Academic Reference Standards (ARS)
For
Master degree in Pharmaceutical Sciences
(*Pharmaceutics*)

Name of the Dept. Pharmaceutics

ARS

Academic Year: 2021/2022

Head of Department

Prof. Dr. Irhan Ibrahim Abu Hashim

Master degree in Pharmaceutical Sciences (Pharmaceutics)

Academic Reference Standards (ARS)

(Department Council Approval on 15/5/2022)

(Faculty Council Approval on 5//2022)

I. Attributes of the graduate:

1. Applying the basics and methodologies of scientific research and manipulating its various tools in the field of pharmaceutics.
2. Mastering of advanced knowledge, professional research skills, attitudes and values in the field of pharmaceutical products and integrating with the relevant subjects in his/her professional practice.
3. Recognizing the current issues in pharmaceutical products preparation, formulation and/or application and participating in systems for dispensing, storage and distribution of medications
4. Adopting the scientific thinking approaches in subjects relevant to drug development and/or drug analysis
5. Identifying and solving problems in the field of pharmaceutics
6. Mastering adequate range of specialized professional skills and using appropriate technology to improve his/her professional practice.
7. Communicating effectively and having the capability of communication skills, time management, critical thinking, and problem-solving, decision-making and team-working.
8. Taking appropriate professional and scientific decisions in light of the available information.
9. Providing information and education services to community and patients about rational use of medications and medical devices.
10. Training in compliance with legal, ethical and professional rules. .
11. Employing the available resources to achieve and preserve the maximum benefit,

comprehending principles of pathophysiology of diseases and participate with other health care professionals in improving health care services using evidence-based data. .

12. Exhibiting awareness of his/her role in the community development and preservation of environment in response to regional global changes.
13. Reflecting commitment to integrity, credibility and rules of the pharmacy profession.
14. Developing presentation, promotion, marketing, business administration, numeric and computation skills

II. General Standards

1. Knowledge and Understanding:

Upon successful completion of the Program, graduates should be able to:

1.1 Identify the principles of basic, pharmaceutical, medical, social, behavioral, management, health and environmental sciences as well as pharmacy practice.
1.2 Recognize the physico-chemical properties of various substances used in preparation of medicines including inactive and active ingredients as well as biotechnology and radio-labeled products.
1.3 Detect all basic and new techniques used in the field of drug design, development and synthesis and/or drug quality control.
1.4 Distinguish the value of ethics and legal issues of research and professional practice in pharmaceutics.
1.5 Identify the properties of different pharmaceutical dosage forms including novel drug delivery systems
1.6 Illustrate the principles of various instruments and techniques including sampling, manufacturing, packaging, labeling, storing and distribution processes in pharmaceutical industry
1.7 Identify the principles of pharmacokinetics and bio pharmaceutics with applications in therapeutic drug monitoring, dose modification and bioequivalence studies.

2. Intellectual Skills

Upon successful completion of the Program, graduates should be qualified to:

2.1 Analyze and evaluate information in the field of pharmaceutics
2.2 Deduce solutions for specialized problems in absence of some information
2.3 Integrate information to solve professional problems.
2.4 Develop methodological scientific studies on certain research problems.

2.5 Asses toxicity profiles of different xenobiotics and detect poisons in biological specimens.
2.6 Plan for development in pharmaceutical products.
2.7 Advise patients and other health care professionals about safe and proper use of medicines.

3. Professional and Practical Skills

Upon completion of the program, graduates should be able to

3.1 Master basic and professional skills in pharmaceutics and related fields.
3.2 Assess research studies, analyze the results and drug quality control.
3.3 Write and evaluate employ proper documentation and drug filing systems.

4. General and transferable skills:

Upon completion of the program, graduates should be able to:

4.1 Communicate clearly by verbal and written means.
4.2 Utilize information from different sources to improve professional competencies.
4.3 Perform critical thinking, problem-solving and decision-making abilities.
4.4 Use numeracy, calculation and statistical methods as well as information technology tools.
4.5 Anticipate needs and risks in the research fields.
4.6 Work in a team and lead others in various professional contexts.
4.7 Demonstrate creativity and time management abilities.
4.8 Interpret and evaluate data available from scientific research.
4.9 Implement writing and presentation skills
4.10 Show awareness of ethical, legal and safety guidelines in pharmaceutics.

Program: Master Degree in Pharmaceutical Sciences (*Pharmaceutics*)

Pharmaceutics Department

Program Specification

Academic Year: *2021/2022*

Head of Department

Prof. Dr. Irhan Ibrahim Abu Hashim

A-Basic Information

1	**Faculty**	**Pharmacy**
2	**Program Title:**	**Master in Pharmaceutical Sciences (Pharmaceutics)**
3	**Program Type:**	**Single**
4	**Department (s):**	**Department of Pharmaceutics**
5	**Final award:**	**Master degree in Pharmaceutics**
6	**Coordinator:**	**Prof. Dr. Hassan Mohammed El-Sabbagh**
7	**External Evaluator(s):**	
8	**Date of Program Specification Approval:**	***Department council: 15/5/2022***

B-Professional Information

1-Program Aims.

Upon successful completion of the program, graduates should demonstrate comprehensive knowledge, clear understanding and outstanding skills in pharmaceutical sciences and pharmaceutics.

1.1 Mastering of advanced knowledge, professional research skills, attitudes and values in the field of pharmaceutical products and integrating with the relevant subjects in his/her professional practice.

1.2 Applying the basics and methodologies of scientific research and manipulating its various tools in the field of pharmaceutics.

1.3 Master practical research procedures according to the good laboratory practice (GLP) basics in pharmaceutics labs and perform experiments with safety guidelines.

1.4 Mastering of all traditional and new techniques used in pharmaceutical products preparation, formulation and/or application and participating in systems for dispensing, storage, distribution of medications and physical and microbiological stability for different pharmaceutical products.

1.5 Applying the scientific thinking approaches and problem-based learning in subjects relevant to pharmaceutical products preparation and/or stability prediction.

1.6 Formulating hypotheses based on current concepts in pharmaceutics field.

1.7 Designing and conducting research projects.

1.8 Analyze and interpret results and information acquired from primary literature sources.

1.9 Manipulate computer program, online database, software and other IT skills to get information and analyze the obtained research data.

1.10 Attaining communication skills, research ethics, time management, decision-making, and team-working.

2-Intended Learning Outcomes (ILOs)

A. Knowledge and Understanding:

By the end of this program the graduate should be able to:

A1.	Explain the concepts and principles which relate pharmacokinetics principles to the pharmacodynamic response of drugs, drug delivery via various routs and drug stability.
A2.	Explain the behavior of single or repeated doses of drugs in the body and design of drug delivery systems.
A3.	Recognize how biochemical and therapeutic drug monitoring can assist in the management of diseases.
A4.	Recall effectively all basic and recent techniques and technological tools used in the principles of clinical pharmacokinetics
A5.	Identify the legal and ethical issues of research and professional practice in pharmaceutics.
A6.	Define the principles and the basics of quality in professional practice in the fields of pharmaceutics.
A7.	Identify appropriate types of data needed to tackle a certain research problem.
A8.	Explain the theories and fundamentals of instrumental analysis, statistics and biostatistics, physical chemistry, and bioinformatics.

