Course Specification of Advanced Drug Delivery Systems

I. Course Identification and General Information:							
1	**Course Title:**	Advanced Drug Delivery Systems					
2	**Course Number & Code:**	**Ph2817**					
3	**Credit hours: 2hrs**	**C.H**				**Total**	
		Theoretical	**Practical**	**Training**	**Seminar**		
		2				**2**	
4	**Study level/ semester at which this course is offered:**	Fourth year/Second semester					
5	**Pre –requisite (if any):**	Pharmaceutics I-IV- Biopharmaceutics					
6	**Co –requisite (if any):**	Pharmacokinetics					
7	**Program (s) in which the course is offered:**	Bachelor of Pharmacy					
8	**Language of teaching the course:**	English					
9	**The department in which the course is offered:**	Pharmaceutics and Industrial Pharmacy					
10	**Location of teaching the course:**	Faculty of Pharmacy-Sana'a University					
11	**Prepared by:**	**Prof Dr/ Mahmoud Mahyoob Alburyhi**					
12	**Date of approval:**						

II. Course description:

This course aims to provide the students to introduce the different technologies that have been investigated recently to enhance the drug accumulation at their target sites. Describe the characters and formulation of drug delivery dosage forms.

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة ا.د.
محمود البريهي	ا.د. محمود البريهي	ا.د.ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

III. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Define the different terminology as sustain, control, drug targeting, novel drug delivery….etc
2. Acquire the knowledge of drug delivery systems.
3. Define the theoretical background of drug release utilized for drug targeting
4. Describe the characters and formulation of drug delivery dosage forms
5. Estimate the differences between methods of formulations for various controlled and colloidal drug new delivery systems in a safe and effective way
6. Relate polymeric structure and properties with the desired drug delivery systems.
7. Identify the methods of achieving drug delivery systems.
8. Illustrate the basic concepts of controlled drug delivery and targeting
9. Monitor the methods of development of colloidal carriers for targeting of drugs
10. Be able to work in industry in either production or quality control of drug delivery systems.
11. Acquire good, scientific knowledge so his counseling abilities to patients improve health
12. Communicate effectively with patients and health care professionals

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students will be able to:		After completing this course, students will be able to:	
A1-	Recognize the principles of physical, clinical, social, behavioral, health and pharmaceutical sciences.	**a1-**	Define the different terminology as sustain, control, drug targeting, novel drug delivery.etc

A3-	Describe the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics, disease pathophysiology, and pharmacogenetic of	**a2-**	Acquire the knowledge of drug delivery systems.
	therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication, rationalize drug use and overall health needs.		
A4-	Recognize the pharmaceutical dosage form design and the quality control of pharmaceutical formulations according to GMP and pharmacopeial requirements to support the pharmaceutical industries and research.	**a3-**	Define the theoretical background of drug release utilized for drug targeting
		a4-	Describe the characters and formulation of drug delivery dosage forms

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:		Lectures and group discussion	Attendance, Written, oral exams and small projects
a1-	Define the different terminology as sustain, control, drug targeting, novel drug delivery….etc		
a2-	Acquire the knowledge of drug delivery systems.		
a3-	Define the theoretical background of drug release utilized for drug targeting		
a4-	Describe the characters and formulation of drug delivery dosage forms		

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة ا.د.
محمود البريهي	ا.د. محمود البريهي	ا.د.ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
B1	Consolidate the chemical, biochemical and	**b1-**	Estimate the differences between methods of
	physiological principles to construct the pharmacophores of the structure and their effect on the stability, pharmacokinetic and pharmacodynamic profiles of the drug.		formulations for various controlled and colloidal drug new delivery systems in a safe and effective way
B3	Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.	**b2-**	Relate polymeric structure and properties with the desired drug delivery systems.
		b3-	Identify the methods of achieving drug delivery systems.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, brainstorming and group discussion	Written, oral exams project, and small projects
b1-	Estimate the differences between methods of formulations for various controlled and colloidal drug new delivery systems in a safe and effective way		
b2-	Relate polymeric structure and properties with the desired drug delivery systems.		

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة ا.د.
محمود البريهي	ا.د. محمود البريهي	ا.د.ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

b3-	Identify the methods of achieving drug delivery systems.		

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
C1-	Operate different pharmaceutical equipments and instruments and use emerging technologies in preformulation, formulation, packaging, storage and analysis of pharmaceutical products according to GLP, GSP and cGMP guidelines	**c1-**	Illustrate the basic concepts of controlled drug delivery and targeting
C4-	Provide patient-oriented pharmaceutical care by collaboration with other health care professionals to optimize therapeutic outcomes.	**c2-**	Monitor the methods of development of colloidal carriers for targeting of drugs
		c3-	Be able to work in industry in either production or quality control of drug delivery systems.
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.		

