The Hashemite University
الجامعـــــــــة الهاشميـــــــــــة
Faculty of Pharmaceutical Sciences
كلية العلوم الصيدلانية

Syllabus: Pharmaceutical Calculations and Compounding (#1917011231)

COURSE INFORMATION	
Course Name: Pharmaceutical Calculations and Compounding **Learning method:** Blended learning **Semester:** Second **Department:** Pharmaceutics and Pharmaceutical Technology **Faculty:** Pharmaceutical Sciences	**Course Code:** 1917011231 **Section:** As per semester **Core Curriculum**: 2019 **Study Plan** **JNQF Level:** 7
Day(s) and Time(s): According to HU courses timetable/semester **Classroom:** As per semester **Date prepared:** February 2023 **Date updated:** May 2024	**Credit Hours:** 3 **Prerequisites**: 110103211
The course material was established by Prof. Saja Hamed	

COURSE DESCRIPTION

This course aims to teach the students the legal and professional aspects of pharmaceutical compounding. It discusses the USP/NF, official formulations, good compounding practices, storage for dispensed products, prescription, abbreviations, labeling, and operational requirements to compound a formulation. In addition to pharmaceutical calculations and pharmaceutical considerations of common compounding procedures.

In this course, formulation for various dosage forms, including solutions, dispersed systems, semisolid formulations, suppositories, radiopharmaceuticals and transdermal delivery systems are thoroughly discussed. Furthermore, novel dosage forms and drug delivery systems are introduced to students.

DELIVERY METHODS

The course will be delivered through a combination of active learning strategies. These will include:

١. PowerPoint lectures and active classroom-based discussion.
٢. Students will be encouraged to participate and be actively involved in the learning process.
٣. Lectures will start with questions to inquire about the students' prior knowledge of the topic. These questions will also be repeated at the end of the lecture to gain insight into the students'competences (to verify whether students have understood the topic).

٤. During delivering the lecture presentation, time will be given to allow students to reflect about what they have learnt and think in and discuss some examples of short case studies.
٥. Relevant films and documentaries
٦. Video lectures.
٧. E-learning resources: e-reading assignments and practice clinical case studies through Model and Microsoft Team.

FACULTY INFORMATION

Name	**Dr. Shorooq Abukhamees**
Academic Title:	**Assistant Professor**
Office Location:	**Third Floor**
Telephone Number:	**Extension: TBA**
Email Address:	**Sh.abukhamees@hu.edu.jo**
Office Hours:	**As announced per semester** ***Please send an e-mail (Sh.abukhamees@hu.edu.jo) to meet at any other time.***

REFERENCES AND LEARNING RESOURCES

Required Textbook(s):.

١. Applied Pharmaceutics in Contemporary Compounding, Robert Shrewsbury, second edition.
٢. Ansel's Pharmaceutical Dosage Forms And Drug Delivery Systems, Loyd V. Allen, Jr.; Nicholas G. Popovich; Howard C. Ansel. Ninth Edition, 2011.
٣. Textbook of Pharmaceutical Dispensing, Amit Goyal, Gautam Rath, RK Narang, first edition, 2012.
٤. Pharmaceutical Calculations, Howard Ansel, 31st Edition, 2010
٥. Pharmaceutical Compounding and Dispensing. Marriott, Wilson, K. A., Langley, C. A., & Belcher, D., (2010).
٦. Aulton's Pharmaceutics: The Design and Manufacture of Medicines, Aulton, M. and Taylor, K., fourth edition, 2004.

Useful Web Resources:

http://pharmlabs.unc.edu
In addition to the websites discussed each lecture.

COURSE OBJECTIVES

At the end of this course, students are expected to know:

١. Legal and professional aspects of pharmaceutical compounding.

٢. Operational requirements to compound a formulation, specifically:

- Prescription or medication order.
- Related calculations.
- Common compounding equipment and facilities.
- Required procedure and records.

٣. Pharmaceutics considerations and common compounding procedures for various formulations including solutions, dispersed systems, semisolid formulations, suppositories, radiopharmaceuticals, transdermal delivery systems, novel dosage forms and drug delivery systems.

COURSE INTENDED LEARNING OUTCOMES (ILOs)

A. Foundational Knowledge

A1- Show knowledge of all aspects of pharmaceutical compounding and extemporaneous dispensing, the different routes of administration, and the different dosage forms and their intended use.

A2- Recognize the basics in formulating different non-sterile dosage forms, especially, formulation techniques, uses, storage conditions, packaging, dispensing and labeling instructions. In addition to identify the pharmacist role in the compounding, packaging, and labeling of different formulations including solutions, despised systems, semisolids, suppositories.