B. Intellectual Skills

By the end of this program the graduate should be able to:

B1.	Analyze and evaluate the data of pharmacokinetics of drugs.
B2.	Predict logic and critical way of thinking to suggest solutions for scientific and professional problems according to accompanying circumstances and causes.
B3.	Verify creativity and innovative scientific and professional approaches regarding pharmaceutics.
B4.	Compare the available professional and scientific resources and research skills to solve problems.
B5.	Assess professional and scientific risks in drug interaction and apply kinetics parameters to solve therapeutic dilemma and handling with recent techniques in the preparation of new delivery system.
B6.	Plan to improve performance and research in the field of pharmaceutics.
B7.	Interpret drug blood levels and recommend the use of computerized programs in therapeutic drug monitoring.
B8.	Formulate professional and scientific decisions based on the characteristics of biopharmaceutical products
B9.	Conduct a comprehensive scientific and professional discussions and communications based on scientific evidence and proofs.
B10.	Analyze and evaluate the gained information in the field of instrumental analysis, biostatistics، physical chemistry, bioinformatics, and drug development.

C. Professional and Practical Skills

By the end of this program the graduate should be able to:

C1.	Apply teamwork with other health care members to modify drug dose regimens and list chemical reactions between the drug substance and site-specific biological fluids.
C2.	Utilize different research methodologies, good experimental and reporting skills in the dose regimens, modified-release dosage forms and controlled release drug delivery systems.
C3.	Illustrate the pharmacokinetic calculations and *in-vitro-in-vivo* correlations about the availability of the drug.
C4.	Handle scientific research and contribute to the knowledge in the field of pharmaceutics.
C5.	Design accurately, evaluate professional reports and publish scientific research papers in scientific journals and conferences.
C6.	Complete thesis in a scientific and precise way.
C7.	Illustrate the effect of his/her professional practice on the community in addition to different methods of delivery route, therapeutic agent, and dosage form in the optimization of pharmacotherapy.

D. General and Transferable Skills

By the end of this program the graduate should be able to:

D1.	Communicate clearly by verbal and written means.
D2.	Use information technology tools such as computer program, online database, software, and other IT to get information and analyze the obtained research data.
D3.	Practice self- assessment and learning needed for continuous professional development.
D4.	Use different available information resources relevant to pharmaceutics.
D5.	Demonstrate critical thinking, problem-solving and decision-making capabilities.
D6.	Solve and Deal with obstacles and problems.
D7.	Work effectively in a team and offer expertise and advice to others
D8.	Show creativity and time management abilities.
D9.	Retrieve and evaluate scientific work, literature, and research data.
D10.	Adopt ethical, legal, professional responsibilities and safety guidelines.
D11.	Develop presentation skills, give seminars, and defend thesis in public.

3-Academic Reference Standards (ARS):

Approved by both the department and faculty councils.
Department Council Approval Date: *15/5/2022*
Faculty Council Approval Date: *5/2022*

3a- Academic References Standards: (**Attached)**

3b-Comparison of provision to External References

Achievement of academic reference standards via program Intended Learning Outcomes.

ILOs	ARS	Program
1. **Knowledge and Understanding**	**1.1**	A3, A7
	1.2	A4
	1.3	A6
	1.4	A5
	1.5	A2, A6
	1.6	A6, A8
	1.7	A1, A4
2. **Intellectual Skills**	**2.1**	B1, B10
	2.2	B2
	2.3	B2, B4, B5
	2.4	B8, B9
	2.5	B5, B7
	2.6	B3, B6
	2.7	B7
3. **Professional and Practical Skills**	**3.1**	C1, C3, C4
	3.2	C5, C6
	3.3	C2, C7
4. **General and Transferable Skills**	**4.1**	D1
	4.2	D2, D4
	4.3	D5, D6
	4.4	D2
	4.5	D5, D10
	4.6	D7, D8
	4.7	D3, D8
	4.8	D9
	4.9	D11
	4.10	D10

4-Curriculum Structure and Contents

4A. Program duration: 18 months from the date of registration -5 years.

4B. Program structure:

a- The program consists of 46 credit hours of study (16 credit hours of courses and 30 credit hours for thesis).

b. The program includes 16 credit hours graduate courses. These courses include 8 credit hours of general required courses of the faculty requirement, in addition to 8 credit hours of special required (6 credit hours) and special elective (2 credit hours) courses. The courses will possess the code [200] according to Faculty By-Law.

c. A scientific research thesis of 30 credit hours represent a main component of the program. It is achieved in a subject assigned by the supervision committee, endorsed by the Department Council, the committee of graduate studies & research and the Faculty Council.

d. The student should publish at least one scientific research paper in scientific journals before the public defense of the Thesis.

4C. Program Components

1- Courses according to the By-law

Code number	Name of the course	Type	Credit Hours	Semester
(GCM-201)	***Instrumental Analysis***	***General*** Compulsory	2	Fall
(GCM-202)	***Statistics and biostatistics***	***General*** Compulsory	2	Fall
(GCM-203)	***Physical chemistry***	***General*** Compulsory	1	Fall
(GCM-204)	***Bioinformatics***	***General*** Compulsory	1	Fall
(GCM-205)	***Research Methodology & Ethics***	***General*** Compulsory	1	Fall
(GCM-206)	***Scientific writing and Seminar***	***General*** Compulsory	1	Fall
(PTM-201)	***Kinetics, stability and storage of dosage forms***	***Special*** Compulsory	2	Spring
(PTM -202)	***Pharmacokinetics***	***Special*** Compulsory	2	Spring
(PTM-203)	***Advanced Drug Delivery Systems***	***Special*** Compulsory	2	Spring
(PTM-204)	***Controlled Drug Delivery System***	Elective	2	Spring
Total (Courses)	10		16	
	Thesis		30	
Total			46	

2- Achievement of Program Intended Learning Outcomes via the courses

Course	C.H/ week	Program ILOs (by No.)			
		K.U*	IS**	P.P.S***	G.T.S****
First Semester - *General Courses (8 C.H.)*					
Instrumental Analysis (GCM-201)	2	A8	B4, B10	C1, C2	D1, D3
Statistics and biostatistics (GCM-202)	2	A8	B4, B10	C1, C2	D2, D6
Physical chemistry (GCM-203)	1	A8	B4, B10	C1, C2	D2, D6
Bioinformatics (GCM-204)	1	A8	B4, B10	C1, C2	D2
Research Methodology & Ethics (GCM-205)	1	A5	B2, B9	C4, C5	D5, D10
Scientific writing and Seminar (GCM-206)	1	A7	B6, B7, B8, B9	C6, C7	D9, D11
Total	**8**				
SECOND SEMESTER - *SPECIAL COURSES (8 C.H.)*					
Kinetics, stability and storage of dosage forms (PTM-201)	**2**	A1	B2, B3, B5	C2, C4	D6, D8
Pharmacokinetics (PTM -202)	**2**	A1, A3, A4	B1, B7, B8	C3	D6, D7
Advanced Drug Delivery Systems (PTM-203)	**2**	A2, A6	B3, B5, B6	C4	D4, D5
Controlled Drug Delivery System (PTM-204)	**2**	A2, A6	B3, B5, B6	C2	D4, D5
Total	**8**				
Thesis	**30**	A4, A5, A6, A7	B2, B6, B9	C5, C6	D9, D11
Total	**46**				

