

## T6. Course Specification (CS) توصيف المقرر

Institution : <b>University of Najran</b>	Date of Report <b>20.12.1438</b>
College/Department : <b>Pharmacy / Pharmaceutical chemistry</b>	

### A. Course Identification and General Information:

1. Course title and code: <b>Instrumental Analysis for Pharmaceutical Preparations (PHCH 519)</b>			
2. Credit hours: <b>3 hours (2+1)</b>			
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs) <b>Pharmaceutical Sciences</b>			
4. Name of faculty member responsible for the course <b>Prof./ Ashraf Mohamed Mohamed Mahmoud</b>			
5. Level/year at which this course is offered <b>10<sup>th</sup> Level / 1438/1439 1<sup>st</sup> Semester</b>			
6. Pre-requisites for this course (if any) <b>Pharmaceutical Medicinal Chemistry-3: course code: PHCH 518</b>			
7. Co-requisites for this course (if any)			
8. Location if not on main campus			
9. Mode of Instruction (mark all that apply)			
a. Traditional classroom	<input checked="" type="checkbox"/>	What percentage %	<input type="text" value="100%"/>
b. Blended (traditional and online)	<input type="checkbox"/>	What percentage :	<input type="text"/>
c. e-learning	<input type="checkbox"/>	What percentage	<input type="text"/>
d. Correspondence	<input type="checkbox"/>	What percentage	<input type="text"/>
f. Other طرق أخرى	<input type="checkbox"/>	What percentage	<input type="text"/>
Comments :			

عليه تعليق [T1]:  
ماذا عن تدريس الجزء العملي؟

## B. Objectives

### 1. What is the main purpose for this course?

Describing and explaining theoretical background and principles underlying quantitative instrumental analysis of chemical compounds by using different methodologies such as photoluminescence, atomic spectroscopy, electrochemistry, gas chromatography and mass spectroscopy in combination with HPLC and GC as well as their instrumentation and applications

### 2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)

Students are referred to specialized websites to enhance their knowledge and making seminars.

## C. Course Description (Note: General description in the form used in the Bulletin or handbook should be attached.)

### Course Description

This course focuses on describing and explaining theoretical background and principles that are used for quantitative instrumental analysis of substances including fundamentals of different methodologies such as photoluminescence, atomic spectroscopy, electrochemistry, gas chromatography and mass spectroscopy in combination with HPLC and GC as well as their instrumentation and applications

### 1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
<b>Atomic spectroscopy</b>		

<b>1- Flame emission spectroscopy (FES)</b> a- Fundamentals of light absorption by atoms b- Factors affecting Flame emission c- Linear relationship for quantitative analysis d- Interferences in Flame photometry e- Instrumentation of Flame photometry f- Application of Flame photometry in the pharmaceutical analysis of drug substances.	3	6
<b>2- Atomic absorption spectroscopy (AAS),</b> a- Theory and instrumentation, b- Application of AAS in the pharmaceutical analysis of drug substances c- Interferences in AAS		
<b>Gas Chromatography (GC)</b>		
a- Definitions of all parts of GC (Instrumentation) b- Modes of separation analysis by using GC c- Qualitative and quantitative analysis by using GC. d- Chromatographic parameters of GC analysis	2	4
<b>Mass spectrometry (MS)</b>		
a. Theory of MS b. Mass interpretation of MS spectrum and structural elucidation c. Application of MS in pharmaceutical analysis	3	6
<b>Luminescence spectroscopy</b>		
a. Theory of fluorescence, phosphorescence and chemoluminescence b. Factors affecting fluorescence and phosphorescence c. Relation between fluorescence and molecular structure d. Quantitation e. Applications	3	6
<b>Electrochemical methods</b>		

a- Introduction for electrochemistry and electrochemical cells	4	8
b- Comparing galvanic and electrolytic cells and their uses.		
c- Types of electrodes		
d- Application of potentiometry.		
e- Fundamentals of polarographic analysis in pharmaceuticals, theory and applications		
f- Fundamentals of conductometry.		
g- Conductometric titrations in pharmaceuticals.		
<b>Total</b>	<b>15</b>	<b>30</b>
<b>2. Practical sessions</b>		
<b>List of experiments in this course</b>	<b>15</b>	<b>30</b>
1- <b>Tutorial class:</b> Introduction to laboratory health and safety procedures		
2- Lab 1. Determination of Na <sup>+</sup> ions by flame		
3- Lab 2. Determination of Pb <sup>2+</sup> ions by AAS		
4- Lab 3. Determination of quinine by FS		
5- Lab 4. Determination of acetic acid conductance		
6- Lab 5. Ion selective electrode for determination of Ca <sup>2+</sup> ion		
7- Lab 6. Determination of aspirin by polarography		
8- Lab 7. GC Determination of methanol and ethanol		
9- Lab 8. Determination of tramadol mixture using MS		
10- Lab 9. Determination of paracetamol using MS		
11- <b>Tutorial class:</b> Interpretation of MS spectra		
12- <b>Tutorial class:</b> Mass fragmentation pattern		
13- Revision.		
14- Final exam week number 16		
<b>Total</b>	<b>14</b>	<b>28</b>

عليه تعليق [T2]: حدد لكل تجربة على حدة عدد الأسابيع المخصصة لها

عليه تعليق [T3]: المفروض 15

1. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory or studio	Practical	Other:	Total
Contact Hours	30	-	-	30	-	60
Credit	2	=	-	1	-	3

3-Additional private study/learning hours expected for students per week **2 hours per week**

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy.