A3- Identify compounding related chapters in the main pharmacopoeias (USP/BP) and illustrate ability to read and understand drug product pharmacopeial monograph.

B. Essentials for Practice and Care

B1- Employ physical principles when formulating different dosage forms.

B2- Illustrate knowledge in using of additive materials in each preparation and develop effective and safe preparation and to suggest proper labeling and packaging for such preparations.

B3- Plan scale up and scale down product master formula and apply pharmaceutical calculation related to dosage forms correctly.

Approach to Practice and Care .**C**

C1- Recognise different formulation and compounding techniques that are fundamental to good compounding practice. and correlate between theoretical principles learnt in the course with and laboratory skills gained from the practical course.

Personal and Professional Development .**D**

D1- The student is expected to selection the proper measurement tools, equipment, techniques, the suitable excipients to compound the preparation.

D.2 Demonstrate integrity by not cheating and not committing plagiarism

Pharmaceutical Product Expert .**E**

E1-The students will be able to exchange their knowledge in compounding and formulation with the pharmaceutical industry.

E2- The student will be able to advice patients on the proper use and storage of the compounded and formulated product.

ACADEMIC SUPPORT

It is The Hashemite University policy to provide educational opportunities that ensure fair, appropriate and reasonable accommodation to students who have disabilities that may affect their ability to participate in course activities or meet course requirements. Students with disabilities are encouraged to contact their instructor to ensure that their individual needs are met. The University through its Special Need section will exert all efforts to accommodate for individual's needs.

Special Needs Section:

Tel: **00962-5-3903333 Extension: 4209**
Location: **Students Affairs Deanship/ Department of Student Welfare Services**
Email: **amalomoush@hu.edu.jo**
amalomoush@staff.hu.edu.jo

COURSE REGULATIONS

Participation .***A***

Excellent attendance is expected. According to the university policy, students who miss more than 15% of the lecture hours with or without excuse will be dismissed from the course. It is a student's responsibility to monitor the frequency of their own absences. **Attendance record begins on the first day of class irrespective of the period allotted to drop/add and late registration. It is a student's responsibility to sign-in; failure to do so will result in a non-attendance being recorded.**

In exceptional cases, the student, with the instructor's prior permission, could be exempted from attending a lecture provided that the number of such occasions does not exceed the limit allowed by the University.

The instructor will determine the acceptability of an absence for being absent. A student who misses more than 25% of classes and has a valid excuse for being absent will be allowed to withdraw from the course.

On average, students need to spend 4 hrs of study and preparation weekly. At the beginning of the lectures, students should be on time and should not leave before the end of the lecture without an accepted excuse. **If the student missed a class, it is him/her responsibility to find out about any announcements or assignments they have missed.** For any clarification, students should communicate with their instructor at her posted office hours or by appointment. Students should listen well to the lecture, if anyone has a question, he/she should ask the instructor. Students can find the course material at the course Microsoft team/Model after the lecture.

Switch off your mobile or keep it silent throughout the lecture. Listen well to the lecture and avoid side discussions.

Sharing of course materials is prohibited. No course material including, but not limited to, course outline, lecture hand-outs, videos, exams, and assignments may be shared online or with anyone outside the class. Any suspected unauthorized sharing of materials, will be reported to the university's Legal Affairs Office. If a student violates this restriction, it could lead to student misconduct procedures.

B. Plagiarism

Plagiarism is considered a serious academic offence and can result in your work losing marks or being failed. HU expects its students to adopt and abide by the highest standards of conduct in their interaction with their professors, peers, and the wider University community. As such, a student is expected not to engage in behaviours that compromise his/her own integrity as well as that of The Hashemite University.

Plagiarism includes the following examples, and it applies to all student assignments or submitted work:

١. **Use of the work, ideas, images or words of someone else without his/her permission or reference to them.**
٢. **Use of someone else's wording, name, phrase, sentence, paragraph or essay without using quotation marks.**
٣. **Misrepresentation of the sources that were used.**

The instructor has the right to fail the coursework or deduct marks where plagiarism is detected.

C. Missed lab session.

In case of expected and valid excuse and if space is available, you will be expected to attend another lab session to complete assigned work (you must contact your instructor to arrange this within 24 hours of the missed session). If this is not possible, and you are given an excused absence, you will be expected to make up the work at an assigned time. For any clarification, please communicate your instructor at his posted office hours or by appointment.

If your excuse is not valid you will take zero evaluation in your missed lab (all related lab session work).

