| Detailed Course Description - Course Plan Development and Updating Procedures/ Pharmacy Department | QF02/0408-3.0E |
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| Faculty | Pharmacy | Department | Pharmacy |
| **Course number** | 0201317 | Course title | Phytochemistry |
| Number of credit hours | 3 | Pre-requisite/co-requisite | Pharmacognosy & Organic Chemistry 2 |

**Brief course description**

Phytochemistry course discusses the major pharmaceutically important secondary metabolites from natural sources of pharmaceutical interest. It provides the basic phytochemical knowledge about the natural source, classification, structures, groups and subgroups, extraction, detection, isolation, pharmacological and toxicological effects.

The course provide students with accurate information about:

a) The properties of natural products (Chemical and physical) which have physiological activities.
b) Biosynthetic pathways of the main active compounds.
c) Extraction and separation methods and the identification and determination of the active compounds.

| | **Course goals and learning outcomes** |
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| **Goal 1** | Description of medicinally active constituents and their structures and groups. |
| Learning outcomes | 1. Students will be familiar with medicinally active constituent's structures and groups (Hydrocarbons, Carbohydrate, Fatty acids, Phenols, Lignans, Tannins, Polyphenols, Flavonoids, Coumarins, Glycosides, Terpenes and Alkaloids). |
| **Goal 2** | Description of main used extraction, detection and identification methods of medicinally active constituents. |
| Learning outcomes | 1. Students will gain the required knowledge of the main used extraction, separation, isolation, detection and identification methods of medicinally active constituents (Hydrocarbons, Carbohydrate, Fatty acids, Phenols, Lignans, Tannins, Polyphenols, Flavonoids, Coumarins, Glycosides, Terpenes and Alkaloids). |
| **Goal 3** | Description of the main biosynthetic methods of medicinally active constituents. |
| Learning outcomes | 1. Students will obtain the ability to evaluate the main biosynthetic pathways of medicinally active constituents (Hydrocarbons, Carbohydrate, Fatty acids, Phenols, Lignans, Tannins, Polyphenols, Flavonoids, Coumarins, Glycosides, Terpenes and Alkaloids). |
| **Textbook** | 1. Trease and Evans Pharmacognosy. 16th edition, saunders, Elsevier.2009 |
| **Supplementary references** | 1. Pharmacognosy and Phytochemistry. 2end edition<br>Bruneton Jean, Springer verlag, 2008, ISBN: 1898298637<br>2. Drugs of natural Origin, 6th edition 2010<br>Gunnar Samuelsson: Swedish Pharmaceutical Press, ISBN 9186274813 |

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| | 3. HBP – Pharmacopoeia. |

**Course timeline**

| Week | Number of hours | Course topics | Pages (textbook) | Notes |
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| 1 | 1<br>1<br>1 | - Introduction<br>-General isolation, extraction, identification and determination methods of the active compounds | 1<br>18<br>19 | |
| 2 | 1<br>1<br>1 | - Hydrocarbons; Chemical structure, groups and subgroups and biosynthesis<br>- Hydrocarbons; Chemical and physical properties<br>- Fixed oils | 20<br>20<br>20 | |
| 3 | 1<br>1<br>1 | - Phenols; Chemical structure, groups and subgroups<br>- Phenols; Biosynthesis<br>- Phenols; Chemical and physical properties | 22-1<br>22-1<br>22-1 | |
| 4 | 1<br>1<br>1 | - Tannins; Chemical structure<br>- Tannins; Biosynthesis<br>- Tannins; Chemical and physical properties | 22-2<br>22-2<br>22-2 | |
| 5 | 1<br>1<br>1 | - Lignans and lignins; Chemical structure, groups and subgroups<br>- Lignans and lignins; Biosynthesis<br>- Lignans and lignins; Chemical and physical properties | 22-10<br>22-10<br>22-10 | |
| 6 | 1<br>1<br>1 | - Coumarins; Chemical structure, , groups and subgroups and biosynthesis<br>- Coumarins; Chemical and physical properties<br>- Flavonoids; Chemical structure | 22-3<br>22-5<br>22-6 | |
| 7 | 1<br>1<br>1 | - Flavonoids; Chemical structure, groups and subgroups<br>- Flavonoids; Biosynthesis<br>- Flavonoids; Biosynthesis | 22-6<br>22-6<br>22-6 | |
| 8 | 1<br>1<br>1 | - Flavonoids; Chemical and physical properties<br>- Terpenoids; Chemical structure, groups and subgroups and biosynthesis.<br>- Chemical and physical properties<br>- Monoterpenes and Sesquiterpenes | 22-7<br>25<br>25-(1-2) | |
| 9 | 1<br>1<br>1 | - Volatile oils; Chemical structure, and biosynthesis. Chemical and physical properties<br>- Diterpenes and Triterpenes<br>- Cardiac glycosides; Chemical structure, and biosynthesis. Chemical and physical properties | 23(1-2)<br>25-(3-5)<br>24-3 | |
| 10 | 1<br>1<br>1 | - Saponins; Chemical structure, groups and subgroups and biosynthesis.<br>- Chemical and physical properties | 24(1-2)<br>25-6 | |

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| | | - Tetraterpenes and Caretonoids | | |
| 11 | 1<br>1<br>1 | - Alkaloids of Tropan, Purin and Amino; Chemical structure, biosynthesis. Chemical and physical properties | 27-3<br><br>27-16 | |
| 12 | 1<br>1<br>1 | - Quinoline Alkaloids; Chemical structure, biosynthesis. Chemical and physical properties<br>- Benzylisoquinoline Alkaloids | 27-5<br><br>27-8 | |
| 13 | 1<br>1<br>1 | - Phenanthrene Alkaloids; Chemical structure, biosynthesis. Chemical and physical properties<br>- Protoalkaloids | 27-10<br>27-10<br>27-10 | |
| 14 | 1<br>1<br>1 | - Indole Alkaloids; Chemical structure, biosynthesis.<br>- Chemical and physical properties<br>- Steroidal Alkaloids<br>- Opioid Alkaloids | 27-11<br><br>27-19<br>27-8 | |
| 15 | 1<br>1<br>1 | - Cannabinoids, hallucinogenic; Chemical structure, and biosynthesis. | 40-5 | |

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| **Theoretical course evaluation methods and weight** | Participation = 10%<br>First exam 20%<br>Second exam 20%<br>Final exam 50% | **Practical (clinical) course evaluation methods** | Semester students' work = 50%<br>(Reports, research, quizzes, etc.)<br>Final exam = 50% |

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| **Approved by head of department** | | **Date of approval** | |

Extra information (to be updated every semester by corresponding faculty member)

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|---|---|---|---|
| **Name of teacher** | Dr. Ala A. Alhusban | Office Number | **406** |
| Phone number (extension) | 454 | Email | Ala.Alhusban@zuj.edu.jo |
| Office hours | To be announced | | |