Model (No 12)

Course Specification : Drug Design

University : Mansoura University

Faculty : Faculty of Pharmacy

Department :

1- Course data :-

Code:	PD524					
Course title:	Drug Design					
Level:	Five					
Program Title:	• pharmaceutical sciences					
Specialization:	Major					
Teaching Hours:	**Theoretical:**	1	**Tutorial:**		**Practical:**	2

2- Course aims :-

1. Understanding the fundamental concepts of drug discovery process.
2. Providing the different strategies adopted in drug design process.
3. Discussing examples and applications of different approaches of drug design.

3- Intended learning outcomes of course (ILO'S) :-

a- Knowledge and understanding

1. [a4] Enumerate the theories of isolation, synthesis, purification, identification and standardization methods of chemicals, natural and pharmaceutical compounds; as well as the fundamentals of drug design and development.
   - a4.1-Classify the various strategies applied in drug design.
   - a4.2-Differentiate the effect of lead optimization in the design of new drugs.
2. [a7] Describe the basics of pharmacokinetics and biopharmaceutics and their application in therapeutic drug monitoring (TDM), dose modification and bioequivalence studies.
   - a7.1-Describe the pharmacokinetic and prodrug issues in drug design.

b- Intellectual skills

1. [b6] Apply the principles of bioinformatics and computer-aided tools and molecular modeling programs in the design of new molecular entities.
    - b6.1-Interpret the factors required to design new molecules for particular enzyme/receptor.
2. [b16] Predict the physical and chemical properties and biological activity of natural and synthetic compounds based on molecular structure.
    - b16.1-Predict the physical and chemical properties and biological activity of natural and synthetic compounds based on molecular structure.

c- Professional and practical skills

1. [c11] Conduct experimental and research studies and present, analyze and interpret the results.
    - c11.1-Employ the computer and molecular docking tools in drug design.
2. [c19] Recognize the basic concepts of drug design, development and targeting.
    - c19.1-Prescribe a case history of the discovery and development of recent drugs.
    - c19.2-Relate physicochemical parameters with biological activity.

d- General and transferable skills

1. [d2] Retrieve and critically evaluate pharmaceutical information and clinical laboratory data from different sources to improve professional competencies.
    - d2.1-Assess scientific data and Interpret research results.
2. [d3] Interact effectively in team working.
    - d3.1-Work effectively in a team.
3. [d5] Practice independent learning needed for continuous professional development.
    - d5.1-Perform self- and continuous-education and study.
4. [d9] Promote critical thinking, problem-solving, decision-making, and time managing capabilities.
    - d9.1-Promote critical thinking, problem solving and decision making capabilities.

4- Course contents :-

No	Topics	Week
1	Introduction and Phases involved in Drug Development	1
2	Withdrawn drugs and Current situation	2
3	Sources of drugs and drug Discovery process	3
4	Design approaches: Simplification & Skeletal variation	4
5	Bioisosteric substitution	5
6	Alteration in stereochemistry	6
7	Mid-term exam	7
8	Design based on Drug Metabolism	8
9	Modification of duration of action &Soft drugs	9
10	Prodrugs	10-11
11	Mutual & Bioprecursor Prodrugs	12
12	Rational Drug Design	13
13	Final written and oral exams	14-15

5- Teaching and learning methods :-

S	Method	Knowledge and understanding	Intellectual skills	Professional skills	General skills
1	Lectures using available facilities as data-show and white board.	a4.1,a4.2,a7.1	b6.1,b16.1		
2	Practical Sessions using facilities as computer and modeling software			c11.1,c19.1,c19.2	d2.1,d9.1
3	Discussion session and case studies	a4.1,a4.2,a7.1	b6.1,b16.1		d2.1,d5.1
4	Research assignments			c11.1	d2.1,d3.1,d5.1,d9.1

6- Teaching and learning methods of disables :-

1. -

7- Student assessment :-

a- Student assessment methods

No	Assessment Method	Knowledge and understanding	Intellectual skills	Professional skills	General skills
1	Written midterm exam	a4.1,a4.2,a7.1	b6.1,b16.1		
2	Practical exam			c11.1,c19.1,c19.2	d2.1,d3.1,d5.1,d9.1
3	Written final exam	a4.1,a4.2,a7.1	b6.1,b16.1		
4	Oral exam				d2.1,d9.1

b- Assessment schedule

No	Method	Week
1	Mid-term exam	7
2	Practical exam	11-12
3	Written exam	14-15
4	Oral exam	14-15

c- Weighting of assessments

No	Method	Weight
1	Mid-term exam	10
2	Practical exam	25
3	Final-term written exam	50
4	Oral exam	15
Total		100%

8- List of references

S	Item	Type
1	Lectures Notes and Lab. Manual written by Faculty Members	Course notes
2	Wilson and Gisvold's Textbook of Organic Medicinal and Pharmaceutical Chemistry.12th Edition, By J M. Beale Jr, J Block (Editors) Publisher: Lippincott–Raven Publishers, Philadelphia, 2011 ISBN-13: 978-0781779296. ISBN-10: 0781779294	Books
3	An Introduction to Medicinal Chemistry. 6th Edition, By Graham L. Patrick (Author) Publisher: Oxford University Press, Oxford; 2017 ISBN-13: 978-0198749691. ISBN-10: 9780198749691	Books

9- Matrix of knowledge and skills of the course

S	Course contents	Knowledge and understanding	Intellectual skills	Professional skills	General skills
1	Introduction and Phases involved in Drug Development	a4.1,a4.2	b6.1,b16.1	c11.1,c19.1,c19.2	d5.1
2	Withdrawn drugs and Current situation	a4.1,a4.2	b6.1,b16.1	c11.1,c19.1,c19.2	d5.1
3	Sources of drugs and drug Discovery process	a4.1,a4.2	b6.1,b16.1	c11.1,c19.1,c19.2	d5.1
4	Design approaches: Simplification & Skeletal variation	a4.1,a4.2	b6.1,b16.1	c11.1,c19.1,c19.2	d5.1
5	Bioisosteric substitution	a4.1,a4.2	b6.1,b16.1	c11.1,c19.1,c19.2	d5.1
6	Alteration in stereochemistry	a4.1,a4.2	b6.1,b16.1	c11.1,c19.1,c19.2	
7	Mid-term exam	a4.1,a4.2	b6.1,b16.1		
8	Design based on Drug Metabolism	a4.1,a4.2	b6.1,b16.1	c11.1,c19.1,c19.2	
9	Modification of duration of action &Soft drugs	a4.1,a4.2	b6.1,b16.1	c11.1,c19.1,c19.2	
10	Prodrugs	a7.1	b6.1,b16.1	c11.1,c19.1,c19.2	d5.1
11	Mutual & Bioprecursor Prodrugs	a7.1	b6.1,b16.1	c11.1,c19.1,c19.2	
12	Rational Drug Design	a4.1,a4.2,a7.1	b6.1,b16.1	c11.1,c19.1,c19.2	
13	Final written and oral exams	a4.1,a4.2,a7.1	b6.1,b16.1		d2.1,d3.1,d5.1,d9.1

Course Coordinator(s): -

Ghada Sameh Hafez Hassan

Head of department: -

Ghada Sameh Hafez Hassan