
# The University of Jordan

## Accreditation & Quality Assurance Center

# COURSE Syllabus

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|---|---|---|
| **1** | Course title | **Practical Pharmaceutical Technology I** |
| **2** | Course number | **1202334** |
| **3** | Credit hours (theory, practical) | **1 (Practical)** |
| | Contact hours (theory, practical) | **3 (practical)** |
| **4** | Prerequisites/co-requisites | **Pharmaceutical Technology I (*1212331*)/ Pharmaceutical Technology I (*1202333*)** |
| **5** | Program title | **BSc Pharmacy** |
| **6** | Program code | **1202334** |
| **7** | Awarding institution | **The University of Jordan** |
| **8** | Faculty | **Pharmacy** |
| **9** | Department | **Department of Pharmaceutics and Pharmaceutical Technology** |
| **10** | Level of course | **Undergraduate** |
| **11** | Year of study and semester (s) | **Second Semester of the 3rd year** |
| **12** | Final Qualification | **Pharmacist** |
| **13** | Other department (s) involved in teaching the course | **NA** |
| **14** | Language of Instruction | **English** |
| **15** | Date of production/revision | **31 January 2016** |

**16. Course Coordinator:**

*Office numbers, office hours, phone numbers, and email addresses should be listed.*

***Suha A Al Muhaissen, BSc, MSc.***
***http://eacademic.ju.edu.jo/s.muhaissen/default.aspx***
***Office: 206***
***Phone: 06/ 5 355 000, Ext. 23348.***
***E-mail:***
***s.muhaissen@ju.edu.jo***
***smuhaissen@hotmail.com***
***Office hours:***
***Monday:*** ***1pm - 3pm***
***Tuesday:*** ***1pm - 2pm***
***Wednesday:*** ***1pm - 3pm***

**17. Other instructors**:

*Office numbers, office hours, phone numbers, and email addresses should be listed.*

**Prof. Ahmad Bani Jaber, PhD.**
**Office:**
Phone:
**E-mail:**
**Office hours:**

**Dr. Bashar Al Khalidi, PhD.**
**Office:**
Phone:
**E-mail:**

**Office hours:**

**Dr. Dina Sabawi, PhD.**
**Office:**
Phone:
**E-mail:**
**Office hours:**

**Dr. Alaa Al Kilani, PhD.**
**Office:**
Phone:
**E-mail:**
**Office hours:**

Pharmacist Eman Al Saad , BSc
Office:
Phone:
E-mail:
Office hours:

## 18. Course Description:

*As stated in the approved study plan.*

***The series of practical classes provides advanced skills in the area of pharmaceutical technology and has particular emphasis on the methods, materials and testing procedures associated with the manufacture of pharmaceutical grade tablets, Solubility and solubilization: effect of chemical structure, effect of pH, salt formation, and cosolvent approach and Emulsions: definition, types of emulsions, pharmaceutical applications, destabilization mechanism (thermodynamic stability: Stokes law and physical stability: creaming, coalescence and phase separation), and Stabilization mechanisms. Experiments illustrate the solubility properties of substances, Sugar Coating and Aqueous Film Coating Techniques, Dissolution of Dosage Forms, and Emulsions Stabilization.***

## 19. Course aims and outcomes:

**A- Aims:**

1. **To be able to conduct pre-formulation studies: Solubility and Solubilization**
2. ***To recognize the preformulation and formulation of small volume Parenteral Dosage Forms.***
3. ***To recognize the manufacturing process and formulation of coatings of solid dosage forms.***
4. ***To recognize the applications, manufacturing process and formulation of emulsions.***

**B- Course Intended Learning Outcomes (ILOs):**

Upon successful completion of this course students will be able to …

***a. Knowledge and understanding:***

1. *To acquire the knowledge of the physicochemical properties of polymers used in coating and to have the ability to select polymers for certain coating purposes, such as enteric coating and sustained release coating.*
2. *To have the ability to deal with coating equipment, such as pan coater.*
3. *To have the ability to select ingredients for coating formulation.*
4. *To have the ability to recognize coating problems.*
5. *To be able to evaluate functional coating (Enteric Coating)*
6. *To be able to recognize the reason(s) why some drugs are formulated as emulsion.*
7. *To be able to differentiate between emulsion types.*
8. *To be able to describe the destabilization mechanisms of emulsions.*
9. *To know various approaches to stabilize emulsions, e.g. HLB method.*
10. *To be able to select ingredients for emulsion formulation.*
11. *To be able to describe the physico-chemical principles of drugs to be formulated as parenteral*

