Course Syllabus

1	**Course title**	Practical Pharmaceutical Technology I
2	**Course number**	1212332
3	**Credit hours**	1 (Practical)
	Contact hours (theory, practical)	3 (Practical)
	Course Level/Hours according to Jordan National Qualifications Framework (JNQF) Standards	**7th/70**
4	**Prerequisites/co-requisites**	Pharmaceutical Technology I (1212331)
5	**Program title**	BSc Pharmacy & PharmD
6	**Program code**	N/A
7	**Awarding institution**	The University of Jordan
8	**School**	School of Pharmacy
9	**Department**	Department of Pharmaceutics and Pharmaceutical Technology
10	**Course level**	Undergraduate
11	**Year of Study and semester (s)**	First semester of the 3rd year
12	**Other department (s) involved in teaching the course**	N/A
13	**Main teaching language**	English
14	**Delivery method**	☐ Face to face learning ☒ Blended ☐ Fully online
15	**Online platform (s)**	☒ Moodle ☒ Microsoft Teams ☐ Skype ☐ Zoom ☐ Others ……
16	**Issuing revisions**	30/08/2023

17 Course Coordinator:

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18 Other Instructors:

Name:	***Contact hours:***
Office number:	***Phone number:***
Email:	

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Office number:	***Phone number:***
Email:	

19 Course Description

Gain advanced skills in the area of pharmaceutical technology, while maintaining particular emphasis on the methods, materials and testing procedures associated with the manufacture of pharmaceutical grade tablets. Illustrate the flow properties of powders, mixing and milling of powders, wet and dry granulation methods, powder particle size analysis, evaluation of granules flow properties, studying the effect of excipients on granules flow properties, quality control tests, tableting technology, and dissolution methods of dosage. Comprehend and perform comprehensive/complete data analysis of results collected for each experiment. Employ Microsoft® Excel in the data analysis done for each experiment results.

التقنية الصيدلانية 1 – عملي

يكتسب الطالب مهارات في مجال التقنية الصيدلانية وبتركيز خاص على الطرق والمواد واجراءات الفحص المرتبطة بتصنيع الحبوب الصيدلانية. يتبين الطالب صفات الجريان للحبيبات وتأثير السواغات عليها، وكذلك عمليات الخلط والطحن وعمليات التحتير الرطب والجاف، وقياس أبعاد الحبيبات وفحوصات ضبط الجودة وتكنولوجيا انتاج الحبوب المضغوطة. كما يستوعب الطالب ويقوم بإجراء تحليل النتائج التي يتم جمعها في التجارب المختلفة باستخدام Microsoft® Excel.

20 Course Aims and Outcomes

A. Aims:

1. To conduct pre-formulation studies.
2. To apply various processes and equipment used in the unit operation: particle size analysis, size reduction, mixing, and drying.
3. To understand the consolidation process of solid dosage forms and the operation of tablet presses.
4. To apply various manufacturing methods of solid dosage forms and recognize the ingredients used in the formulation of solid dosage forms.
5. To perform and evaluate release properties of solid dosage forms.
6. To recognize the problems encountered during the manufacturing of solid dosage forms.
7. To perform quality control tests for solid dosage forms and evaluate the results based on official reference values.

B. Students Learning Outcomes (SLOs):

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

A. Knowledge

Foundational Knowledge

- Develop, integrate, and apply knowledge from the foundational sciences (i.e., pharmaceutical, social/behavioral/administrative, and clinical sciences) to evaluate the scientific literature,

explain drug action, solve therapeutic problems, and advance population health and patient centered care, ***Learner***.

B. Skills

Essentials for Practice and Care

- Medication use systems management- Manage patient healthcare needs using human, financial, technological, and physical resources to optimize the safety and efficacy of medication use systems, ***Manager***.

Approach to Practice and Care

- Communication – Effectively communicate verbally and nonverbally when interacting with an individual, group, or organization, ***Communicator***.

Pharmaceutical product expert

- Carry out compounding procedures to produce an effective and safe medicine and implement quality control measures and tests, ***Manufacturer***.