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, brainstorming and group discussion	Written, oral exams, report, project and observation.
c1-	Illustrate the basic concepts of controlled drug delivery and targeting		

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة ا.د.
محمود البريهي	ا.د. محمود البريهي	ا.د.ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

c2	Monitor the methods of development of colloidal carriers for targeting of drugs		
c3	Be able to work in industry in either production or quality control of drug delivery systems.		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
D2-	Employ proper documentation and filing systems in different pharmaceutical fields	**d1-**	Acquire good, scientific knowledge so his counseling abilities to patients improve health
D4-	Take responsibility for adaptation to change needs in pharmacy practice.	**d2**	Communicate effectively with patients and health care professionals
D5-	Apply information and communication technology and working effectively in a team.		

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, brainstorming and group discussion	Written, oral exams, report, project and observation.
d1-	Acquire good, scientific knowledge so his counseling abilities to patients improve health		
d2-	Communicate effectively with patients and health care professionals		

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Introduction to advanced drug delivery and Targeting	**a1,a2,a3, b1, b2, b3, c3, d2**	Drug Delivery: The Basic Concepts Biopharmaceutical, Physiological, and Clinical Considerations	**1**	**2**
2	Types of DDS Physicochemical properties of drugs	**a1, a2, c1, c3, d1, d2**	Factors Controlling Pharmacokinetics of DDS, Drug carriers	**1**	**2**
3	Biological factors influencing design and performance of sustained/controlled release	**a3,a4, b2,b3, c1, c2, d1**	Definition factors Classification	**1**	**2**
	products				
4	Delivery principles and Use of polymers	**a4, b2, b3, c1, d1**	Nasal drug delivery, colorectal drug delivery, pulmonary drug delivery, cardiovascular drug delivery	**1**	**2**
5	Drug targeting	**a4, b2, d1, d2**	Human intestinal cellular characteristics and drug permeability, targeted drug delivery to tumor cells	**1**	**2**

6	Routes of drug delivery Oral DDS	**a4, b3, d1, d2**	Softgel Formulations, Improving Drug Release Mechanisms of Oral Preparations, Oral trans-mucosal drug delivery	**1**	**2**
7	**Mid-term exam**	**a1-4, b1-3, c1-3**		**1**	**2**
8	Transdermal DDS	**a3, a4,b1, c1, c3, d1,d2**	Local application, carriers, formulations, Penetration enhancers, future prospectives	**1**	**2**
9	Parenteral DDS	**a4, b3, c3, d1, d2**	Formulations, carriers	**1**	**2**
10	Targeting to different sites	**a4, b1, b2, b3, c3**	Polymeric Carriers for Drug Delivery	**1**	**2**
11	Design of targeting carriers	**a4, b3, c3, d1, d2**	Receptor-Mediated Targeted Drug Delivery	**1**	**2**
12	Microencapsulation and Bioadhesion	**a4, b2,b3,c3, d1, d2**	formulations for extended-release matrices	**1**	**2**
13	Microemulsions	**a4, b3, d1, d2**	Types, application	**1**	**2**
14	Nanoparticles as controlled drug delivery systems.	**a2,a3, b1, b2, b3, c3, d2**	technology application in pulmonary delivery of proteins, Polymer nanoparticles in drug	**1**	**2**
			delivery system		
15	Future directions of drug delivery and targeting	**a3, b1, b2, b3, c3, d2**	Novel carriers and formulations for drug delivery Novel approaches	**1**	**2**
16	Final-term exam	**a1-4, b1-3, c1-3**		**1**	**2**
Number of Weeks /and Units Per Semester				**16**	**32**

VI. a- Teaching strategies of the course:

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة ا.د.
محمود البريهي	ا.د. محمود البريهي	ا.د.ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

Lecture method, Group Discussion, Problem solving sessions**,** tutorials and brainstorming.
b-Assessment Methods:
Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, project, and Written exam

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-4, b1-3, d1-2**	Sporadic through the semester	**10**
2	Reports	**c1-3, d1-2**		

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	Quizzes, Attendance, Participation, Homework, reports	All weeks	**10**	10%	**a1-4, b1-3, c1-3, d1-2**
2	Written Mid exam, Oral exam, projects	2-14	**30**	30%	**a1-4, b1-3, c1-3**
3	Written Final exam	16th	**60**	60%	**a1-4, b1-3, c1-3**
	Total		**100**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
2hrs/week	

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة ا.د.
محمود البريهي	ا.د. محمود البريهي	ا.د.ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

X. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

1. A book prepared by the staff members
2. Taylor and Francis (2001) Drug Delivery and Targeting, first edition, London and New York.
3. Chien, Y.W. (ed.) (1991) Novel Drug Delivery Systems, 2nd edn. Marcel Dekker, New Yor