* ***K**nowledge and **U**nderstanding* *** ***P**rofessional and **P**ractical **S**kills*
** ***I**ntellectual **S**kills* **** ***G**eneral and **T**ransferable **S**kills*

Code	Course title	K.U*								IS**									
		A1	A2	A3	A4	A5	A6	A7	A8	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10
GCM-201	Instrumental Analysis								√				√						√
GCM-202	Statistics and biostatistics								√				√						√
GCM-203	Physical chemistry								√				√						√
GCM-204	Bioinformatics								√				√						√
GCM-20)	Research Methodology & Ethics					√					√							√	
GCM-206	Scientific writing and Seminar							√							√	√	√	√	
PTM-201	Kinetics, stability, and storage of dosage forms	√									√	√		√					
PTM-202	Pharmacokinetics	√		√	√					√						√	√		
PTM-203	Advanced Drug Delivery Systems		√				√					√		√	√				
PTM-204	Controlled Drug Delivery System (E)		√				√					√		√	√				
	Thesis				√	√	√	√	√		√				√			√	

* ***K**nowledge and **U**nderstanding.*
** ***I**ntellectual **S**kills*
E ***Elective Course***

Code	Course title	P.P.S***							G.T.S****										
		C1	C2	C3	C4	C5	C6	C7	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11
GCM-201	Instrumental Analysis	√	√						√		√								
GCM-202	Statistics and biostatistics	√	√							√				√					
GCM-203	Physical chemistry	√	√							√				√					
GCM-204	Bioinformatics	√	√							√									
GCM-20)	Research Methodology & Ethics				√	√							√					√	
GCM-206	Scientific writing and Seminar						√	√									√		√
PTM-201	Kinetics, stability, and storage of dosage forms		√		√									√		√			
PTM-202	Pharmacokinetics			√										√	√				
PTM-203	Advanced Drug Delivery Systems				√							√	√						
PTM-204	Controlled Drug Delivery System (E)		√									√	√						
	Thesis					√	√										√		√

*** *Professional and Practical Skills*
**** *General and Transferable Skills*
E ***Elective Course***

6- Student Assessment Methods

6.1- Written exam (general and special courses).	To assess Knowledge and Understanding and Intellectual Skills
6.2- Oral exam (general and special courses).	To assess Knowledge and Understanding, Intellectual Skills and General and transferable Skills
6.3- Scientific seminar for thesis registration	To assess Knowledge and Understanding, Intellectual Skills and General and transferable Skills
6.4- Published scientific research paper.	Knowledge and Understanding, Intellectual Skills, Professional and practical Skills
6.5- Thesis writing	Knowledge and Understanding, Intellectual Skills, Professional and practical Skills & General and Transferable Skills
6.5- Public presentation and discussion of the thesis.	Knowledge and Understanding, Intellectual Skills, Professional and practical Skills & General and Transferable Skills

7- Program Admission Requirements

7.1- The candidate should hold a bachelor's degree in pharmacy from any faculty of pharmacy from Egypt or Arabian countries or foreign universities recognized by the Supreme Council of Universities recognized by the Supreme Council of Universities with minimum general grade of "**Good**". Candidates having Diploma in specialty are preferred. It is possible to enroll foreign students with general grade "**Good**".

7.2- The candidate should be available for study at least two days per week throughout the duration of study.

7.3- The candidate should possess at least grade "**Good**" in the subject of the specialty.

7.4- The department council starts the registration process for the candidate after his/her successful passing of the general courses of the first semester.

7.5- The candidate should follow postgraduate rules of by-law (**2014**) and its modified by-law **(2017)** of Faculty of Pharmacy-Mansoura University.

8- Regulations for progression and program completion

8.1- The minimum duration of time to gain the master's degree is two years from the date of enrollment or 18 months from the date of registration of the master thesis.

8.2- The maximum duration of time to gain the master's degree is 5 years from the date of registration, putting in consideration the periods of enrollment suspension. It is possible to extend this period up to two years (one year at a time) based on a request from the candidate's major supervisor, a suggestion from the department council and the committee of graduate studies & research and the approval of the faculty council. The final decision should be endorsed by the university council of graduate studies & research.

8.3- The student has to pass the assigned courses, and to practically do a scientific research thesis for complete fulfillment of the master's degree.

8.4- An annual progress report is presented by the supervisors of thesis to the Dept council by December.

8.5- The candidate should follow postgraduate rules of by-law (**2014**) and its modified by-law **(2017)** of Faculty of Pharmacy-Mansoura University.

9- Facilities Required for Search:

9.1.Computers.
9.2.Library and digital library supplied by recent scientific books and journals.
9.3. Laboratories with enough chemicals, apparatus, and advanced instruments.
9.4. Access to research engines for scientific periodicals in the field of pharmaceutics
9.5.Computer software for data analysis.

10-Thesis

A thesis should be prepared by the student for complete fulfillment of the master degree.

11- Evaluation of program

Evaluator	Method	Sample
Internal evaluator	Program evaluation Courses evaluation	Program report Courses report
External evaluator	Program evaluation Courses evaluation	Program report Courses report
Stakeholders	Questionnaires	To be Attached
Postgraduates	Questionnaires	To be Attached
Self-evaluation	Matrices	To be Attached
Supervisors of Thesis	Reports	Reports of staff members of committee to evaluate the thesis

Program Coordinator: Prof. Dr. Hassan Mohammed El-Sabbagh

Head of Department: Prof. Dr.Irhan Ibrahim Abu Hashim

Annex 1

Attach courses and thesis specifications.

Program: Master in Pharmaceutical Sciences (*Pharmaceutics*)

Pharmaceutics Department

Master Thesis Specification

Academic Year: 2021/2022

Head of Department

Prof. Dr. Irhan Ibrahim Abu Hashim

A-Basic Information

1	**Faculty**	**Pharmacy**
2	**Program Title:**	**Master in Pharmaceutical Sciences (*Pharmaceutics*)**
3	**Program Type:**	**Single**
4	**Department (s):**	**Pharmaceutics Department**
	Total credits of the Thesis	**42 C. H.**
	Total credits of the Program	**50 C.H.**
5	**Final award of the Program:**	**Master degree of Pharmaceutical Sciences (Pharmaceutics)**
6	**Coordinator:**	**Prof. Dr. Hassan Mohammed El-Sabbagh**
7	**External Evaluator(s):**	
8	**Date of Program Specification Approval:**	***Department council: 15/5/2022***

B-Professional Information

1-Aims

The overall aims of the thesis:

1. Recognizing novel concepts, methods and/or techniques in the field of pharmaceutics.
2. Adopting the critical and analytical thinking approaches in drug delivery systems, pharmaceutical dosage forms formulation, and stability.
3. Integrating the knowledge in the field of advanced trends of pharmaceutical technology, bioavailability, and targeted drug delivery with other relevant subjects.
4. Identifying challenging professional problems and finding innovative solutions.
5. Providing the ability to critically analyze the impact and outcomes of research results.
6. Training in ethical and legal aspects of scientific inquiry.
7. Mastering of advanced knowledge base, professional research skills, attitudes, and values.
8. Utilizing effectively available professional and scientific resources in the field of pharmaceutics.
9. Showing awareness about the role of the graduate in community development.
10. Attaining communication skills, research ethics, time management, and team-working.

