



ATTACHMENT 2 (e)

Course Specifications

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

Molecular Spectroscopy

4024577-2

**Course Specifications
(CS)**





Course Specifications

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

A. Course Identification and General Information

1. Course title and code: Molecular Spectroscopy - 4024577-2			
2. Credit hours: 2 h (theoretical)			
3. Program(s) in which the course is offered. Chemistry			
4. Name of faculty member responsible for the course: Ahmed Mohamed El Defrawy			
5. Level/year at which this course is offered: 7th level/fourth Year			
6. Pre-requisites for this course (if any): Quantum Chemistry			
7. Co-requisites for this course (if any): none			
8. Location if not on main campus: : both on El-Abedyah and El-Zaher			
9. Mode of Instruction (mark all that apply)			
a. Traditional classroom	<input checked="" type="checkbox"/>	What percentage?	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	<input type="checkbox"/>	What percentage?	<input type="text"/>
Comments:			



B Objectives

1. What is the main purpose for this course?

By the end of this course student will :

1. describe the fundamental principles of molecular spectroscopy.
2. apply quantitative reasoning and problem-solving skills with quantum chemistry as a context to explain the different types of molecular spectra.
3. develop physical intuition, mathematical reasoning, and problem solving skills.
4. be further prepared for the necessarily rigorous sequence in chemistry courses needed the molecular spectroscopy.

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 students will be mentioned to prepare an essay or a report from literature using the library, data base services, and/or websites to follow up and update the new topics of the subject of the course

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

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
1- Introduction to molecular structure and electromagnetic radiation	1	2
2- Rotational spectra- Rigid rotor	3	6
3- Vibrational spectra – harmonic oscillator	3	6
4- Electronic spectra	2	4
5- NMR	2	4
6- Molecular symmetry and spectroscopy	3	6





2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	28	-	-	-		28
Credit	2	-	-	-		2

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

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

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge		
1.1	Recognize the meaning of Electromagnetic radiation	<ul style="list-style-type: none"> • Lectures • Scientific discussion • Library visits • Web-based study 	<ul style="list-style-type: none"> • Exams • portfolios • long and short essays • quizzes
1.2	Identify the laws of absorption and emission of radiation.		
1.3	identify the absorption spectra in the microwave and infrared region		
1.4	Name the types of molecules based on the symmetry of their structures x		
1.5	describe how quantum treatment is used to study the rigid rotor and the harmonic oscillator.		
1.6	list the different electronic transition in organic compounds in the UV/Vis region using quantum theory.		
1.7	recognize the absorption spectra in the Radio wave region		
1.8	Recognize classical and qualitative description of the Nuclear magnetic resonance (NMR)		
1.9	Define the symmetry –symmetry elements and different symmetry operations – Point groups – retaliation between		



	the symmetry and spectroscopy and the molecular orbital theory		
2.0	Cognitive Skills		
2.1	apply the laws of absorption and emission of radiation for any kinds of radiation	<ul style="list-style-type: none"> • Scientific discussion • Library visits • Web-based study 	<ul style="list-style-type: none"> • portfolios • final exam • group discussion
2.2	analyze the spectra of different region of electromagnetic radiation based on quantum chemical aspects.		
2.3	Compare between classical and qualitative description of the Nuclear magnetic resonance (NMR)		
2.4	Apply the symmetry elements and operation on different compounds		
3.0	Interpersonal Skills & Responsibility		
3.1	Manage resources, time and collaborate with members of the group.	<ol style="list-style-type: none"> 1. Team work groups for cooperative work making. 2. Presenting the analysis and interpretation of a case study for each group to the other groups in class. 3. Open a general discussion with students in the area of educational issues for knowledge transfer between the students. 	<ol style="list-style-type: none"> 1. Writing group scientific report for a case study. 2. Assessment of the solution of problems submitted by the students
3.2	Use university library and web search engines for collecting information and search about different topics .		
4.0	Communication, Information Technology, Numerical		
4.1	Work effectively both in a team, and independently on solving chemistry problems.	<ol style="list-style-type: none"> 1. Write a Report 2. Use digital libraries and/or E-Learning Systems for the communication with lecturer through the course work 	<ol style="list-style-type: none"> 1. Evaluating the activities of the students through the semester for their activities on the E-learning system, as well as, their communication with each other in different tasks. 2. Evaluation of the report presented
4.2	Communicate effectively with his lecturer and colleagues		
4.3	Use IT and web search engines for collecting information.		
5.0	Psychomotor		
5.1	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	Homework or activities.	--	10 %
2	First Periodic Exam.	6	20 %
3	Second Periodic Exam.	12	20 %
4	Final Exam.(2 hours exam)	16	50 %
5	Total		100 %

D. Student Academic Counseling and Support

<p>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)</p> <ul style="list-style-type: none"> • We have faculty members to provide counseling and advice. • Office hours: During the working hours weekly. • Academic Advising for students.
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E. Learning Resources

<p>1. List Required Textbooks</p> <p>- I.N. Levine, Molecular Spectroscopy, Wiley Interscience, New York, 1975.</p>
<p>2. List Essential References Materials (Journals, Reports, etc.)</p> <p>- W. J. Moore, Physical Chemistry, 5th edition, Longman, 1972.</p> <p>- K. Anderson, Fundamental of Molecular Spectroscopy, John Wiley& Sons, 3rd Edition, 1992.</p> <p>- J. Michael Hollas, Modern Spectroscopy, 4th ed. John, Wiley & Sons New York, 2004.</p>
<p>3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)</p> <p>none</p>
<p>4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.)</p> <ul style="list-style-type: none"> • 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.)

- **Classrooms capacity (30) students.**
- **Providing hall of teaching aids including computers and projector.**

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 Program/Department Instructor

- **Observations and the assistance of colleagues.**
- **Independent evaluation for extent to achieve students the standards.**
- **Independent advice of the duties and tasks.**

3 Processes for Improvement of Teaching

- **Workshops for teaching methods.**
- **Continuous training of member staff.**
- **Review of strategies proposed.**
- **Providing new tools for learning.**
- **Application of e-learning.**
- **Eexchange of experiences internal and external.**



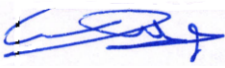
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

- **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.

- **Periodic Review of the contents of the syllabus and modify the negatives.**
- **Consult other staff of the course.**
- **Hosting a visiting staff to evaluate of the course.**
- **Workshops for teachers of the course.**


Faculty or Teaching Staff: **Ahmed Mohamed El Defrawy**

Signature: 

Date Report Completed: 12/1/2019

Received by: **Dr. Ismail Althagafi**

Department Head

Signature: 

Date: 20/1/2019