2- Recommended Readings and Reference Materials

1. Ansel; H.C., (2011) Pharmaceutical Dosage Forms and drug Delivery Systems'. 9th ed ,Lea & Febiger; Philadelphia; London.
2. Aulton, M.E. (ed). (2013) Pharmaceutics, the design and manufacture of medicines. 4th edition Churchill Livingstone, Edinburgh.
3. Loyd, V Allen J.,2013, Remington: The Science and Practice of Pharmacy 22nd edition, Pharmaceutical Press, London.
4. Gibaldi, M. (1991) Biopharmaceutics and Clinical Pharmacokinetics, 4th edn. Lea & Febiger, Philadelphia.
5. Florence, A.T. and Attwood D. (1998) Physicochemical Principles of Pharmacy, 3rd edn. Macmillan London.

6.Robinson, J.R. and Lee, V.L. (eds) (1987) Controlled Drug Delivery: Fundamentals and Applicat 2nd edn. Marcel Dekker, New York.

3- Electronic Materials and Web Sites *etc*.

www.pubmed.com
http://www.sciencedirect.com

4- Other Learning Material:

International journal of drug delivery
J. Pharm. Sci
Published articles related to the discussed topics

	United States Pharmacopeia and National Formulary (latest edition) United States Pharmacopeial Convention Inc., Rockville, MD. British Pharmacopoeia (latest edition), HMSO. London. Martindale, W. (latest edition) The Extra Pharmacopoeia., Royal Pharmaceutical Society of Great Britain, London.

XI. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

XII. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة ا.د.
محمود البريهي	ا.د. محمود البريهي	ا.د.ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
4- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.

2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Advanced Drug Delivery systems

I. - Information about Faculty Member Responsible for the Course:		
Name of Faculty Member	Prof Dr/ Mahmoud Mahyoob Alburyhi	Office Hours

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة ا.د.
محمود البريهي	ا.د. محمود البريهي	ا.د.ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

Location & Telephone No.	777970600	SAT	SUN	MON	TUE	WED	THU
E-mail	buryhi@yahoo.com			2hrs	2hrs		

II. Course Identification and General Information:

1-	Course Title:	**Advanced Drug Delivery Systems**				
2-	Course Number & Code:	Ph2817				
3-	Credit hours: 2hrs	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		2	-	-		2
4-	Study level/year at which this course is offered:	Fourth year/Second semester				
5-	Pre –requisite (if any):	Pharmaceutics I-IV- Biopharmaceutics				
6-	Co –requisite (if any):	Pharmacokinetics				
7-	Program (s) in which the course is offered	Bachelor of Pharmacy				
8-	Language of teaching the course:	English				
9-	System of Study:	Semesters				
10-	Mode of delivery:	Regular				
11-	Location of teaching the course:	Faculty of Pharmacy-Sana'a University				

III. Course description:

This course aims to provide the students to introduce the different technologies that have been investigated recently to enhance the drug accumulation at their target sites. Describe the characters and formulation of drug delivery dosage forms.

IV. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Define the different terminology as sustain, control, drug targeting, novel drug delivery….etc
2. Acquire the knowledge of drug delivery systems.
3. Define the theoretical background of drug release utilized for drug targeting
4. Describe the characters and formulation of drug delivery dosage forms
5. Estimate the differences between methods of formulations for various controlled and colloidal drug new delivery systems in a safe and effective way
6. Relate polymeric structure and properties with the desired drug delivery systems.
7. Identify the methods of achieving drug delivery systems.
8. Illustrate the basic concepts of controlled drug delivery and targeting
9. Monitor the methods of development of colloidal carriers for targeting of drugs
10. Be able to work in industry in either production or quality control of drug delivery systems.
11. Acquire good, scientific knowledge so his counseling abilities to patients improve health
12. Communicate effectively with patients and health care professionals

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours

1	Introduction to advanced drug delivery and Targeting	**a1,a2,a3, b1, b2, b3, c3, d2**	Drug Delivery: The Basic Concepts Biopharmaceutical, Physiological, and Clinical Considerations	**1**	**2**
2	Types of DDS Physicochemical properties of drugs	**a1, a2, c1, c3, d1, d2**	Factors Controlling Pharmacokinetics of DDS, Drug carriers	**1**	**2**
3	Biological factors influencing design and performance of sustained/controlled release products	**a3,a4, b2,b3, c1, c2, d1**	Definition factors Classification	**1**	**2**
4	Delivery principles and Use of polymers	**a4, b2, b3, c1, d1**	Nasal drug delivery, colorectal drug delivery, pulmonary drug delivery, cardiovascular drug delivery	**1**	**2**
5	Drug targeting	**a4, b2, d1, d2**	Human intestinal cellular characteristics and drug permeability, targeted drug delivery to tumor cells	**1**	**2**
6	Routes of drug delivery Oral DDS	**a4, b3, d1, d2**	Softgel Formulations, Improving Drug Release Mechanisms of Oral Preparations, Oral trans-mucosal drug delivery	**1**	**2**
7	**Mid-term exam**	**a1-4, b1-3, c1-3**		**1**	**2**
8	Transdermal DDS	**a3, a4,b1, c1, c3, d1,d2**	Local application, carriers, formulations, Penetration enhancers, future prospectives	**1**	**2**
9	Parenteral DDS	**a4, b3, c3, d1, d2**	Formulations, carriers	**1**	**2**

