

ATTACHMENT 5.

Kingdom of Saudi Arabia
**The National Commission for Academic Accreditation &
Assessment**

**T6. Course Specifications
(CS)**

Advanced Analytical Chemistry

(402711-2)



Course Specifications

Institution: Umm Al-qura University	Date: 2017
College/Department: Faculty of Applied Science / Department of Chemistry	

A. Course Identification and General Information

1. Course title and code: Advanced Analytical Chemistry / 402711-2			
2. Credit hours: 2 hrs.(Theoretical)			
3. Program(s) in which the course is offered: Ph. D. in Chemistry			
4. Name of faculty member responsible for the course: Dr. Amr Lotfy Saber			
5. Level/year at which this course is offered: 1st / 1st			
6. Pre-requisites for this course (if any): not applicable			
7. Co-requisites for this course (if any): not applicable			
8. Location if not on main campus: El-Abedyah, El-Azizya, and El-Zaher			
9. Mode of Instruction (mark all that apply)			
a. traditional classroom	<input type="checkbox"/>	What percentage?	<input type="checkbox"/>
b. blended (traditional and online)	<input checked="" type="checkbox"/>	What percentage?	100%
c. e-learning	<input type="checkbox"/>	What percentage?	<input type="checkbox"/>
d. correspondence	<input type="checkbox"/>	What percentage?	<input type="checkbox"/>
f. other	<input type="checkbox"/>	What percentage?	<input type="checkbox"/>
Comments:			

B Objectives

1. What is the main purpose for this course?

By completing this course, the students will be able to:

- Explain the principles of hyphenated chromatographic techniques.
- Compare between different detectors which are used with liquid chromatographic techniques.
- Classify the different types of hyphenated chromatography.
- Use hyphenated chromatographic techniques for the analysis of different samples.
- Compare between the advantages of deferent detectors coupling with liquid chromatography.

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)

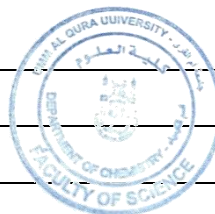
- Changes in content as a result of new research in the field.
- Encourage students to carry out research reports related to the course subjects using the library, data base services, and/or websites.
- Increased use of IT or web based reference material.
- The use of smart teaching halls for lectures.

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

Course Description:

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Mass spectrometry and separation science	2	4
Analytical aspects of modern gas chromatography	2	4



Coupling liquid chromatography and other separation techniques to Nuclear Magnetic Resonance Spectroscopy	1	2
Application of infrared and raman spectroscopy for detection in liquid chromatographic separations	1	2
Evaporative light scattering and charged aerosol detector	1	2
Detection and determination of heteroatom-containing molecules by HPLC: Inductively coupled plasma mass spectrometry	1	2
HPLC with electrochemical detection	1	2
Liquid-phase chemiluminescence detection for HPLC	1	2
Multidimensional High-Performance Liquid Chromatography.	2	4
Revision	1	2

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

	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	26	-		-		26
Credit	2	-		-		2

3. Additional private study/learning hours expected for students per week.

2 hrs

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
1.0	Knowledge		
1.1	Describe the analytical aspects of hyphenated chromatographic techniques	<ul style="list-style-type: none"> • Lectures • Scientific discussion • Library visits • Web-based study • Using open discussion to link the previous knowledge to the current and future topics • The students use the internet to prepare an essay about a recent advances related to the course 	<ul style="list-style-type: none"> • Exams • web-based student performance systems • portfolios • long and short essays
1.2	Select the procedures for coupling between mass spectrometry and separation science		
1.3	Determine the relation between the evaporative light scattering and charged aerosol detector		
1.4	Familiar with coupling liquid chromatography and other separation techniques to NMRS		
1.5	Know information about liquid-phase chemiluminescence detection for HPLC		
1.6	Recognize the multidimensional High-Performance Liquid Chromatography		
1.7	Explain the application of infrared and raman spectroscopy for detection in liquid chromatographic separations		
2.0	Cognitive Skills		
2.1	Construct the coupling between mass spectrometry and separation science.	• Lectures	• Exams

