**The University of Jordan**

**Accreditation & Quality Assurance Center**

**Pharmacognosy**

**COURSE Syllabus**

2021-2022

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| --- | --- | --- |
| 1 | Course title | Pharmacognosy |
| 2 | Course number | 1201321 |
| 3 | Credit hours (theory, practical) | 2 (theory) |
| Contact hours (theory, practical) | 26 (theory) |
| 4 | Prerequisites/corequisites | General Biology - 2 (0304102), Biochemistry - 1 (1203251) |
| 5 | Program title | BSc & PharmD |
| 6 | Program code |  |
| 7 | Awarding institution  | The University of Jordan |
| 8 | Faculty | Pharmacy |
| 9 | Department | Pharmaceutical Sciences |
| 10 | Level of course  | Undergraduate |
| 11 | Year of study and semester (s) | Summer semester, 3rd year |
| 12 | Final Qualification | BSc & PharmD |
| 13 | Other department (s) involved in teaching the course | NA |
| 14 | Language of Instruction | English |
| 15 | Date of production/revision | 6 Oct 2021 |

16. Course Coordinator:

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| Prof. Khaled tawahaE-mail: tawaha2003@yahoo.com, k.tawaha@ju.edu.jo Office No.: Office hours: To be announced. Students are welcome to contact the instructor via email or to arrange a meeting via MS teams. |

17. Other instructors:

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| Dr. Yahia Tabaza, *BSc, MSc, PhD.*Office: 209Phone: 5355000, ext. 23257E-mail: y.tabaza@ju.edu.joOffice hours: To be announced. Students are welcome to contact the instructor via email or to arrange a meeting via MS teams. |

**18. Course Description:**

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| This course aims at acquainting students with the basic knowledge of pharmacognosy science and medicinal plants used in pharmacy and therapy. The course involves two main topics; the first devoted to subjects deals generally with natural drug products, their classification, production, evaluation and their general chemistry. The second emphasizes upon the products of plant primary metabolism including carbohydrates, lipids, and amino acids and their derivatives. |

19. Course aims and outcomes:

\* Program Competencies Achieved:

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| --- | --- |
| **Category** | **Elements** |
| 1 Dispensing of Medicines(Natural Products)  | 1.1 Recognize pharmacological classes of drugs1.2 Identify available originator brands of medicines and their alternative generic products1.5 Obtain medicines from their legal and reliable sources1.6 Recognize and follow proper storage conditions of medicines1.11 Package medicines properly to ensure their stability, safety and patient accessibility 1.13 Advise patients on proper storage, usage and adherence of dispensed medicines |
| 2. Patient Care(Natural Products) | 2.8 Identify indications, side effects and contraindications of medicines2.9 Identify drug-drug and drug-food interactions of medicines2.18 Identify any medicament-related problems and take appropriate actions to resolve them2.22 Identify the main mechanisms of action of drugs2.23 Recognize the principles of drug safety and efficacy evaluation |
| 3. Pharmaceutical Industry (Natural Products) | 3.1 Identify physiochemical properties of drug substances |
| 4. Pharmaceutical Supply and Marketing(Natural Products) | 4.1 Store pharmaceutical products in proper facilities under suitable storage conditions |

A- Aims:

1. Understanding the definition and material of pharmacognosy science and its applications in therapy and pharmacy.
2. Acquainting knowledge of natural drugs, their classification, production, evaluation as well as their general chemistry.
3. Understanding type, chemistry, use and applications of products of plant primary metabolism including carbohydrates, lipids, amino acids and their derivatives.

B- Course Intended Learning Outcomes (ILOs): Upon successful completion of this course students will be able to …

Successful completion of the course should lead to the following outcomes:

**A. Knowledge and Understanding:** Student is expected to

A1. Understand the science of pharmacognosy and the roles of natural products (e.g. medicinal plants and herbs) in pharmacy and therapy.

A2. Acquaint the knowledge of plant primary metabolites and their importance as natural products.

**B. Intellectual Analytical and Cognitive Skills:** Student is expected to

B1. Generally define and investigate in the different fields and disciplines related to study of natural drugs and pharmacognosy science including sample preparation and separation.

B2. Define, identify and evaluate natural drugs derived from plant primary metabolism (carbohydrates, lipids, and proteins).

**C. Subject-Specific Skills:** Student is expected to

C1. Acquaint practical knowledge of methods of identification, classification, production, chemical and physical evaluation of natural drug products.

C2. Identify natural products of plant primary metabolism and their applications in therapy, pharmacy and food industry.

**D. Transferable Key Skills:** Students is expected to

D1. Work in a team as a work-group and discuss results with other colleagues.

D2. Know how to conduct a literature survey, access specific information about medicinal plants and natural products as well as how to collect data of others’ research to prepare a group common report.