2-Intended Learning Outcomes (ILOs)

a- Knowledge and Understanding:

Upon successful completion of the thesis, the graduate should be able to efficiently demonstrate the essential knowledge and understanding of:

a1	Recognize the basic techniques and the principles of clinical pharmacokinetics.
a2	Describe the role of pharmaceutics to enhance bioavailability of drugs.
a3	Define the research ethics and regulations with professional practice in pharmaceutics.
a4	Illustrate the importance of professional practice in pharmaceutical field on the environmental development and maintenance.
a5	Distinguish different drug delivery system according to needs and challenges.
a6	Explain the theories and fundamentals of pharmaceutics.

b- Intellectual Skills

By the end of this thesis, the graduate should be able to:

b1	Analyse clinical and laboratory problems effectively, and correctly interpret and explain results simply and effectively.
b2	Specify important approaches to enhance the therapeutic efficacy and bioavailability of pharmaceutical dosage forms.
b3	Conduct the proper experimental methods and evaluate the scientific risks in practicing laboratory experiments.
b4	Analyze statistically the obtained results.
b5	Formulate the research results in peer-reviewed publications and in a dissertation.
b6	Organize professionally a scientific paper in the fields of Microbiology and Immunology
b7	Interpret the research results and discuss them with other researchers

c- Professional and Practical Skills

By the end of this thesis, the graduate should be able to:

c1	Complete laboratory reports.
c2	Examine research data and employ them for statistical processing.
c3	Perform professional reports and contribute to the knowledge in the field of pharmaceutics.
c4	Analyse and interpret laboratory data relevant.
c5	Design data in publication form.
c6	Complete thesis in a scientific and precise way.

d. General and Transferable Skills

By the end of this thesis, the graduate should be able to:

d1	Perform self and continuous education skills.
d2	Analyze data and facts available for scientific research.
d3	Deal with obstacles and problems and finding the proper solution.
d4	Use computer programs, online database, and different information resources relevant to microbiological techniques
d5	Communicate research results effectively through oral presentations at scientific seminars, conferences, and other venues.
d6	Implement written and oral communication skills.
d7	Work effectively in a team and independently.
d8	Organize and manage research schedule.
d9	Demonstrate time management ability
d10	Transfer knowledge and experience to others and evaluate their performance.

3- Thesis Contents:

Part	Topics
1	Abstract (Arabic and English)
2	Introduction
3	Aims, Objectives and Rational of the work
4	Results and Discussion, covering all fields
5	Methodology and Experimental Work of all fields
6	Conclusion
7	References

4- Matrix of knowledge and skills of the Thesis:

Part	Topics	Course ILOs			
		K.U*	IS**	P.P.S***	G.T.S****
2	Introduction	a1, a3	b1, b3	c2, c3, c4	d1, d3, d5
3	Objectives/Rational	a2, a4	b2, b4	c2, c5	d2, d3, d4
4	Results and Discussion	a1, a3, a4	b1, b3, b4, b7	c1, c6	d6, d7, d8
5	Experimental Work	a2, a3, a4, a6	b2, b3, b4, b6	c1, c2, c3, c4	d2, d3, d4
6	Conclusion	a2, a5, a6	b2, b5, b6	c5, c6	d7, d8, d9, d10

* ***K**nowledge and **U**nderstanding* *****I**ntellectual **S**kills* ******P**rofessional and **P**ractical **S**kills* *******G**eneral and **T**ransferable **S**kill*

5. Student Assessment:

A written Thesis	To assess Knowledge and Understanding, Intellectual Skills and Professional and practical Skills
Published Research Paper(s)	To assess Knowledge and Understanding,

	Intellectual Skills, Professional and practical Skills & General and Transferable Skills
Public Defense	To assess Knowledge and Understanding, Intellectual Skills and General and transferable Skills
Committee-in-Charge Report	Assess and evaluate thesis
Dept Council Approval	To approve thesis

Guidelines of the Thesis (according to By-Law).

1- The minimum period for obtaining a Master is two years from the date of enrolment and 18 months from the date of approval of the University's Graduate Studies Council for registration.
2- The maximum limit for obtaining a doctoral degree is five years from the date of registration, considering cases of suspension of registration, and registration may be extended upon the request of supervisors and the approval of the relevant department council, the Graduate Studies and Research Committee, and the College Board for an academic year with a maximum of two years.

3- The student must pass the English Language Examination with the minimum score specified by the University Studies Board to approve the Master defense date.

4- The number of credit hours for obtaining a master's degree is 46 hours (16 course hours - 30 credit hours per thesis). The student studies courses of at least 16 credit hours of postgraduate courses from code [200], including compulsory general courses (8 credit hours) as the college requirements and compulsory and optional specialized courses (8 credit hours).
5- The student conducts a research on a topic determined by the supervisory committee and approved by the relevant department council and the college, graduate studies and research councils.
6- The researcher submits, before registering for the academic degree, the research plan in a public discussion in the department to discuss the topic of the thesis, determine the objectives of the research, the extent of its application, potential problems and how to overcome them.

7- The scientific thesis is the responsibility of the relevant department council and is accomplished scientifically and technically under the responsibility of the supervisory committee. Scientific, technical and administrative support must be provided to the researcher for its completion, and the supervision committee is formed as follows:
8- The College Council, upon the proposal of the relevant Department Council, appoints a professor who supervises the thesis (principal supervisor). The council may entrust the supervision of the thesis to one of the assistant professors.
9- It is permissible for the supervisors to be many professors or assistant professors, and teachers may participate with a maximum of one in the same specialty.
10- A member from abroad who has experience in the specialty to which the dissertation belongs may be joined to the supervision committee.

11- The student should meet his main supervisor at least once monthly and a semi-annual report must be provided by the supervisor(s) on the progress of student to the department council and the Graduate Studies Committee and the graduate should be given a copy of the report. The annual report must be submitted to the college council in October each year.

12- A postgraduate student registered to obtain a master's degree or a doctorate degree, after completing the thesis preparation, holds a public discussion session on the thesis summary and the

results he reached, during which the supervisors determine the extent to which the student fulfills the research point before submitting the thesis to the department council.
13- The principal supervisor submits an application that includes a proposal to form a discussion committee and judge the thesis after preparing it and preparing it for discussion in preparation for presentation to the Postgraduate Studies and Research Committee and then the College Board for approval and is supported by the following:
14- The report on the validity of the dissertation for discussion, signed by the majority of the members of the supervisory committee, one of whom is the main supervisor.
15- A copy of the thesis prepared according to the instructions for writing scientific theses in the faculty.
16- At least one research published in a scientific refereed journal.
17- The committee for discussion and judgment on the dissertation is formed of three members based on the proposal of the relevant department council, the graduate studies and research committee, and the approval of the college council, one of whom is the main supervisor or two members with one vote. And two other members from among the professors or assistant professors, at least one of them is from outside the college for master's theses, and at least one of them is from outside the university for doctoral theses (the two are from outside the college) according to the text of Article 153 of the Universities Organization Law.