10	Targeting to different sites	**a4, b1, b2, b3, c3**	Polymeric Carriers for Drug Delivery	**1**	
					2
11	Design of targeting carriers	**a4, b3, c3, d1, d2**	Receptor-Mediated Targeted Drug Delivery	**1**	**2**
12	Microencapsulation and Bioadhesion	**a4, b2,b3,c3, d1, d2**	formulations for extended-release matrices	**1**	**2**
13	Microemulsions	**a4, b3, d1, d2**	Types, application	**1**	**2**
14	Nanoparticles as controlled drug delivery systems.	**a2,a3, b1, b2, b3, c3, d2**	technology application in pulmonary delivery of proteins, Polymer nanoparticles in drug delivery system	**1**	**2**
15	Future directions of drug delivery and targeting	**a3, b1, b2, b3, c3, d2**	Novel carriers and formulations for drug delivery Novel approaches	**1**	**2**
16	Final-term exam	**a1-4, b1-3, c1-3**		**1**	**2**
Number of Weeks /and Units Per Semester				**16**	**32**

VI. a- Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions**,** tutorials and brainstorming.

b-Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, project, and Written exam

VII. Assignments:

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة ا.د.
محمود البريهي	ا.د. محمود البريهي	ا.د.ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-4, b1-3, d1-2**	Sporadic through the semester	**10**
2	Reports	**c1-3, d1-2**		

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	Quizzes, Attendance, Participation, Homework, reports	All weeks	**10**	10%	**a1-4, b1-3, c1-3, d1-2**
2	Written Mid exam, Oral exam, projects	2-14	**30**	30%	**a1-4, b1-3, c1-3**
3	Written Final exam	16th	**60**	60%	**a1-4, b1-3, c1-3**
	Total		**100**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
2hrs/week	

X. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

4. A book prepared by the staff members
5. Taylor and Francis (2001) Drug Delivery and Targeting, first edition, London and New York.
6. Chien, Y.W. (ed.) (1991) Novel Drug Delivery Systems, 2nd edn. Marcel Dekker, New Yor

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة ا.د.
محمود البريهي	ا.د. محمود البريهي	ا.د.ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

2- Recommended Readings and Reference Materials	
	6. Ansel; H.C., (2011) Pharmaceutical Dosage Forms and drug Delivery Systems'. 9th ed ,Lea & Febiger; Philadelphia; London. 7. Aulton, M.E. (ed). (2013) Pharmaceutics, the design and manufacture of medicines. 4th edition Churchill Livingstone, Edinburgh. 8. Loyd, V Allen J.,2013, Remington: The Science and Practice of Pharmacy 22nd edition, Pharmaceutical Press, London.
	9. Gibaldi, M. (1991) Biopharmaceutics and Clinical Pharmacokinetics, 4th edn. Lea & Febiger, Philadelphia. 10. Florence, A.T. and Attwood D. (1998) Physicochemical Principles of Pharmacy, 3rd edn. Macmillan London. 6.Robinson, J.R. and Lee, V.L. (eds) (1987) Controlled Drug Delivery: Fundamentals and Applicat 2nd edn. Marcel Dekker, New York.
3- Electronic Materials and Web Sites *etc*.	
	www.pubmed.com http://www.sciencedirect.com
4- Other Learning Material:	
	International journal of drug delivery J. Pharm. Sci Published articles related to the discussed topics United States Pharmacopeia and National Formulary (latest edition) United States Pharmacopeial Convention Inc., Rockville, MD. British Pharmacopoeia (latest edition), HMSO. London. Martindale, W. (latest edition) The Extra Pharmacopoeia., Royal Pharmaceutical Society of Great Britain, London.

XI. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

XII.	Course Improvement Processes:
6- Strategies for obtaining student feedback on effectiveness of teaching	
	▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
7- Other strategies for evaluation of teaching by the instructor or by the department.	
	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
8- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة ا.د.
محمود البريهي	ا.د. محمود البريهي	ا.د.ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)

The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة ا.د.
محمود البريهي	ا.د. محمود البريهي	ا.د.ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.