Course specification
2020-2021
Faculty of Pharmacy
Mansoura University

Third Level

Course Specification Instrumental and Applied Analysis

University: Mansoura University (MU)
Faculty: Pharmacy
Department: Pharmaceutical Analytical Chemistry
Course title: **Instrumental and Applied Analysis**
Course code: PA315

Program on which the course is given	**B. Pharm**
Academic Level	Third Level, First semester, 2020-2021
Date of course specification approval	

1. Basic Information: Course data:

Course title:	**Instrumental and Applied Analysis**	**Code: PA315**
Specialization:	**Pharmaceutical**	
Prerequisite:	**Registration**	
Teaching Hours:	**Lecture:2**	**Practical:2**
Number of units: (credit hours)	**3**	

2. Course Aims:

2.1. Give the principle of instrumental and applied analytical methods, including chromatographic methods, electrochemical analysis, capillary electrophoresis and mass spectrometry. Cover the application of these methods to pharmaceutical compounds.

3. Intended learning outcomes (ILOs):

a- Knowledge and understanding

At the end of this course the student will be able to:

a1	Identify the principles of basic, pharmaceutical, medical, food components, herbal, social, behavioral, management, health and environmental sciences as well as pharmacy practice
a3	List the different analytical techniques for drugs from synthetic and natural origin using good laboratory practice (GLP) guidelines and validation procedures. a3.1Recognize the different analytical techniques used for determination of chemical substances

b- Intellectual skills

At the end of this course the student will be able to:

b3	Determine suitable methods of analysis and QC of drugs as raw material, in dosage forms and in biological fluids. b3.1-Determine suitable methods of analysis of drugs as raw material and in dosage forms.
b13	Interpret experimental data and published literatures, based on relevant chemical, pharmaceutical, statistical principles. B13.1-Interpret experimental data based on relevant chemical and pharmaceutical, principles

c- Professional and practical skills

At the end of this course the student will be able to:

c11	Conduct experimental and research studies and present, analyze and interpret the results. c11.1-Show the ability to conduct experimental studies and apply different quantitative methods of analysis of pharmaceuticals
c14	Apply different qualitative and quantitative analytical, chemical, microscopical, and biological methods for identification, quality control (QC) and assay of raw materials as well as pharmaceutical preparations. c14.1-Analyze and interpret quantitative analytical data

d- General and transferable skills

At the end of this course the student will be able to:

d3	d3.1Interact effectively in team working.
d4	Apply calculations for chemical analysis.
d4.1	Acquire the ability to learn independently.
d9	Present information clearly in written, electronic and oral forms.
d9.1	Show the ability for critical thinking, problem-solving, decision-making, and time managing capabilities.

4. Contents:

Week No	Topics	No.of hours	Lecture credit hours	Practical credit hours
1.	Introduction to chromatography, PC, TLC	2	2 hours	

2.	HPLC, instrumentation and applications.	2	2 hours	
3.	GC, instrumentation and applications	2	2 hours	
4.	Capillary electrophoresis.	2	2 hours	
5.	Potentiometry principles and instrumentation	2	2 hours	
6.	Potentiometric titration and its pharmaceutical applications.	2	2 hours	
7.	**Mid-term Exam**			
8.	Potentiometric titration and its pharmaceutical applications, cont.	2	2 hours	
9.	Introduction of polarography and instrumentation	2	2 hours	
10.	Applications of polarography. Conductometry principles	2	2 hours	
11.	Conductometry instrumentation and applications	2	2 hours	
	Final written & oral exam			
	Practical topics			
Week No	**Topics**	**No.of hours**	**Lecture credit hours**	**Practical credit hours**
1,2.	-Paper chromatography Thin layer chromatography, Water acidity and water alkalinity.	4		2hour
3,4.	Water hardness: EDTA method Water hardness: Soda reagent method	4		2hour
5,6.	1-- Interpretation of chromatograms - HPLC demonstration. 2- Determination of chloride content in water Determination of chlorine content in water	4		2 hour
7.	**Mid-term Exam.**			
8.9.	1-Determination of cupper content in water Potentiometric titration of HCl, NaOH 2-Determination of oxygen absorbed from KMnO4 Problem on Interpretation of chromatograms	4		2hour
10.	Final practical exam1st group.	2		1 hour
11.	Final practical exam2nd group.	2		1 hour

5. Teaching and learning Methods:

5.1	Lectures online
5.2	Lectures using , PowerPoint presentations
5.3	Laboratory with equipments, chemicals and reagents.