18- The department council approves the individual reports, the group report, and what indicates that the student has made the proposed amendments from the discussion and judgment committee and submitted them to the Graduate Studies and Research Committee and the College Board in preparation for presentation to the University Council.
19- The date of awarding the academic degree is the date on which the University Council approved the College Board's recommendation for grants.
20- The college council, based on the proposal of the discussion and judgment committee, may return the message to the student to correct the errors and complete what the committee deems short of or submit another message in case the thesis is rejected.

6 – Facilities Required:

Laboratory	Magnetic stirrers, HPLC, UV-visible spectroscopy, Rotary evaporator, probe sonicators, centrifuges, viscometers, sensitive electric balances, ovens, incubators, PH meters, sonicating water baths, refrigerators, hot plates, freeze dryer, ……. etc
Library	British Pharmacopeia, USP Pharmacopeia, Encyclopedia of pharmaceutical technology, Published research articles, ……etc
Others	-------

Thesis Coordinator	Head of Department	Date
Prof. Dr. Hassan Mohammed El-Sabbagh	**Prof. Dr.Irhan Ibrahim Abu Hashim**	15/5/2022

* Date of Dept. Council Approval

Dept. of Pharmaceutics	Course Specification	*Master degree Courses*

Master Degree Courses

Course Specification

Academic year: 2021/2022

البرنامج **الحصول علي درجة الماجيستيرفي العلوم الصيدلية**	**توصيف مقرر** **Advanced Drug Delivery Systems**
رئيس القسم **أ.د/ إرهان إبراهيم أبو هاشم**	**منسق المقرر** **ا. د. خيري السيد جبر**

General

University	Mansoura
Faculty	Pharmacy
Department offering the course	Pharmaceutics
Department supervising the course	Pharmaceutics
Program on which the course is given	Master Degree Courses
Academic Level	Postgraduate
Academic year	2021/2022 - second semester
Date of course specification approval	15/5/2022

A.Basic Information : Course data :

Course Title	**Advanced Drug Delivery Systems**
Course Code	**PTM-203**
Prerequisite	------
Teaching Hours: Lecture	2 عدد الساعات الزمنية
: Practical	0 عدد الساعات الزمنية
Total Credit Hours	2

B. Professional Information

1- Overall Aims of Course:

1- Provide the student with comprehensive knowledge & basics of advanced drug delivery system.
2- To understand the characteristics of potential sites for drug delivery and to recognize the strategies required to deliver and/or target drugs successfully to these sites.
3- Provide the student with comprehensive theoretical basic information of modern techniques used for the release of the drug.
4- Cover the modern systems used to deliver drugs from selected pharmaceutical dosage forms.
5- To understand the characteristics of various advanced drug delivery systems (including vesicular carriers such as niosomes, transfersomes, ethosomes, dendrimes) used in practice and under development, be able to recognize their advantages and limitations.
6- Formulation of targeted action dosage forms.
7- Evaluation and stability of advanced and targeted dosage forms.

2- Intended Learning Outcomes (ILOs)

2.1. *Knowledge and Understanding*

After completion of the course, graduates will be able to

A1	a1	Define the fundamentals of delivery system formulation and evaluation.
	a2	Illustrate the concepts of drug delivery via various routes.
A2	a3	Recognize the different theories and techniques to prepare the sustained release dosage forms.
	a4	List the different techniques for preparation of advanced drug delivery systems and their relevant basic principles, advantages, and disadvantages.

2.2. Intellectual Skills

After completion of the course, graduates will be able to

B2	b1	Predict possible approaches to overcome formulation obstacles of the advanced drug delivery systems.
	b2	Differentiate between the techniques in the preparation of new delivery system.
B3	b3	Combine the knowledge of the modern systems in development of new trends to deliver drug molecules to specific target sites.
	b4	Integrate the basic knowledge with updated in developing new delivery system.

2.3. Professional and Practical Skills

After completion of the course, graduates will be able to

C2, C7	c1	Use different techniques needed for development, formulation, and evaluation of delivery system.
	c2	Apply the pharmaceutical principles governing the selection of delivery route, therapeutic agent, and dosage form in the optimization of pharmacotherapy.
	c3	Design new formulation suitable for each disease.
	c4	Implement practical solutions to modify drug dosage forms controlled and/or sustained release according to needs.

2.4. General and Transferable Skills

After completion of the course, graduates will be able to

D2	d1	Use modern technology in retrieving information
D1	d2	Communicate effectively in a scientific language.
	d3	Implement writing and presentation skills.
D6	d4	Identify and solve problems.

3. Course Contents

Week No.	Lecture Topics	Hours
1	Fundamental of drug delivery systems (Influence of drug properties, Design of sustained and controlled release)	2
2	Site-directed Drug Delivery & Targeting.	2
3	Vesicular drug delivery systems such as liposomes (preparation, characterization, advantages, and applications).	2
4	Vesicular drug delivery systems (niosomes).	2
5	Vesicular drug delivery systems (transfersomes, and ethosomes).	2
6	Dendrimers as drug and gene delivery system (preparation, characterization, advantages, and applications).	2
7	Oral and mucosal advanced drug delivery systems.	2
8	Nasal and ocular advanced delivery systems.	2
9	Transdermal drug delivery and advanced delivery systems.	2
10	Vaginal drug delivery and advanced delivery systems.	2
Total 10 weeks		20
	Final Exam	

4- Matrix of knowledge and skills of the course (contents versus ILOs of the course)

Week	Topics	Course ILOs			
		K.U*	IS**	P.P.S***	G.T.S****
1	Fundamental of drug delivery systems (Influence of drug properties, Design of sustained and controlled release)	a1,a2,a3,a4	b1,b2,b3	c1,c3	d1,d2, d4
2	Site-directed Drug Delivery & Targeting.	a4	b4	c1, c2,c3	d3
3	Vesicular drug delivery systems such as liposomes (preparation, characterization, advantages, and applications).	a1,a2,a3,a4	b2	c2,c3	d2,d4

4	Vesicular drug delivery systems (niosomes).	a1,a2,a3,a4	b2	c2,c3	d2,d4
5	Vesicular drug delivery systems (transfersomes, and ethosomes).	a1,a2,a3,a4	b2	c2,c3	d2
6	Dendrimers as drug and gene delivery system (preparation, characterization, advantages, and applications).	a1,a2,a3,a4	b1,b4	c1,c2,c3	d4
7	Oral and mucosal advanced drug delivery systems.	a1,a2,a3,a4	b1,b4	c1,c4	d4
8	Nasal and ocular advanced delivery systems.	a1,a2,a3,a4	b1, b3	c1,c2	d4
9	Transdermal drug delivery and advanced delivery systems.	a1,a2,a3,a4	b4	c1,c4	d4
10	Vaginal drug delivery and advanced delivery systems.	a1,a2,a3,a4	b1,b2,b3	c1,c2,c4	d2,d4

5- Teaching and Learning Methods:

5.1	**Lectures using Power Point** (PPT) presentations
5.2	**Lectures using whiteboard**
5.3	**Video-recorded lectures**, uploaded to the University Portal for Online learning
5.4	**Interactive Sessions** using Microsoft Teams

6-Student Assessment:

	Assessment Methods		**Assessment Schedule**	**Weighing of Assessments**
Assessment 1	**Written Exam (Final)**	Paper exams that are corrected electronically and/or manually. To assess understanding, intellectual, professional skills	Week 11	90%
Assessment 3	**Oral Exam**	To assess understanding, intellectual skills, General and Transferable skills	Week 11	10%
				100 %

7- List of References

	Reference	Type
1.	"Remington's: The science and practice of pharmacy" 21st Ed., Gennaro, A. R., ed., Mack publishing C., **Lippincott Williams and Wilkins, Philadelphia, (2006).**	Essential Book **(Text Books)**
2.	Aulton M., E., Pharmaceutics: The Science of Dosage Form Design, 2nd ed., **Churchill Livingstone, Edinburgh (2009).**	Recommended books
3.	http:// www.fda.gov http://www.drugs.com http://www.eda.mohp.gov.eg http://www.elsevier.comdescription http://www.sciencedirect.com	websites

8- Facilities required for teaching and learning

-Class room	Data show- Computers, Internet. ……..
- Library	Recommended books
Others	Internet resources

9. Signature

Course Coordinator	Head of Department	Date
Prof. Dr. Khairy Ghabr	**Prof Dr.** **Irhan Ibrahim Abu Hashim**	15/5/2022

* Date of Dept. Council Approval

Dept. of Pharmaceutics	Course Specification	*Master Degree Courses*

Master Degree Courses

Course Specification

Academic year: 2021/2022

البرنامج	توصيف مقرر
ماجستير في العلوم الصيدلية	Controlled Drug Delivery System

رئيس القسم	منسق المقرر
أ د. ارهان ابراهيم أبوهاشم	د.ولاء ابراهيم عبد الهادى

General

University	Mansoura
Faculty	Pharmacy
Department offering the course	Pharmaceutics
Department supervising the course	Pharmaceutics
Program on which the course is given	MSc Courses
Academic Level	Postgraduate
Academic year	2021/2022 - second semester
Date of course specification approval	15/5/2022

A.Basic Information : Course data :

Course Title	Controlled Drug Delivery System
Course Code	**PTM-204**
Prerequisite	------
Teaching Hours: Lecture	2 عدد الساعات الزمنية
: Practical	0 عدد الساعات الزمنية
Total Credit Hours	2

B. Professional Information

1- Overall Aims of Course:

1- Gain the fundamental basis of controlled drug delivery system and its pharmaceutical applications.
2- Design and formulation of oral controlled release drug delivery systems and parenteral products including implantable therapeutic systems and transdermal therapeutic systems.
3- Pharmacokinetic and pharmacodynamics basis of controlled drug release, requirements for modified release dosage forms.
4- Clinical considerations in the use of modified release dosage forms.

2- Intended Learning Outcomes (ILOs)

2.1. *Knowledge and Understanding*

After completion of the course, graduates will be able to

(A2)	a1	Describe different mechanisms of drug release from pharmaceutical dosage forms.
(A1)	a2	Identify the possibility of using drugs candidates for extended-, sustained-, and controlled-release drug products.

(A3)	a3	Illustrate polymers and polymerization mechanisms and methods of modifying drug dissolution.
	a4	Identify the biochemical and molecular biology approaches to control drug diffusion rates from dosage forms.

2.2. Intellectual Skills

After completion of the course, graduates will be able to

(B1)	b1	Compare the kinetic analysis data of modified-release dosage forms.
(B3)	b2	Specify suitable polymers, excipients, and technique for preparation of controlled drug delivery systems
(B6)	b3	Evaluate the release pattern of the drug delivery system and its ability to control and target a drug at the receptor site.

2.3. Professional and Practical Skills

After completion of the course, graduates will be able to

(C2)	c1	Utilize the basis for the influences of drug properties and the route of administration on the design of the modified release products.
	c2	Apply the technology of the diffusion-controlled the release of active agents.
	c3	Examine the therapeutic efficacy of the controlled drug delivery system over conventional ones.

2.4. General and Transferable Skills

After completion of the course, graduates will be able to

(D2)	d1	Use information technology tools to retrieve data.
(D9)	d2	Retrieve and evaluate information.
(D11)	d3	Develop management skills.
(D3)	d4	Practice independent learning.

3. Course Contents

Week No.	Lecture Topics	Hours
1	Fundamental of controlled drug delivery systems (Influence of drug properties, Design of sustained and controlled release)	2
2	Design and formulation of oral controlled release drug delivery systems	2

3	Parenteral products including implantable therapeutic systems	2
4	Parenteral products including transdermal therapeutic systems.	2
5	Pharmacokinetic and pharmacodynamics basis of controlled drug delivery.	2
6	Dosing considerations and bioavailability assessment of controlled drug delivery systems.	2
7	Requirements for modified release dosage forms.	2
8	In-vitro-in-vivo correlations of the drug availability.	2
9	Clinical considerations in the use of modified-release dosage forms.	2
10	Transdermal drug delivery systems and clinical considerations.	2
Total 10 weeks		20
	Final Exam	

4- Matrix of knowledge and skills of the course (contents versus ILOs of the course)

Week	Topics	Course ILOs			
		K.U*	IS**	P.P.S***	G.T.S****
1	Fundamental of controlled drug delivery systems (Influence of drug properties, Design of sustained and controlled release)	a1,a4	b2	c2,c3	d2, d4
2	Design and formulation of oral controlled release drug delivery systems	a3,a4	b1,b2,b3	c2	d1, d4
3	Parenteral products including implantable therapeutic systems	a1,a4	b2	c2,c3	d2,d4
4	Parenteral products including transdermal therapeutic systems.	a1,a4	b2	c2,c3	d2,d4
5	Pharmacokinetic and pharmacodynamics basis of controlled drug delivery.	a4	b1	c3	d2
6	Dosing considerations and bioavailability assessment of controlled drug delivery systems.	a4	b1	c3	d2
7	Requirements for modified release dosage forms.	a2,a4	b4	c1	d3
8	In-vitro-in-vivo correlations of the drug availability.	a1	b1, b3	c1,c2	d3

9	Clinical considerations in the use of modified-release dosage forms.	a2,a4	b4	c1	d3
10	Transdermal drug delivery systems and clinical considerations.	a1,a2,a3,a4	b1,b2,b3	c1,c2	d2,d3

5- Teaching and Learning Methods:

5.1	**Lectures using Power Point (PPT) presentations**
5.2	**Lectures using whiteboard**
5.3	**Internet search and Research Assignments to design Formative Assignments**
5.4	**Interactive Sessions using Microsoft Teams**
5.5	**Activities and tasks required to develop students' self-learning skills.**
5.6	**Seminar / Workshop**

6- Student Assessment:

	Assessment Methods		**Assessment Schedule**	**Weighing of Assessments**
Assessment 1	**Written Exam (Final)**	Paper exams that are corrected electronically and/or manually. To assess understanding, intellectual, professional skills	Week 11	90%
Assessment 3	**Oral Exam**	To assess understanding, intellectual skills, General and Transferable skills	Week 11	10%
				100 %

