ATTACHMENT 5.

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

T6. Course Specifications
(CS)

Advanced Analytical Spectroscopy

(402712-2)

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 Spectroscopy / 402712–2**
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. AmrLotfy Saber**
5. Level/year at which this course is offered: **2nd / 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	☐	What percentage?	☐
b. blended (traditional and online)	■	What percentage?	100%
c. e-learning	☐	What percentage?	☐
d. correspondence	☐	What percentage?	☐
f. other	☐	What percentage?	☐

Comments:

B Objectives

1. What is the main purpose for this course? By the end of this course, the students will be able to: • Classify spectroscopic methods based on absorption an emission of EMR. • Explain the basic concepts of molecular photoluminescence spectroscopy. • Know the difference between molecular fluorescence and phosphorescence spectra. • Use the advanced spectroscopic methods for quantitative applications. • Compare between the deferent spectroscopic methods based on absorption, emission and scattering.
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) • The use of smart teaching halls for lectures. • Changes in content as a result of new research in the field. • Encourage students to carry out research reports in the course subjects using the library, data base services, and/or websites. • Increased use of IT or web based reference material.

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

Introduction of chemiluminescence, molecular fluorescence and phosphorescence spectra.	**1**	**2**
Instrumentation, quantitative applications using molecular luminescence, evaluation, theory of atomic emission spectra, equipment and its quantitative applications.	**1**	**2**
Flam emission spectroscopy, (the induction coupled plasma (ICP), analytical performance and general characteristics, instrumentation, advantages, disadvantages and applications).	**2**	**4**
Types of spectroscopic methods which based on scattering turbidimetry and nephelometry.	**2**	**4**
X-Ray methods (principles of XRD, reciprocal lattice constructions and the rotating crystal method.	**1**	**2**
Introduction of raman spectroscopy, raman sample preparation and handling, microscopy, data handling, manipulation and quantitation.	**1**	**2**
Absorption and scattering, states of a system and Hook's law, nature of polarizability and measurement of polarization.	**2**	**4**
Resonance raman scattering.	**1**	**2**
Applications (inorganics, minerals, polymers and emulsion, colour, Biological and pharmaceutical)	**1**	**2**
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 deferent spectroscopic methods based on absorption, emission and scattering.	• 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	• Exams • web-based student performance systems • portfolios • long and short essays
1.2	Selectthe suitable spectroscopic methods (turbidimetry and nephelometry) for turbid solution analysis.		
1.3	Determine inorganics, minerals, polymers and emulsion using Raman spectroscopy		
1.4	Describethe instrumentation, quantitative applications using molecular luminescence, evaluation, theory of atomic emission spectra, equipment and its quantitative applications		
1.5	Know X-Ray methods (principles of XRD, reciprocal lattice constructions and the rotating crystal method.		

1.6	Recognize the difference between flam emission spectroscopy and the induction coupled plasma (ICP).	advances related to the course	
1.7	Explainresonance Raman scattering		
2.0	**Cognitive Skills**		
2.1	Develop the suitable spectroscopic methods for turbid solution analysis	• Lectures • 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.	• Exams • web-based student performance systems • portfolios • long and short essays • Through assignments and homework.
2.2	Discover the application of Raman Spectroscopy for detection inorganic ions, minerals and emulsion.		
2.3	Formulate the difference between flam emission spectroscopy and the induction coupled plasma (ICP)		
2.4	Modify the instrumentation of X-Ray methods		
2.5	Report the information about Raman spectroscopy		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Take the personality and responsibility for their own learning.	• Encourage the solving problems in groups during lecture.	• 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.	• Making open discussion about certain recent topic of the course.	
4.0	**Communication, Information Technology, Numerical**		
4.1	Communicate effectively in oral and written forms.	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • long and short essays
4.2	Use information and communication technologies		
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 -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.
2. List Essential References Materials (Journals, Reports, etc.) •Lecture handouts available on the coordinator website.
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) - Ewen Smith, Geoffrey Dent. "Modern Raman Spectroscopy - A Practical Approach" Copyright © 2005 John Wiley & Sons Ltd, The Atrium, Southern Gate, Chichester, West Sussex PO19 8SQ, England.
4. List Electronic Materials, Web Sites, Facebook, Twitter, etc. • **http://www.chemweb.com** • **http://www.sciencedirect.com** • **http://www.rsc.org**
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

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.) • Equippedclassrooms.
2. Computing resources (AV, data show, Smart Board, software, etc.) • Room equipped with computer and projector and TV.

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) : **No other requirements**

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching • Complete the questionnaire evaluation of the course in particular
2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department • Independent evaluation for extent to achieve students the standards. • Independent advice of the duties and tasks.
3 Processes for Improvement of Teaching • Continuous training of member staff. • The application of e-learning. • Exchange of experiences internal and external.
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) • 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.
5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. • Hosting a visiting staff to evaluate of the course. • Workshops for teachers of the course. • Periodic review of the contents of the syllabus and modify the negatives.

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

Signature:_____Date Report Completed: 16/1/2017_

Name of Field Experience Teaching Staff _Analytical Chemistry

Program Coordinator:_____

Signature: _____