On the table below are the five NQF Learning Domains, numbered in the left column.

**First**, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table)

**Second**, insert supporting teaching strategies that fit and align with the assessment methods and intended learning outcomes.

**Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy ought to reasonably fit and flow together as an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain).

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
<b>1.0</b>	<b>Knowledge</b>		
1.1	Describe the theoretical background and principles underlying quantitative instrumental analysis of chemical compounds	1. Lectures, 2. Tutorials 3. Brain storming	1. Theoretical exams 2. Observation card
1.2	Describe the rules of structural elucidation of the chemical compounds		
<b>2.0</b>	<b>Cognitive Skills</b>		
2.1	Explain the possible interactions or interferences of some compounds with	1. Lectures,	1. Theoretical exams

	analysis of other compounds.	2. Tutorials	2. Observation card
2.2	Plan strategies for the solution of analytical problems	3. Brain storming	3. Practical exam
		4. Solving of analytical problems	
		5. Carrying laboratory experiment	
<b>3.0</b>	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	Use standard quantitative analysis procedures.	1. Step by step demonstrating of analytical experiments	1. Observation card
3.2	Use properly the chemical compounds in the laboratory according to the rules of good laboratory and storage practice		2. Practical exam
<b>4.0</b>	<b>Communication, Information Technology, Numerical</b>		
4.1	Operate instruments well	Standard operating procedures of laboratory equipment's	1. Observation card
4.2	Demonstrate practical skills of preparation of standard solutions and end point determination	Calculation of the concentrations of the substances in different ways	2. Practical exam
<b>5.0</b>	<b>Psychomotor</b>		
5.1			
5.2			

<b>5. Schedule of Assessment Tasks for Students During the Semester</b>			
	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Quiz on theoretical part	4-5	5%
2	Seminar or individual assignment	11	10%
3	Observation card in lectures	2-12	5%
4	Midterm exam	9	20%
5	Observation card in lab	2-12	5%
6	Final practical Exam	16	15%
7	Final exam	17	40%

8	Total		100%
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#### D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

**6 hours**

#### E. Learning Resources

1. List Required Textbooks:

2. **Analytical Chemistry by Christian, G.D. 4th Edition, John Wiley and Sons: New York, 1986.**
3. **Modern Analytical Chemistry by David Harvey 1st ed, 2000; ISBN 0-07-237547-7; McGraw-Hill.**
4. **Practical pharmaceutical analysis by A.H. Beckett and J.B.Stenlake; 4th Ed, Part (1), the press London, 1988.**

2. List Essential References Materials (Journals, Reports, etc.)

3. List Electronic Materials Web Sites, Facebook, Twitter, etc.

**www.dlaf.nu.edu.sa**

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

**Excel software for calculations and drawing**

#### F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

1. Suitable lecture room equipped with projector.
2. Suitable laboratories equipped with health and safety tools.

2. Computing resources (AV, data show, Smart Board, software, etc.)

**Data show**

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

1. pH meters
2. Pipets
3. Atomic absorption spectrometer
4. Flame photometer
5. Fluorescence spectrophotometer
6. HPLC-MS instrument

#### G. Course Evaluation and Improvement Processes:

##### 1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching

1. Questionnaires
2. Direct questions (Provoke students' initiative by asking questions)
3. Observation card in lectures

##### 2 Other Strategies for Evaluation of Teaching by the Instructor or by the department **Course report and course portfolio**

##### 3 Processes for Improvement of Teaching

1. Effective training and workshops for members of staff.
2. Exchange of experiences with similar institutes if possible.
3. Availability of textbooks, references, periodicals and journals.
4. Encouragement of student to participate in the research field.
5. **Evaluation of the student for the course**

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

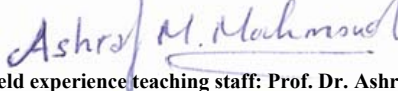
##### 5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

Each semester we periodically review the course contents, effectiveness, course ILOs according to the progression in the field worldwide

- a- Assessment of course content in relation to the progressing knowledge in the field.
- b- Assessment of course content in relation to the changing demands worldwide.
- c- **Course report and course portfolio**
- d- Trend analysis

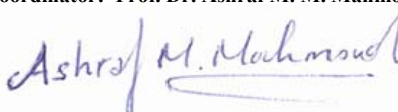
Use of the software for measuring of the ILOs of the course

Name of instructor: Prof. Dr. Ashraf Mohamed Mohamed Mahmoud

Signature:  Date Report Completed: 20.12.1438 H

Name of field experience teaching staff: Prof. Dr. Ashraf M. M. Mahmoud

Program coordinator: Prof. Dr. Ashraf M. M. Mahmoud



عليه تعليق [T4]:

Monitoring and Evaluating the strategies of teaching and Assessment  
Monitoring and Evaluating the strategies of Measuring the Achievement of the Course Intended Learning Outcomes



Signature:

Date: 20.12.1438 H

**Internal Revision Committee**

	Name	Signature
1	Dr. Mohamed S. Al Qahtani	
2	Prof. Ashraf M. Mohamed	
3	Prof. Mohamed Abdel Motaleb	
4	Dr. Basel Abdel Naem	
5	Dr. Ali Al Shabby	