7- List of References

	Reference	**Type**
1.	"Remington's: The science and practice of pharmacy" 21st Ed., Gennaro, A. R., ed., Mack publishing C., **Lippincott Williams and Wilkins, Philadelphia, (2006).**	Essential Book **(Textbooks)**
2.	Aulton M., E., Pharmaceutics: The Science of Dosage Form Design, 2nd ed., **Churchill Livingstone, Edinburgh (2009).**	Recommended books

3.	http:// www.fda.gov http://www.drugs.com http://www.eda.mohp.gov.eg http://www.elsevier.comdescription http://www.sciencedirect.com	websites

8- Facilities required for teaching and learning

-Class room	Data show- Computers, Internet.
- Library	Recommended books
Others	Internet resources

9. Signature

Course Coordinator	Head of Department	Date
Dr. Walaa Ebrahim Abd El Hady	**Prof. Dr. Irhan Ibrahim Abu Hashim**	15/5/2022

* Date of Dept. Council Approval

Dept. of Pharmaceutics	Course Specification	*Master Degree Courses*

Master Degree Courses

Course Specification

Academic year: 2021/2022

البرنامج
الحصول علي درجة الماجيستيرفي العلوم الصيدلية

توصيف مقرر
Kinetics, stability, and storage of dosage forms

رئيس القسم

أ د. ارهان إبراهيم أبو هاشم

منسق المقرر

ا. د. حسن الصباغ

General

University	Mansoura
Faculty	Pharmacy
Department offering the course	Pharmaceutics
Department supervising the course	Pharmaceutics
Program on which the course is given	MSc Courses
Academic Level	Postgraduate
Academic year	2021/2022 - second semester
Date of course specification approval	15/5/2022

A.Basic Information: Course data:

Course Title	**Kinetics, stability and storage of dosage forms**
Course Code	**PTM-201**
Prerequisite	------
Teaching Hours: Lecture	2 عدد الساعات الزمنية
: Practical	0 عدد الساعات الزمنية
Total Credit Hours	2

B. Professional Information

1- Overall Aims of Course:

1. Predicting stability of dosage forms, stability calculations and strategy of stability testing.
2. Recognizing the basic chemical kinetic mechanisms and interpret experimental data.
3. Understanding the principle of physical and microbiological stability for different pharmaceutical products.
4. Knowing the different types of packaging materials to maintain safety, purity, uniformity and stability of the pharmaceutical product during its shelf life.
5. Summarizing the different types of chemical degradation reactions for drug products.

2- Intended Learning Outcomes (ILOs)

2.1. *Knowledge and Understanding*

After completion of the course, graduates will be able to

A1	a1	Understand orders of reaction kinetics and drug stability
	a2	Know the storage conditions and packaging methods (materials-package selection-testing the finished product in the package).

2.2. Intellectual Skills

After completion of the course, graduates will be able to

B1	b1	Assess the rate of reactions and the different factors affecting this rate.
B2	b2	Predict the stability profiles and the self-life of pharmaceutical dosage forms.
B4	b3	Solve problems related to inappropriate storage conditions and pharmaceutical dosage forms with poor stability.
B3	b4	Generate new approaches using recent techniques to enhance the pharmaceutical dosage forms stability and prolong their self-life.

2.3. Professional and Practical Skills

After completion of the course, graduates will be able to

C2, C4	c1	Specify the proper storage condition of different pharmaceutical dosage forms.
	c2	Conduct different research methodologies to study the stability of pharmaceutical dosage forms and select the suitable packaging materials.
	c3	Predict the interactions that may occur during storage of pharmaceutical dosage forms.

2.4. General and Transferable Skills

After completion of the course, graduates will be able to

D8	d1	Demonstrate time management ability.
D1	d2	Present data clearly in oral and written.
	d3	Communicate effectively in a scientific language.
D4	d4	Use modern technology in retrieving information.

3. Course Contents

Week No.	Lecture Topics	Hours
1	Kinetics of the reaction.	2
2	Kinetics of the reaction.	2
3	Principle of physical and microbiological stability for different pharmaceutical products.	2
4	Stability fundamental degradation pathways.	2
5	Stability fundamental degradation pathways.	2

6	Stability prediction by the pharmacist.	2
7	Stability prediction by the pharmacist.	2
8	Stability calculations.	2
9	Different types of packaging materials	2
10	Strategy of stability testing.	2
Total 10 weeks		20
	Final Exam	

4- Matrix of knowledge and skills of the course (contents versus ILOs of the course)

Week	Topics	Course ILOs			
		K.U*	IS**	P.P.S***	G.T.S****
1	Kinetics of the reaction.	a1	b1,b3	c1,c2,c3	d1,d2,d4
2	Kinetics of the reaction.	a1	b1,b3	c1, c2,c3	d1,d2, d4
3	Principle of physical and microbiological stability for different pharmaceutical products.	a1	b2	c2,c3	d1,d2
4	Stability fundamental degradation pathways.	a1	b1,b3	c1,c2,c3	d3,d2
5	Stability fundamental degradation pathways.	a1	b1,b3	c1,c2,c3	d3,d2
6	Stability prediction by the pharmacist.	a1	b1,b3	c3,c4	d1,d2
7	Stability prediction by the pharmacist.	a1	b2,b4	c3,c4	d1,d2
8	Stability calculations.	a1	b2, b4	c1,c2	d1,d2, d4
9	Different types of packaging materials	a2	b4	c1,c4	d1,d2
10	Strategy of stability testing.	a1	b1,b2,b4	c1,c2,c4	d1,d2

5- Teaching and Learning Methods:

5.1	**Lectures using Power Point** (PPT) presentations
5.2	**Video-recorded lectures**, uploaded to the University Portal for Online learning
5.3	**Interactive Sessions** using Microsoft Teams

6- Student Assessment:

	Assessment Methods		**Assessment Schedule**	**Weighing of Assessments**
Assessment 1	**Written Exam (Final)**	Paper exams that are corrected electronically and/or manually. To assess understanding, intellectual, professional skills	Week 11	90%
Assessment 3	**Oral Exam**	To assess understanding, intellectual skills, General and Transferable skills	Week 11	10%
				100 %

7- List of References

	Reference	**Type**
1.	Martin's: Physical pharmacy and pharmaceutical sciences (2011)	Essential Book **(Text Books)**
2.	Applied physical pharmacy, Mansoor M. Amiji, Beverly J. S., eds., Grow-Hill Companies INC.,(2012)	Recommended books
3.	http:// www.fda.gov http://www.drugs.com http://www.eda.mohp.gov.eg http://www.elsevier.comdescription http://www.sciencedirect.com	websites

8- Facilities required for teaching and learning

-Class room	Data show- Computers, Internet. ……..
- Library	Recommended books
Others	Internet resources

9. Signature

Course Coordinator	Head of Department	Date
Prof. Dr. Hassan El Sabbagh	**Prof. Dr. Irhan Ibrahim Abu Hashim**	15/5/2022

