. Furthermore, the course will expose the students to chemicals, glassware, equipment and instruments used in organic lab. The course does also introduce the students to safety rules and methodologies in handling chemicals and conducting synthesis experiments. |

**21 Course aims and outcomes:**

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| **A- Aims:**   1. This course aims mainly at introducing the students to practical experience related to assays, tests of medicinal substances and their chemical preparations. 2. It aims also to provide means of quality control by applying the various methods and techniques described in the official compendia. 3. The course focuses in its second part on multi-step synthesis of medicinal drugs illustration different principles in synthesis such as steric hindrance and protection groups.   **B- Intended Learning Outcomes (ILOs):**  Student is expected to understand and gain   1. Physical behaviour and chemical identification of functional groups in organic compounds. 2. The importance of functional groups in pharmaceutical behaviour of Drugs.   3- Gain practical experience in drugs synthesis and identification based on these functional groups.  4- Acquire decent knowledge of safety precautions and laboratory rules implemented in Organic Chemistry Laboratory while handling chemicals and glassware.  5- Application of practical experience in identification of any unknown functional group or drugs incorporating these groups; such as Alcohols, Phenols, Ethers, Aldehydes, Ketones, Carboxylic acids and their derivatives, Nitro and Amino compounds.  6- Ability to synthesis some simple organic compounds and drugs such as Aspirin in organic laboratory implementing all techniques gained in this course.  7- Ability to understand and explain theoretical mechanism or behaviour of certain drugs based on simple laboratory tests or reactions.  8- Chemical and physical identification of basic organic functional groups through basic practical named test performed in any organic laboratory.  9- Acquaint practical skills regarding synthesis techniques, and preparation tools, in addition to methods of identification, classification, chemical and physical evaluation.  10- Practicing special techniques related to organic synthesis such as crystallization, melting point determination, distillation and refluxing.  11- Acquaint practical skills regarding to safe chemical handling and disposal.  12- Utilize the concept of functional groups alteration, modification, derivatisation in pharmaceutical drugs as tools for identification, characterization, purification, or even to improving the biological activity of a drug.  13- Work in a team to organize and plan a synthetic experiment and fulfil course library requirements (writing scientific report). This must reflect positively on his future training of how to choose the right tools and approaches to conduct his experiment.  14- Master the rules of laboratory safety protocols and procedures needed for next laboratories.  15- Share, discuss and express ideas while working in group discussion sessions (Group discussion sessions to answer some questions)  16- Gaining some electronic and internet experience while answering some problems through visiting specific web sites related to organic chemistry and answering preparing assignments using internet, and PC.  17- Developing problem solving approach. |

**22. Topic Outline and Schedule:**

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| |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Content** | **Week** | **ILO/s** | **Teaching method** | **Evaluation method** | | **1-Introduction: Laboratory rules and safety precautions** | **1** | **1-5** | **1,2,3,4** | **1,3** | | **2- Functional group identification** |  |  |  |  | | **Part 1: Mono-hydric alcohols** | **2** | **1-10** | **1,2,4** | **1,3** | | **Part 2: Mono-hydric alcohols** | **3** | **1-10** | **1,2,4** | **1,3** | | **Poly-valent alcohols and phenols** | **4** | **1-10** | **1,2,4,5** | **1,2** | | **Aldehydes and Ketones** | **5** | **1-15** | **1,2,4** | **1,3** | | **Carboxylic acids Identification** | **6** | **1-10** | **1,2,4** | **1,3** | | **Carboxylic acids /Individual reactions** | **7** | **1-10** | **1,2,4** | **1,3** | | **Midterm Exam (practical and theoretical exam)** | **8** | **7-17** |  |  | | **3- Solid derivatives of aldehydes and ketones** |  |  |  |  | | **Part1: Benzaldehyde phenylhydrazone** | **9** | **6-17** | **1,2,4** | **1,2** | | **Part 2: Acetone and semicarbazone** | **10** | **6-17** | **1,2,4** | **1,2** | | **Final Exam (practical and theoretical exam)** | **11** |  |  |  | |

* Teaching methods include: Synchronous lecturing/meeting; Asynchronous lecturing/meeting
* Evaluation methods include: Homework, Quiz, Exam, pre-lab quiz…etc

**23 Evaluation Methods:**

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| Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:  Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:   |  |  |  | | --- | --- | --- | | Evaluation | Point % | Date | | Reports | 8 | For every week | | Quizzes | 10 | Predetermined quizzes | | Evaluation based on practical work  **Blended Learning related activities** | 7  5 | Prelab quizzes and assignments | | Midterm Exam | 30 | 28/11-2/12/2021 | | Final Exam | 40 | 19-23/12/2021 | |

**24 Course Requirements (e.g: students should have a computer, internet connection, webcam, account on a specific software/platform…etc):**

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| **students should have a computer, internet connection, account on moodle** |

**25 Course Policies:**

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| A- Attendance policies:  Obligatory  First warning – with 1 absences  Last warning – with 2 absences  Failing in the subject – with 3 absences  B- Absences from exams and handing in assignments on time:  Make up exams only for official excuses.  C- Health and safety procedures:  Should be followed.  Described and discussed with students in the first week.  D- Honesty policy regarding cheating, plagiarism, misbehavior:  The participation , the commitment of cheating will lead to applying all following penalties together   1. Failing the subject he/she cheated at 2. Failing the other subjects taken in the same course 3. Not allowed to register for the next semester. The summer semester is not considered as a semester   E- Grading policy:  See evaluation methods  F- Available university services that support achievement in the course: |

**26 References:**

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| 1. Required book (s), assigned reading and audio-visuals:   1. The systemic identification of organic compounds by Shriner   1. Recommended books, materials, and media:   2. Introduction to Modern Experimental organic Chemistry, By Robert Gilbert  3. Unitized Experiments in Organic Chemistry, 4th ed., by Brewster, VanderWerf and McEwen |

**27 Additional information:**

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| **Instructional Mode**  **This course is taught in a “blended” learning environment, meaning students interact with course content, instructors, and peers via in-person lab time and online learning.**  **Course material and announcements** : students need to use the university website and use e-learning to obtain the material and attend the uploaded videos for demonstrations , report forms and theory required  In addition, course related announcements will be posted on this site, it is the responsibility of the students at the beginning of the semester check in the site on a regular basis to obtain the material required for the specified weeks  **Grievance policy:**  According to the general policies applied at the University of Jordan for grievance when there is a complaint or conflict between a student and an academic/staff member or another student the following procedures must be followed :   1. The student writes a formal complaint describing the situation of conflict to the Dean of the School or the President of the University 2. Dean or President will first try to resolve the controversy by meeting/listening to both parties 3. If agreement was not possible, Dean or President forms an investigation committee which will follow, within a specified timeline, the general policies for relevant circumstances. The following points are considered: 4. The committee will meet/talk to both parties and witnesses ( if applicable) within two weeks of conflict 5. All meetings and discussions are documented according to university policies   Results/recommendations will be sent to the Dean or President who is responsible for their implementation |

Name of Course Coordinator: Ruba Tarawneh Signature: ------------------ Date: 10/10/2021

Head of Curriculum Committee/Department: ---------------------------- Signature: --------------------------

Head of Department: ------------------------------------------------------------ Signature: -----------------------

Head of Curriculum Committee/Faculty: ---------------------------------------- Signature: -------------------

Dean: ---------------------------------------------------------- Signature: -------------------------------------------