*solution, among which is to be able to determine the drug solubility in various media for the purpose of formulation as parenteral solution and to correlate the solubility with the drug chemical structure.*

12. *To know the ingredients used in parenteral product formulation.*
13. *To know various packaging materials used for parenteral product.*
14. *To recognize the problems encountered during the formulation of parenteral products.*

**b. *Intellectual skills:***

1. *To be able suggest methods for solubility enhancement of APIs.*
2. *To be able to suggest coating formulations with the necessary calculations.*
3. *To be able to suggest remedies for coating problems.*
4. *To be able to suggest formulation for pharmaceutical emulsions and to solve problems encountered during their manufacturing and during their stability.*

**c. *Subject-specific skills:***

1. Deductive reasoning
2. Numerical Analysis
3. Written/oral communication
4. Information retrieval and analysis
5. Practical application of theory
6. Report writing

**d. *Transferable skills***

1. To gains knowledge and analytical skills to work with people in pharmaceutical firms.
2. To have the ability for quick adaptation to the working environment in pharmaceutical firms
3. To have the ability to deal with and suggest solutions to the problems encountered during the manufacturing process of pharmaceutical dosage forms in pharmaceutical firms.

**C. Program Competencies Achieved:**

3.1 Identify physiochemical properties of drug substances
3.2 Recognize the role of pharmaceutical excipients and their uses in drug formulations
3.3 Characterize various pharmaceutical dosage forms
3.4 Identify formulation principles and product development stages
3.5 Recognize various pharmaceutical manufacturing processes
3.6 Demonstrate the ability to perform pharmaceutical calculations
3.7 Comply with principles of good manufacturing practice (GMP) and good laboratory practice (GLP)
3.8 Recognize quality assurance principles
3.9 Recognize quality control principles
3.11 Identify analytical method development and validation used in pharmaceutical analysis
3.12 Demonstrate the ability to perform proper documentation
3.13 Identify the general principles of environmental control within pharmaceutical manufacturing sites

## 20. Topic Outline and Schedule:

| *Topic* | *Week* | *Instructor* | *Achieved ILOs* | *Evaluation Methods* | *Reference* |
|---|---|---|---|---|---|
| Orientation (Introduction to General Laboratory Instructions) | 1 | Section Instructor* | C3-6 | Oral Discussion, Practical Sessions Evaluation | Laboratory Manual |
| How to Prepare Laboratory Log-Book? | 1 | Section Instructor* | d1 & 2, c3 | Log-Book | Instructor |
| Solubilization of Mefenamic Acid: pH-Solubility profile | 2 & 3 | Section Instructor* | a11-14, b1, c1-6,d1 | Oral Discussion, Reports, Exams | Laboratory Manual, General References provided below Assignment Chapter (Pharmaceutical Dosage Forms: Parenteral, |
| Solubilization of Mefenamic Acid: Effect of Cosolvent | 4 | Section Instructor* | a11-14,b1, c1-6, d1 | Oral Discussion, Reports, Exams | |

| | | | | | |
|---|---|---|---|---|---|
| Solubilization of Mefenamic Acid: Salt Formation | 5 | Section Instructor* | a11-14, b1, c1-6 | Oral Discussion, Reports, Exams | Volume 1, Chapter 4) |
| Midterm exam | 6 | | | | |
| Sugar Coating | 7 | Section Instructor* | a1-5, b2&3, c1-6 | Oral Discussion, Reports, Exams | Laboratory Manual, General References provided below |
| Aqueous Film Coating | 8 & 9 | Section Instructor* | a1-5, b2&3, c1-6, d2&3 | Oral Discussion, Reports, Exams | Laboratory Manual, General References provided below |
| Dissolution of Enteric Coated Tablets | 10 | Section Instructor* | a1-5, b2&3, c1-6 | Oral Discussion, Reports, Exams | aLaboratory Manual, General References provided below |
| Emulsions: Preparation and Stabilization | 11 & 12 | Section Instructor* | a6-10, b4, c1-6 | Oral Discussion, Reports, Exams | Laboratory Manual, General References provided below |
| Final exam | 13 | | | | |