* Date of Dept. Council Approval

Dept. of Pharmaceutics	Course Specification	*MSc Courses*

MSD Courses

Course Specification

Academic year: 2021/2022

البرنامج **الحصول درجة الماجيستير**	**توصيف مقرر** **Pharmacokinetics**
رئيس القسم **أ د. ارهان إبراهيم أبو هاشم**	**منسق المقرر** **ا. د. محاسن مشالي**

General

University	Mansoura
Faculty	Pharmacy
Department offering the course	Pharmaceutics
Department supervising the course	Pharmaceutics
Program on which the course is given	MSc Courses
Academic Level	Postgraduate
Academic year	2022/2021 - second semester
Date of course specification approval	15/5/2022

A.Basic Information: Course data:

Course Title	**Pharmacokinetics**	
Course Code	**PTM-202**	
Prerequisite	------	
Teaching Hours: Lecture	2	عدد الساعات الزمنية
: Practical	0	عدد الساعات الزمنية
Total Credit Hours	2	

B. Professional Information

1- Overall Aims of Course:

1- Understanding physicochemical, physiological, pathological, pharmaceutical, and biological factors affecting drug bioavailability (including drug absorption, distribution, metabolism, and excretion)
2- Knowing the experimental models for assessing formulation effects on bioavailability (viz. *in-vitro*, *in-situ*, and *in-vivo* models), assessment of bioavailability, bioequivalence testing, *in-vitro in-vivo* correlation, drug product selection and biopharmaceutics.
3- Covering the basic principles for selection a particular drug preparation, route of administration, evaluation of bioavailability of drug products manufactured by different suppliers.
4- Identify patient's factors which require a modification of the average drug dose and dosage regimen.
5- Detailed discussion of interpretation of plasma drug concentrations, protein binding and its effect on the disposition of drugs and principles of therapeutic drug monitoring.

2- Intended Learning Outcomes (ILOs)

2.1. *Knowledge and Understanding*

After completion of the course, graduates will be able to

A1	a1	Classify the factors affecting the drug bioavailability.

	a2	Differentiate between the experimental and compartmental models for assessing the bioavailability, bioequivalence testing, pharmacokinetic parameters, and *in-vitro in-vivo* correlation.
A3	a3	Identify the concept of individualization for calculation of a patient's dosage regimen.
A4	a4	Recognize the principles and procedure of therapeutic drug monitoring.

2.2. Intellectual Skills

After completion of the course, graduates will be able to

B1	b1	Analyze and interpret the pharmacokinetic data of drugs.
B7	b2	Conduct adjustment of dosage regimens in case of patients with renal impairment and /or hepatic insufficiency
	b3	Predict the importance of specific drug interaction and apply kinetic parameters to solve therapeutic dilemma.
B8	b4	Develop the plasma drug concentration versus time curves and analyze them via the use of suitable software.

2.3. Professional and Practical Skills

After completion of the course, graduates will be able to

C3	c1	Design the dose regimens according to age, disease, genetics, and drug interaction.
	c2	Counsel the other members of the health care team on the impacts of the developed dosage regime on the therapeutic response.
	c3	Utilize the plasma drug concentration monitoring and correlate them with drug efficacy and toxicity.
	c4	Perform efficiently the pharmacokinetic calculations.

2.4. General and Transferable Skills

After completion of the course, graduates will be able to

D6	d1	Present data clearly in oral and written approaches.
	d2	Adopt basic information such as numeric calculation and statistical methods.
D7	d3	Use web browsing to locate and use online data bases.
	d4	Solve problems, decision making and time management.

3. Course Contents

Week No.	Lecture Topics	Hours
1	Review of reaction orders.	2
2	Pharmacokinetics of oral administration.	2
3	Single IV drug administration and IV drug infusion.	2
4	Multiple administrations (IV and oral).	2
5	Area under the curve.	2
6	Bioavailability and bioequivalence.	2
7	Nonlinear Pharmacokinetics (e.g. Digoxin).	2
8	Nonlinear pharmacokinetics (e.g. Phenytoin).	2
9	Applied Pharmacokinetics of Theophylline and Cyclosporine.	2
10	Review of reaction orders.	2
Total 10 weeks		20
	Final Exam	

4. Matrix of knowledge and skills of the course (contents versus ILOs of the course)

Week	Topics	Course ILOs			
		K.U*	IS**	P.P.S***	G.T.S****
1	Review of reaction orders.	a1,a2,a4	b4	c4	d1,d2, d3, d4
2	Pharmacokinetics of oral administration.	a1,a2,a4	b1,b2,b3	c4	d1,d2, d3, d4
3	Single IV drug administration and IV drug infusion.	a1,a4	b1,b2,b3	c1,c3	d1,d2, d3, d4
4	Multiple administrations (IV and oral).	a3	b1,b2,b3	c1,c3	d1,d2, d3, d4
5	Area under the curve.	a4	b1,b2,b3	c3	d1,d2, d3, d4

6	Bioavailability and bioequivalence.	a4	b1,b2,b3	c3	d1,d2, d3, d4
7	Nonlinear Pharmacokinetics (e.g. Digoxin).	a2	b1,b2,b3	c1,c2	d2,d3
8	Nonlinear pharmacokinetics (e.g. Phenytoin).	a2	b1,b2,b3	c1,c2	d2,d3
9	Applied Pharmacokinetics of Theophylline and Cyclosporine.	a2,a4	b1,b2,b3	c2	d1,d2,d3
10	Review of reaction orders.	a1,a2,a3,a4	b4	c4	d1,d2, d3, d4

5- Teaching and Learning Methods:

5.1	**Lectures using Power Point** (PPT) presentations
5.2	**Lectures using whiteboard**
5.3	**Video-recorded lectures**, uploaded to the University Portal for Online learning
5.4	**Interactive Sessions** using Microsoft Teams

6- Student Assessment:

	Assessment Methods		**Assessment Schedule**	**Weighing of Assessments**
Assessment 1	**Written Exam (Final)**	Paper exams that are corrected electronically and/or manually. To assess understanding, intellectual, professional skills	Week 11	90%
Assessment 3	**Oral Exam**	To assess understanding, intellectual skills, General and Transferable skills	Week 11	10%
	Total			100 %

7- List of References

	Reference	**Type**
1.	British Pharmacopoeia, Vol., I, 1st Ed., ***The Stationery Office, London, U. K., (2010).*** Clinical pharmacology and drug therapy (Oxford textbook) **3rd Ed., Grahame and Aronson, eds., (2002).**	Essential Book **(Textbooks)**
2.	Tozer T.N. and M. Rowland, Introduction to Pharmacokinetics and Pharmacodynamics: The Quantitative Basis of Drug Therapy**, 1st ed., Lippincott, Williams & Wilkins, Philadelphia, 2006.**	Recommended books

3.	Pharm web - http://www.mcc.ac.UK/pharmweb package Inserts - http://www.druginfonet.com. RX-list: The internet drug Index http://www.rxlist.com. ASHP - http://www.ashp.com www.ekb.eg	websites

8- Facilities required for teaching and learning

-Class room	Data show- Computers, Internet.
- Library	Recommended books
Others	Internet resources

9. Signature

Course Coordinator	Head of Department	Date
Prof. Dr. Mahassen M. Mashaly	**Prof. Dr. Irhan Ibrahim Abu Hashim**	15/5/2022

* Date of Dept. Council Approval