C. Competencies

Personal and Professional Development

- Leadership- Demonstrate responsibility for creating and achieving shared goals, regardless of position, ***Leader***.
- Professionalism - Exhibit behaviors and values that are consistent with the trust given to the profession by patients, other healthcare providers, and society, ***Professional***.

SLOs (PLOs) / *SLOs of the course*	*Learner*	*Manager*	*Communicator*	*Manufacturer*	*Leader*	*Professional*
(K1) Recognize various manufacturing processes for solid dosage forms with their advantages, utilities, and limitations, consolidation process of powders and the operation of equipment, equipment in the operation unit (particle size analysis, size reduction, mixing, and drying wet granulation, and direct compression, and the categories of inactive ingredients used in the manufacturing of solid dosage forms, their functions.	**D**					
(S1) Develop and provide accurate and usable dosage forms information regarding dosing and use instructions and utilize proper documentation in management.		**D**				
(S2) Communicate effectively in a manner appropriate to the discipline(s) and report practical procedures in a clear and concise manner in a variety of formats.			**D**			
(S3) Utilize some equipment used in unit operation, quality control tests for intermediate and final dosage forms, including compressibility, flow rate, weight variation, friability, hardness, disintegration, and dissolution, and release properties of solid dosage forms and outline and solve the problems encountered manufacturing process of pharmaceutical dosage forms in pharmaceutical firms.				**I**		
(S4) Interpret and analyze experimentally derived data, then build up scientific reports for experiments using different including Microsoft Excel®.				**D**		
(C1) Develop and show qualities and skills to integrate, work, and coordinate with people in a team.					**D**	
(C2) Demonstrate integrity by not cheating and not committing plagiarism, respect to professors and classmates (active listening inside classrooms), and acquire analytical skills required to adapt in working environment in pharmaceutical firm.						**D**

I: Introduced
D: Developed (Enforced)
P: Proficiency.

21 Topic Outline and Schedule:

Week	*Topic*	*SLOs /Course*	*Learning Method**	*Platform*	*Lecturing@*	*Evaluation Method*	*Resources*
1	***Topic 1***: Orientation & Introduction to general Laboratory Instructions.	S2	BL	Moodle MS® TEAMS	Asynchronous	Oral Discussion, Practical Session Weekly Evaluation	Laboratory Manual
2	***Topic 2***: How to report data (Reports components and writing). How to prepare Laboratory Logbooks. How to construct "Student Portfolio". Introduction to unit Processes (Concept & Equipment)	S1, S2, S4, C2	BL	Moodle MS® TEAMS	Asynchronous	Portfolio (Reports, Logbook), Pre-lab Assessment (Moodle-based quizzes)	Videos Instructor and Reports, Logbook, & Portfolio templates & models
3	***Topic 3***: Powder Mixing	K1, S1, S2, S3, S4, C1, C2	BL	Moodle MS® TEAMS	Synchronous	Oral Discussion, Practical Session Weekly Evaluation, Portfolio construction (Reports & Data Analysis, Logbook), Pre-lab Assessment (Moodle-based quizzes), & Examinations	Videos Laboratory Manual, General References provided below
4	***Topic 4***: Size reduction of Powders	K1, S1, S2, S3, S4, C1, C2	BL	Moodle MS® TEAMS	Synchronous		
5	***Topic 5***: Granulation of Powders	K1, S1, S2, S3, S4, C1, C2	BL	Moodle MS® TEAMS	Synchronous		
6	***Topic 6***: USP Dissolution Method of Paracetamol/Acetaminophen Tablets	K1, S2, S3, S4, C1, C2	BL	Moodle MS® TEAMS	Synchronous		
7	***Midterm Examination***						
8 & 9	***Topic 7***: Characterization of Granules Flow Properties	K1, S1, S2, S3, S4, C1, C2	BL	Moodle MS® TEAMS	Synchronous	Oral Discussion, Practical Session Weekly Evaluation,	Videos

