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| Course Plan for Bachelor Program - Study Plan Development and Updating Procedures/ Pharmacy Department | QF02/0408-4.0E |
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| Study Plan No. | 2021/2022 | University Specialization | Bachelor of Pharmacy |
| Course No. | 0201370 | Course Name | Pharmaceutical Dosage Forms (2) |
| Credit Hours | 2 | Prerequisite *Co-requisite | Pharmaceutical Dosage Forms (1) |
| Course Type | <input type="checkbox"/> Mandatory University Requirement <input type="checkbox"/> University Elective Requirement | <input type="checkbox"/> Faculty Mandatory Requirement <input type="checkbox"/> Support course family requirements | <input checked="" type="checkbox"/> Mandatory Requirement <input type="checkbox"/> Elective Requirement |
| Teaching Style | <input type="checkbox"/> Full Online Learning | <input checked="" type="checkbox"/> Blended Learning | <input type="checkbox"/> Traditional Learning |
| Teaching Model | <input type="checkbox"/> 1 Synchronous: 1 Asynchronous | <input checked="" type="checkbox"/> 1 Face to Face: 1 Asynchronous | <input type="checkbox"/> 2 Traditional |

Faculty Member and Study Divisions Information (to be filled in each semester by the subject instructor)

| Faculty Member and Study Divisions Information (to be filled in each semester by the subject instructor) | | | | | |
|--|------------------------------|------------|-----------------------|---------------------|--------------------------------------|
| Name | Academic rank | Office No. | Phone No. | E-mail | |
| | | | | | |
| Office Hours (Days/Time) | Sunday, Tuesday, Thursday () | | Monday, Wednesday () | | |
| Division number | Time | Place | Number of Students | Teaching Style | Approved Model |
| | | | | Blended Learning | 1 Face to Face: 1 Asynchronous |

Brief Description

This course is designed to introduce the students to the physicochemical and biological structure of the skin in order to employ it either as a direct target for therapy or portal to deliver the drug in to circulation. The course intends to introduce the topical preparations for both local and transdermal drug delivery. Moreover, the course will introduce the ophthalmic and rectal delivery. Also, the students will be introduced to parenteral therapy along with the specific design of each route. These principles will lay the foundation for dosage form design and manufacture, as well as biopharmaceutics and pharmacokinetics.

Learning Resources

| | |
|--|--|
| Course Book Information (Title, author, date of issue, publisher ... etc) | 1. Ansel's Pharmaceutical Dosage Forms and Drug Delivery Systems, L.V. Allen and H.C. Ansel, 10 th Edition, 2014 2. Aulton's Pharmaceutics: The Design and Manufacture of Medicines, M.E. Aulton and K.M.G. Taylor, 4 th Edition, 2013. |
| Supportive Learning Resources (Books, databases, periodicals, software, applications, others) | 1. British Pharmacopeia, 2010. 2. Remington's: The Science and Practice of Pharmacy, 21 st edition |
| Supporting Websites | https://www.fda.gov/ |

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| The Physical Environment for Teaching | <input checked="" type="checkbox"/> Classroom | <input type="checkbox"/> Labs | <input checked="" type="checkbox"/> Virtual Educational Platform | <input type="checkbox"/> Others |
| Necessary Equipment and Software | - Moodle. | | | |
| Supporting People with Special Needs | | | | |
| For Technical Support | E-Learning & Open Educational Resources Center. Email: ellearning@zu.edu.jo ; Phone: +962 6 429 1511 ext. 425/362. | | | |

Course learning outcomes (K= Knowledge, S= Skills, C= Competencies)

| No. | Course Learning Outcomes | The Associated Program Learning Output Code |
|---------------------------------------|--|---|
| Knowledge | | |
| The student should be able to: | | |
| K1 | Describe the barrier properties of the skin. | MK2 |
| K2 | Differentiate between various topical and transdermal preparations such as ointments, creams, gels, pastes, and transdermal patches. | MK2 |
| K3 | Recognize the attributes of rectal, ophthalmic, and parenteral administration routes. | MK2 |
| K4 | Identify the formulation and sterility requirements of parenteral preparations. | MK2 |
| Skills | | |
| The student should be able to: | | |
| S1 | Design the most suitable dosage form that takes into account the biopharmaceutical properties of the drug and the patient's condition. | MS2, MS4 |
| S2 | Apply the appropriate quality control tests for topical, transdermal, rectal, ophthalmic, and parenteral dosage forms. | MS4 |
| Competencies | | |
| The student should be able to: | | |
| C1 | Educate patients about the proper use of topical, transdermal, rectal, ophthalmic, and parenteral dosage forms. | MC2 |
| C2 | Assume responsibility for his/her own learning by following up with the weekly tasks and submitting the assignments on time. | MC3 |