# **Teaching Methods**

E-Lectures, E-Meetings, Discussions, Assignments and Exams

20. Topic Outline and Schedule:

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| --- | --- | --- | --- | --- | --- |
| ***Content*** | ***Week*** | **Instructor** | **Achieved ILOs** | **Evaluation Methods** | **Reference (part)** |
| **Introduction to Pharmacognosy**: | **(1-7)** | Khaled Tawaha | A B C D | Exams | **2 & 3** |
| - Definitions and materials of pharmacognosy science | ***1*** | K. Tawaha | A B C D | Exams | 2(1), 3(1) |
| - Roles of natural products in modern medicine | ***1*** | K. Tawaha | A B C D | Exams | 2(1), 3(1,6) |
| - Plant nomenclature and taxonomy | ***2-3*** | K. Tawaha | A B C D | Exams | 3(3) |
| - Production (preparation) and sources of natural drugs | ***4*** | K. Tawaha | A B C D | Exams | 2(1), 3(4,9) |
| - Classification of natural drugs | ***5-6*** | K. Tawaha | A B C D | Exams | 2(1), 3(2) |
| - Quality and evaluation of natural drugs (Organoleptic, Microscopical, Chemical, etc.) | ***6*** | K. Tawaha | A B C D | Exams | 2(1) |
| - Chemistry and variability factors | ***7*** | K. Tawaha | A B C D | Exams | 2(1), 3(9) |
| - Photosynthesis | ***7*** | K. Tawaha | A B C D | Exams | 2(2), 3(19) |
| **Chemistry of natural products** | **(8-13)** | Y. Tabaza | A B C D | Exams | 4, 5 |
| **Introduction to chemistry of natural products** | ***8*** | Y. Tabaza | A B C D | Exams | 4, 5 |
| **Carbohydrates** | ***8-11*** | Y. Tabaza | A B C D | Exams | 4, 5 |
| Carbohydrates - IntroductionMonosaccharides - Introduction  | ***8*** | Y. Tabaza | A B C D | Exams | 4, 5 |
| Monosaccharides - Chemistry  | ***9*** | Y. Tabaza | A B C D | Exams | 4, 5 |
| Monosaccharides - Examples  | ***9*** | Y. Tabaza | A B C D | Exams | 4, 5 |
| Oligosaccharides | ***10*** | Y. Tabaza | A B C D | Exams | 4, 5 |
| Polysaccharides - 1 | ***10*** | Y. Tabaza | A B C D | Exams | 4, 5 |
| Polysaccharides - 2 | **11** | Y. Tabaza | A B C D | Exams | 4, 5 |
| Aminoglycosides and Lincosamides | ***11*** | Y. Tabaza | A B C D | Exams | 4, 5 |
| **Lipids** | ***12-13*** | Y. Tabaza | A B C D | Exams | 4, 5 |
| Introduction to lipids | ***12*** | Y. Tabaza | A B C D | Exams | 4, 5 |
| Aldol and Claisen Reactions | ***12*** | Y. Tabaza | A B C D | Exams | 4, 5 |
| Fatty Acids - Introduction and Biosynthesis | ***12*** | Y. Tabaza | A B C D | Exams | 4, 5 |
| Fatty Acids - TriglyceridesFatty Acids - PhospholipidsFatty Acids - Fixed oils | ***12*** | Y. Tabaza | A B C D | Exams | 4, 5 |
| Fatty Acids - Unsaturated Fatty AcidsFatty Acids - Uncommon Fatty Acids | ***13*** | Y. Tabaza | A B C D | Exams | 4, 5 |
| Eicosanoids | ***13*** | Y. Tabaza | A B C D | Exams | 4, 5 |

21. Teaching Methods and Assignments:

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| Development of ILOs is promoted through the following teaching and learning methods:

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| **ILO/s** | **Learning Methods** | **Evaluation Methods** |
| **A B C D** | E-LecturesE-MeetingsAssignmentsDiscussions AND Video simulations | Exams, Quizzes, AssignmentsQuiz in self-study materials |

Learning skills:1. Critical thinking
2. Digital literacy
3. Problem-solving skills
4. self-study
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22. Evaluation Methods and Course Requirements:

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| Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:1. Exams (quiz, midterm and Final)
2. Assignments
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23. Course Policies:

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| A- Attendance policies:***Attendance: Mandatory.******University regulations will be applied***B- Absences from exams and handing in assignments on time:***University regulations will be applied***C- Health and safety procedures: NAD- Honesty policy regarding cheating, plagiarism, misbehavior:The participation in and/or the commitment of cheating will lead to applying all of the following penalties together1) Failing the subject he/she cheated at2) Failing the other subjects taken in the same course3) Not allowed to register for the next semester. The summer semester is not considered as a semesterE- Grading policy:Exams and Quizzes. Oral discussion (4th week): **10** pointsQuiz (9th week): **10** pointsMidterm exam: **30** pointsFinal Exam: **50** pointsTotal **100** pointsF- Available university services that support achievement in the course:Classrooms, internet classes |

24. Required equipment:

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| Data show and internet connection |

**25. References:**

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| SN | ISBN | Title | Author | Year |
| 1 | 1-898298-63-7 | Pharmacognosy, Phytochemistry, Medicinal plants | Jean Bruneton | 1999 (2nd Ed) |
| 2 | 971-05-0211-5 | Pharmacognosy | V.E. Tyler, L.R. Brady, and J.E. Robbers | 1981 (8th Ed) |
| 3 | 0-7020-2617-4 | Trease and Evans Pharmacognosy (2000, 2002, 2004, 2005). | by W.C. Evans | 2000 (15th Ed) |
| 4 | 978-0-470-74168-9 | Medicinal Natural Products | Paul Dewick | 2009 (3rd Ed) |
| 5 | 978-81-312-2298-0 | Textbook of Pharmacognosy and Phytochemistry | Shah and Seth | 2010 (1st) |

Name of Course Coordinator: **Prof. Khaled Tawaha**  Signature: -------------------------------

Head of curriculum committee/Department: ------------------------- Signature: -------------------------------

Head of Department: **Prof. Sana Bardaweel**  Signature: -------------------------------

Head of curriculum committee/Faculty: **Prof. Mutasim Ghzawi** Signature: -------------------------------

Dean: **Prof. Rana Abu Dahab** Signature: -------------------------------

Date: **Oct 6, 2021**

Copy to:

Head of Department

 Assistant Dean for Quality Assurance

 Course File