* Sections (1, 2, 5, 9, & 11) instructor: Suha Al Muhaissen, Section (3 & 8) instructor: Prof. Ahamad & Ph. Eman, Section (4 & 10) instructor: Dr. Bashar & Ph. Eman, Section (7 & 12) instructor: Dr. Dina & Ph. Eman, Section (6) instructor: Dr. Alaa & Ph. Eman

## 21. Teaching Methods and Assignments:

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

| *ILO/s* | *Teaching and Learning Method/s* | *Evaluation Method/s* |
|---|---|---|
| *a1-10* | *Practical Sessions (Experiments), Lecturing, Oral Discussion* | *Student Evaluation, Reports, Exams* |
| *a11-14* | *Practical Sessions (Experiments), Lecturing, Oral Discussion, Assignment* | *Student Evaluation, Reports, Exams* |
| *b1-3* | *Practical Sessions (Experiments), Lecturing, Assignment* | *Log-Book, Reports, Exams* |
| *c1-6* | *Practical Sessions (Experiments), Oral Discussion* | *Reports, Home Work, Exams* |
| *d1-3* | *Practical Sessions (Experiments), Oral Discussion* | *Reports, Log-Book* |

***Learning Skills:***

1. *Critical thinking*
2. *Digital literacy*
3. *Problem-solving skills*
4. *Self-directed learning*
5. *Scientific reasoning*
6. *Communication skills*
7. *Team and group working*

## 22. Evaluation Methods and Course Requirements:

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:

***1. Reports and Home Works***
***2. Evaluation on Practical Sessions***
***3. Log-Book Preparations***
***4. Exams***

## 23. Course Policies:

A- Attendance policies:

***Attendance: Mandatory.***

***First Warning:*** *with 1 absence*

***Last Warning:*** *with 2 absences*

***Failing in the Subject:*** *with 3 absences*

***NB: University Regulation Applied***

B- Absences from exams and handing in assignments on time:

***Will result in zero achievement unless health report or other significant excuse is documented.***

C- Health and safety procedures:

***General Laboratory Safety Instruction are maintained***

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***

***NB: University Regulation Applied***

E- Grading policy:

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|---|---|
| ***Reports*** | ***10 points*** |
| ***Log-Book*** | ***10 points*** |
| ***Evaluation*** | ***10 points*** |
| ***Midterm Exam*** | ***30 points*** |
| ***Final Exam*** | ***40 points*** |
| ***Total*** | ***100 points*** |

F- Available university services that support achievement in the course:

a. ***Laboratory Room***
b. ***Internet access at different Computer Rooms***
c. ***Computers to prepare materials and print outs at different Computer Rooms***

## 24. Required equipment:

***All Equipment; devices, tools, instruments, and glassware required to perform assigned experiments***

## 25. References:

A- Required book (s), assigned reading and audio-visuals:

1. ***Laboratory Manual (****Practical Pharmaceutical Technology II Manual****)***

***2. Pharmaceutical Dosage Forms: Parenterals , Volume 1, Chapter 4.***

B- Recommended books, materials, and media:

- ***Pharmaceutics: The Science of Dosage Form design (M.E.Aulton, latest edition)***
- ***Pharmaceutical Dosage Forms: Parenterals , Volume 1 (Leiberman and Lachman eds)***
- ***British Pharmacopeia***
- ***United States Pharmacopeia***

## 26. Additional information:

***NA***

| | | |
|---|---|---|
| Name of Course Coordinator: ***Suha Al Muhaissen*** | Signature: | Date: Jan. 31, 2016 |
| Head of curriculum committee/Department: | Signature: | |
| Head of Department: | Signature: | |
| Head of curriculum committee/Faculty: | Signature: | |
| Dean: | Signature: | |

Copy to:
Head of Department
Assistant Dean for Quality Assurance
Course File