D. *Missed Assessments.*

- Assignments are due at the beginning of the class period on the date/time designated by the instructor.
- Late course work is not accepted (e.g. projects, reports, papers…), unless otherwise indicated by the instructor. Work will only be accepted in an emergency situation.
- In all cases of assessment, students who fails to attend an exam on the scheduled date without prior permission, and/or are unable to provide a medical note, will automatically receive a failure grade for this part of the assessment.
- In cases where a student misses an assessment on account of a medical reason or with prior permission; in line with university regulations an incomplete grade for the specific assessment will be awarded and an alternative assessment or extension can be arranged.

E. *Cheating*

♦ Cheating, academic disconduct, fabrication and plagiarism will not be tolerated, and the university policy will be applied.

♦ Cheating policy: The participation, the commitment of cheating will lead to applying all following penalties together:

١. Failing the subject, he/she cheated at.
٢. Failing the other subjects taken in the same course.
٣. Not allowed to register for the next semester.
٤. The summer semester is not considered as a semester.

F. *Student Complaints Policy*

Students at The Hashemite University have the right to pursue complaints related to faculty, staff, and other students. The nature of the complaints may be either academic or non-academic. For more information about the policy and processes related to this policy, you may refer to the students' handbook.

COURSE ASSESSMENT

Course Calendar and Assessment

Students will be graded through the following means of assessment:

Course Assessment Plan

Assessment	Grade Weighting	Deadline Assessment	CILOs			
			A	B	C	D

First Exam	30%	During the semester	A	B	C	D
Second Exam	30%	To be announced	A	B	C	D
Final Exam	40%	The 14th week	A	B	C	D

Description of Exams

Test questions will predominately come from material presented in the lectures and the lectures themselves. Semester exams may be conducted during the regularly scheduled lecture period. Exam may consist of a combination of multiple choice, short answer, match, true and false, and/or descriptive questions.

No make-up exams will be given. Only documented absences will be considered as per HU guidelines. Make-up exams may be different from regular exams in content and format.

Grades are not negotiable and are awarded according to the following criteria:

Letter Grade	Description	Grade Points
A+	Excellent	4.00
A		3.75
A-		3.50
B+	Very Good	3.25
B		3.00
B-		2.75
C+	Good	2.50
C		2.25
C-		2.00
D+	Pass	1.75
D	Pass	1.50
F	Fail	0.00
I	Incomplete	-

WEEKLY LECTURE SCHEDULE AND CONTENT DISTRIBUTION

All lectures are delivered by blended learning.

Course Contents			
Estimated no. of hours	**CILOs**	**Topics**	**Delivery Methods**

1	A	Introduction, What is compounding and why do it?	PowerPoint Lectures. Active Classroom-Based Discussions
1	A B C D	Regulatory aspects of compounding: the USP/NF, official formulations, good compounding practices, storage for dispensed products.	PowerPoint Lectures. Active Classroom-Based Discussions Examples discussion using white board.
2	A B C D	An order to compound: prescription and medication orders, abbreviations, labeling, auxiliary labels, storage conditions	PowerPoint Lectures. Active Classroom-Based Discussions Examples discussion using white board.
4	A B C D	Pharmaceutical calculations	PowerPoint Lectures. Active Classroom-Based Discussions Examples discussion using white board
4	A B C D	Solutions	PowerPoint Lectures. Active Classroom-Based Discussions Examples discussion using white board
First Exam			
2	A B C D	Disperse systems: Suspensions	PowerPoint Lectures. Active Classroom-Based Discussions Examples discussion using white board
5	A B C D	Disperse systems: Emulsions	PowerPoint Lectures. Active Classroom-Based Discussions Examples discussion using white board
2	A B C D	Disperse systems: Colloids and gels	PowerPoint Lectures. Active Classroom-Based Discussions Examples discussion using white board

Second Exam			
2	A B C D	Semisolid preparations: Ointments and pastes	PowerPoint Lectures. Active Classroom-Based Discussions Examples discussion using white board
2	A B C D	Nasal and otic preparations	PowerPoint Lectures. Active Classroom-Based Discussions Examples discussion using white board
3	A B C D	Suppositories and inserts	PowerPoint Lectures. Active Classroom-Based Discussions Examples discussion using white board
2	A B C D	Transdermal drug delivery systems	PowerPoint Lectures. Active Classroom-Based Discussions Examples discussion using white board
2	A B C D	Novel dosage forms and drug delivery systems	PowerPoint Lectures. Active Classroom-Based Discussions Examples discussion using white board
2	A B C D	Radiopharmaceuticals	PowerPoint Lectures. Active Classroom-Based Discussions Examples discussion using white board