Mechanisms for Direct Evaluation of Learning Outcomes

| Type of Assessment / Learning Style | Fully Electronic Learning | Blended Learning | Traditional Learning (Theory Learning) | Traditional Learning (Practical Learning) |
|--|---------------------------|------------------|--|---|
| Midterm Exam | 30% | 30% | 30% | 0% |
| Participation / Practical Applications | 0% | 0% | 20% | 50% |
| Asynchronous Interactive Activities | 20% | 20% | 0% | 0% |

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|------------|-----|-----|-----|-----|
| Final Exam | 50% | 50% | 50% | 50% |
|------------|-----|-----|-----|-----|

Note 1: Asynchronous interactive activities are activities, tasks, projects, assignments, research, studies, projects, and work within student groups ... etc, which the student carries out on his own, through the virtual platform without a direct encounter with the subject teacher.

Note 2: According to the Regulations of granting Master's degree at Al-Zaytoonah University of Jordan, 40% of final evaluation goes for the final exam, and 60% for the semester work (examinations, reports, research or any scientific activity assigned to the student).

Schedule of Simultaneous / Face-to-Face Encounters and their Topics

| Week | Subject | Learning Style* | Reference ** |
|------|--|---|---|
| 1 | Introduction to topical and transdermal drug delivery | Problem solving discussion Lecture | Ch. 39 (Aulton) pp. 675-697 |
| 2 | Topical and transdermal preparations (formulation principles and options) | Flipped Learning and Lecture | Ch. 39 (Aulton) pp. 675-697 Ch. 10 (Ansel) pp. 316-341 |
| 3 | Ointments | Lecture | Ch. 10 (Ansel) pp. 316-341 |
| 4 | Creams, pastes | Lecture | Ch. 10 (Ansel) pp. 316-341 |
| 5 | Gels | Lecture learning through problem solving | Ch. 11 (Ansel) pp. 316-341 |
| 6 | Percutaneous absorption Design and features of transdermal drug delivery systems | Participating and Lecture | Ch. 39 (Aulton) pp. 675-697 Ch. 11 (Ansel) pp. 342-363 |
| 7 | Wound dressings | Lecture | Ch. 40 (Aulton) pp. 698-709 |
| 8 | Introduction to suppositories Factors affecting drug absorption from the rectum, properties of ideal suppository bases and types of suppository bases | Lecture | Ch. 12 (Ansel) pp. 364-374 |
| 9 | Methods of preparation of suppositories, determination of displacement values Quality control of suppositories, packaging and storage, rectal formulations other than suppositories, vaginal drug delivery Midterm Exam | Lecture | Ch. 12 (Ansel) pp. 374-388 |
| 10 | Ophthalmic preparations: Formulation and pharmaceutical requirements | Lecture | Ch. 17 (Ansel) pp. 606-617 |
| 11 | Ophthalmic preparations: Packaging and administration | Lecture | Ch. 17 (Ansel) pp. 617-624 |

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| | Ophthalmic ointments and gels; contact lenses | | |
| 12 | Parenteral preparations: Routes of administration and formulation considerations | Lecture | Ch. 15 (Ansel) pp. 508-522 |
| 13 | Small- and large-volume parenterals Special considerations associated with parenteral therapy | Lecture | Ch. 15 (Ansel) pp. 544-572 |
| 14 | Methods of sterilization of parenteral preparations | Lecture | Ch. 15 (Ansel) pp. 522-532 |
| 15 | Biopharmaceutical principles of drug delivery | Problem solving and Lecture | Ch. 18 (Aulton) pp. 292-333 |
| 16 | Final Exam | | |

* Learning styles: Lecture, flipped learning, learning through projects, learning through problem solving, participatory learning ... etc.

** Reference: Pages in a book, database, recorded lecture, content on the e-learning platform, video, website ... etc.

Schedule of Asynchronous Interactive Activities (in the case of e-learning and blended learning)

| Week | Task / Activity | Reference | Expected Results |
|------|--|-----------|--|
| 1 | | | |
| 2 | | | |
| 3 | Ointments: Commercial medicated ointment Recorded Lecture | Ansel's | List of commercially available bases and their types |
| 4 | | | |
| 5 | | | |
| 6 | Transdermal Delivery Recorded lecture | Ansel's | Answering questions |
| 7 | | | |
| 8 | | | |
| 9 | Preparations of suppositories (Recorded Lecture). | Ansel's | Answering assigned questions |
| 10 | | | |
| 11 | | Ansel's | Answering assignment questions |
| 12 | Ophthalmic preparations: Packaging and administration Ophthalmic ointments and gels; contact lenses | Ansel's | |
| 13 | | | |
| 14 | | | |
| 15 | Biopharmaceutics | Ansel's | Answering questions |
| 16 | | | |