10	***Topic 8***: Effect of Additives on Flow Properties	K1, S1, S2, S4, C1, C2	BL	Moodle MS® TEAMS	Synchronous	Portfolio construction (Reports & Data Analysis, Logbook), Pre-lab Assessment (Moodle-based quizzes), & Examination	Laboratory Manual, General References provided below
11	***Topic 9***: Quality Control Tests	K1, S1, S2, S3, S4, C1, C2	BL	Moodle MS® TEAMS	Synchronous		
12 & 13	***Topic 10***: Tablets Preparation and Testing	K1, S1, S2, S3, S4, C1, C2	BL	Moodle MS® TEAMS	Synchronous		
14	Final Exam						

*Learning Methods: Face to Face (F2F), Blended Learning (BL)
@ Synchronous or Asynchronous Lecturing

22 Evaluation Methods:

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

Evaluation Activity	*Mark*	*Topic (s)*	*SLOs Course*	*Period (Week)*	*Platform*
Pre-lab quizzes	10	Topics 2 - 10	K1, S1 – S4	Weeks 2 – 13	Moodle (juexams.com)
Portfolio construction (Reports & Data Analysis, Logbook),	20	Topics 2 - 10	K1, S1 – S4	Weeks 2 – 13	On-campus
Practical Session Weekly Evaluation Including Oral Discussion and Teamwork	10	Topics 3 - 10	K1, S1 – S4, C1, C2	Weeks 3 – 13	On-campus
Midterm Exam	20	Topics 1 -6	K1, S1 – S4, C1, C2	Week 7 or 8	On-campus
Final Exam	40	All topics	K1, S1 – S4, C1, C2	Week 15 - 16	On-campus

23 Course Requirements:

Classroom (Laboratory):

a. All equipment; devices. Tools, instruments, and glass-wares required to perform assigned experiments.
b. Data show/Screen and internet connection.

Students should have:

1. A computer,
2. Internet connection,
3. Account on Microsoft Teams and Moodle.
4. Lab-coat
5. Student manual

24 Course Policies:

A. Attendance policies:

- Attendance: Mandatory.
  First Warning: after/with 1 absence
  Second Warning: after/with 2 absences
  Falling in the Subject/Course: after/with 3 absences
- NB. University regulations applied.

B. Absences from exams and handing assignments on time:

- Will result in zero achievement unless a medical report or other significant excuse is documented.

C. Health and safety procedures:

- General Laboratory Safety Instructions 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 on.
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 regulations applied.

E. Grading policy:

Portfolio	20 points
Reports	
Logbook	
Pre-Lab Assessment (BL related activities)	10 points
Evaluation	10 points
Midterm Examination	20 points
Final Examination	40 points
Total	100 points

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

a. Laboratory Room.
b. Computers in Laboratory Rooms to enable data processing using Microsoft Excel®.
c. Internet access at different Computers Rooms.
d. Computers to prepare materials and printouts at different Computer Rooms.
e. Classrooms, internet, library (books, and electronics journals and books).

25 References:

A. Required websites and electronic references:

1. Laboratory Manual (Practical Pharmaceutical Technology I Manual).
2. USP Pharmacopeia (Monograph for Acetaminophen, and Solid Dosage Forms Official Testing).
3. British Pharmacopeia (Solid Dosage Forms Official Testing).
4. Videos for the used equipment and processes.

B. Recommended books, materials, and media:

- ✓ Pharmaceutics: The Science of Dosage Form Design (M. E. Aulton, latest edition)
- ✓ Pharmaceutical Dosage Forms: Tablets (1:3) (Leiberman and Lachman, latest edition)
- ✓ United States Pharmacopeia
- ✓ British Pharmacopeia
- ✓ Additional:

  Any suitable reference book is accepted.

  Research and review articles are also used

26 Additional Information:

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:

a. The committee will meet/talk to both parties and witnesses (if applicable) within two weeks of conflict.
b. All meetings and discussions are documented according to the university policies.
c. Results/ recommendations will be sent to the Dean or President who is responsible for their implementation

***Course Coordinator Name: Suha** A. AlMuhaissen, MSc.*	***Signature:***	***Date:*** 24/02/2024
Head of Curriculum Committee/Department:	***Signature:***	
Head of Department:	***Signature:***	
Head of Curriculum Committee/School:	***Signature:***	
Dean:	***Signature:***	