6. Student Assessment:

a- Assessment methods

1. Written exam	To assess understanding, intellectual and professionalskills
2. Practical exam	To assess professional and practical skills
3. Oral	To assess knowledge, understanding, intellectual skills, general skills and confidence
4. Quizzes.	To assess the skills of problem-solving.

b- Assessment schedule

Assessment 1	Practical	11th and 12th week
Assessment 2	Mid-term	7thweek
Assessment 3	Oral	14thweek
Assessment 4	Written	4thweek

c- Weighting of assessments

1.	Mid-term examination	10%
2.	Final-term examination	50%
3.	Oral examination	15%
4.	Practical examination and Semester work	25%
Total		100%

7. List of References

No	Reference	Type
1.	Practical course notes prepared by the department staff members	Course notes
2.	Lecture notes and practical course notes prepared by the department staff members.	Course notes
3.	Fundamentals of Analytical Chemistry , Douglas A.; Skoog; Donald M., West, F.James Holler, Stanely, R.Crouch Thomson, Australia 8th ed. (2004).	Book
4.	Quantitative Chemical Analysis, Daniel C. Harris, 6th ed., W.H. Freeman and Company, New York (2003).	Book

5.	Vogel,s Textbook of Quanitative chemical Analysis, J. Mendham, M.A, MSc, C. Chem, M. RSC, 6th ed., India (2004).	**Book**
6.	Pharmaceutical Analytical Chemistry, Quantitative Analysis, Amer, M.M. Faculty of Pharmacy, Cairo University.	**Book**
7.	Practical Pharmaceutical Chemistry, par II, Beckett, A. H. and Stenlake, J. B. 4th ed., Cambridge, England (2001)	**Book**
8.	Instrumental Methods of Chemical Analysis, Galan W. Ewing, 5th ed. McGraw-hill book company, New York (1995).	**Books**
9.	Principles of Instrumrntal Analysis, Skoog, D. A. Holler, F. J. and Crouch, S.R. 6th ed., Thomson, Belmont, USA (2007)	**Books**

8. Matrix of knowledge and skills of the course

No	Course contents	ILOS			
		Knowledge & understanding	Intellectual skills	Professional and practical skills	General & transferable skills
1.	Introduction to chromatography, PC, TLC	a1.1,a3.1	b3.1,b13.1	c11.1,c14.1	d9.1
2.	HPLC, instrumentation and applications.	a1.1,a3.1	b3.1,b13.1	c11.1,c14.1	d9.1
3.	GC, instrumentation and applications	a1.1,a3.1	b3.1,b13.1	c11.1,c14.1	
4.	Capillary electrophoresis.	a1.1,a3.1	b3.1,b13.1	c11.1,c14.1	d9.1
5.	Potentiometry principles and instrumentation	a1.1,a3.1	b3.1,b13.1	c11.1,c14.1	
6.	Potentiometric titration and its pharmaceutical applications.	a1.1,a3.1	b3.1,b13.1	c11.1,c14.1	d9.1
7.	mid term exam				
8.	Potentiometric titration and its pharmaceutical applications, cont.	a1.1,a3.1	b3.1,b13.1	c11.1,c14.1	d9.1
8.	Introduction of polarography and instrumentation	a1.1,a3.1	b3.1,b13.1	c11.1,c14.1	d9.1
9.	Applications of polarography. Conductometry principles	a1.1,a3.1	b3.1,b13.1	c11.1,c14.1	d9.1
10.	Conductometry instrumentation and applications	a1.1,a3.1	b3.1,b13.1	c11.1,c14.1	d9.1
11.	Practical topics	a1.1,a3.1	b3.1,b13.1	c11.1,c14.1	d3.1,d4.1,d9.1

Course Coordinator:	**Amina El Brashy**

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Head of Department:	**Nahed Mahmoud El-Enany**