2.2	Discover the application of Infrared and Raman Spectroscopy for detection in liquid chromatographic separations.	<ul style="list-style-type: none"> • Scientific discussion • Library visits • Web-based study • Using brain storming at the beginning of each lecture in order to stimulate the students towards the new topic of the course. • Enhancing open discussion during the lecture. 	<ul style="list-style-type: none"> • web-based student performance systems • portfolios • long and short essays • Through assignments and homework.
2.3	Formulate the information about liquid-phase chemiluminescence detection for HPLC		
2.4	Develop the coupling of liquid chromatography and other separation techniques to NMRS.		
2.5	Report the relation between the evaporative light scattering and charged aerosol detector.		
3.0	Interpersonal Skills & Responsibility		
3.1	Take the personality and responsibility for their own learning.	<ul style="list-style-type: none"> • Encourage the solving problems in groups during lecture. • Making open discussion about certain recent topic of the course. 	<ul style="list-style-type: none"> • Homework and group reports
3.2	Work effectively in groups and exercise leadership when appropriate.		
3.3	Act ethically and consistently with high molar standards in personal and public forums.		
3.4	Community linked thinking.		
4.0	Communication, Information Technology, Numerical		
4.1	Communicate effectively in oral and written forms.	<ul style="list-style-type: none"> • Lectures 	<ul style="list-style-type: none"> • Exams

4.2	Use information and communication technologies	<ul style="list-style-type: none"> • Scientific discussion • Library visits • Web-based study 	<ul style="list-style-type: none"> • web-based student performance systems • portfolios • long and short essays
4.3	Use basic mathematical and statistical techniques.		
5.0	Psychomotor: NOT APPLICABLE		

5. Schedule of Assessment Tasks for Students During the Semester			
	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Activities and Assignments.	--	10 %
2	Midterm Exam.	8	30 %
3	Final Exam.	15-16	60 %
4	Total		100 %

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)

- We have faculty members to provide counselling and advice.
- Office hours: During the working hours weekly.
- Academic Advising for students.

E Learning Resources

1. List Required Textbooks

-R. Andrew Shalliker “Hyphenated and Alternative Methods of Detection in Chromatography” CRC Taylor & Francis Group, LLC, Copyright © 2012.

<p>-David Harvey “Modern Analytical Chemistry” Copyright © 2000. Exclusive rights by The McGraw-Hill Companies, Inc. for manufacture and export INTERNATIONAL EDITION ISBN 0–07–116953–9.</p>
<p>2. List Essential References Materials (Journals, Reports, etc.)</p> <ul style="list-style-type: none">• Lecture Handouts available on the coordinator website
<p>3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)</p> <p>- R. Andrew Shalliker “Hyphenated and Alternative Methods of Detection in Chromatography” CRC Taylor & Francis Group, LLC, Copyright © 2012.</p> <p>-Gary D. Christian, Purnendu K. Dasgupta and Kevin A. Schug, Analytical Chemistry, 7th edition, WILEY (2014).</p>
<p>4. List Electronic Materials, Web Sites, Facebook, Twitter, etc.</p> <ul style="list-style-type: none">• http://www.chemweb.com• http://www.sciencedirect.com• http://www.rsc.org
<p>5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.</p>

F. Facilities Required

<p>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.)</p>
<p>1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)</p> <ul style="list-style-type: none">• Equipped classrooms.• Providing hall of teaching aids including computers and projector.
<p>2. Computing resources (AV, data show, Smart Board, software, etc.)</p> <ul style="list-style-type: none">• Room equipped with computer and projector and TV.
<p>3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) : No other requirements</p>

G Course Evaluation and Improvement Processes

<p>1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching</p> <ul style="list-style-type: none">• Complete the questionnaire evaluation of the course in particular
<p>2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department</p> <ul style="list-style-type: none">• Observations and the assistance of colleagues.• Independent evaluation for extent to achieve students the standards.• Independent advice of the duties and tasks.
<p>3 Processes for Improvement of Teaching</p> <ul style="list-style-type: none">• Workshops for teaching methods.• Continuous training of member staff.• The application of e-learning.• Exchange of experiences internal and external.
<p>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)</p> <ul style="list-style-type: none">• Check marking of a sample of exam papers, or student work.• Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.
<p>5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.</p> <ul style="list-style-type: none">• Periodic review of the contents of the syllabus and modify the negatives.• Hosting a visiting staff to evaluate of the course.• Workshops for teachers of the course.

Name of Instructor: **Dr. Amr Lotfy Saber**

Signature: _____ Date Report Completed: 10/1/2017

Name of Field Experience Teaching Staff Analytical Chemistry

Program Coordinator: _____

Signature: _____ Date Received: _____