Course Specifications

Course Title:	**Organic Spectroscopy**
Course Code:	**4023561-3**
Program:	**. Chemistry**
Department:	**Department of chemistry**
College:	**Faculty of Applied Science**
Institution:	**Umm Al-qura University**

Table of Contents

A. Course Identification

1. Credit hours:	**: 3 hrs (2 theoretical + 1** Tutorial**)**
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered:	**5th level/3rd year**
4. Pre-requisites for this course :	**Physical Organic Chemistry**
5. Co-requisites for this course (if any)**: …….**	

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	√	100%
2	**Blended**	-	-
3	**E-learning**	-	-
4	**Correspondence**	-	-
5	**Other**	-	-

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	30
2	**Laboratory/Studio**	42
3	**Tutorial**	-
4	**Exams & Quizzes**	8
	Total	80
Other Learning Hours*		
1	**Study**	30
2	**Assignments**	10
3	**Practical**	22
4	**Exams & Quizzes**	20
5	**Others** (specify)	-
	Total	82

* The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

This course is designed to help the students to an understanding of the various spectroscopy characterization techniques and how to determine the structure of organic compounds utilizing spectroscopic techniques which is an important part of modern day research and development. and focusing on applications in determining the structure of the organic molecules

2. Course Main Objective

-By the end of this course student will be familiar with compounds analysis by (UV-Spectroscopy , Infra-Red Spectroscopy ,NMR-Spectroscopy,Mass Spectroscopy)

-The students will be training to using data base services, and/or websites to improving interpretation of compounds with spectroscopy

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge:**	
1.1	Recognize the general Principals of different spectroscopy.	K1
1.2	Know position the functional groups in infra red	K4
1.3	Describe the compounds with spectroscopy	K2
1.4	Familiar with the factors affecting absorption frequency	K1
1.5	Determine the type and numbers of signals for NMR spectra in the different compounds	K5
1.6	Identify the examples of common types of fragmentation processes	K2
1.7	Identify the Index of Hydrogen Deficiency	K2
2	**Skills :**	
2.1	Apply the spectroscopy steps for all compounds .	S1
2.2	Predict the structure of compounds with study spectroscopy	S2
2.3	Compare between methods spectroscopy .	S3
2.4	Explain the different Benefits for study organic spectroscopy	S4
2.5	Summarize the spectroscopy of organic compounds	S5
2.6	development Reverse thinking skill (back thinking)	S7
3	**Competence:**	
3.1	Use the spectroscopy for Discovers the structure of compound	C1
3.2	Justify the structure of compound according to spectroscopy	C1
3.3	Ability to communicate results of work to classmates.	C1
3.4	Demonstrate structure for organic compounds with spectroscopy	C2
3.5	The ability to use e-mail to communicate with the instructor and other students.	C3
3.6	Use his/her observations to solve problems.	C4

C. Course Content

No	List of Topics	Contact Hours
1	Principals of spectroscopy and index of hydrogen deficiency	2
2	UV Spectroscopy: ground and excited states, molar absorptivity, an calculation of A max to the possible structure	4
3	Applications and solving problems	2
4	Factors affecting absorption frequency, experimental aspects of IR spectroscopy.	2
5	Interpretation of IR charts.	2
6	The nature of NMR absorption instrumentation; chemical shifts in 1H NMR spectroscopy.	2
7	Shielding and de shielding effect magnetic anisotropy, spin-spin coupling in 1H NMR spectroscopy.	4
8	^{13}C NMR spectroscopy (chemical shift);more complex spin-spin splitting patterns.	2
9	Mass Spectrometry (MS): ionization process and instrumentation.	2
10	Examples of common types of fragmentation processes.	2
11	Applications and solving problems.	2
12	Apply all Spectra.	4
Total		30

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge**		
1.1	Recognize the general Principals of different spectroscopy.	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • long and short essays • posters • lab manuals
1.2	Know position the functional groups in infrared		
1.3	Describe the compounds with spectroscopy		
1.4	Familiar with the factors affecting absorption frequency		
1.5	Determine the type and numbers of signals for NMR spectra in the different compounds		
1.6	Identify the examples of common types of fragmentation processes		
1.7	Identify the Index of Hydrogen Deficiency		
2.0	**Skills**		
2.1	Apply the spectroscopy steps for all compounds .	• Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • posters • individual and group presentations • video analsis lap manuals
2.2	Predict the structure of compounds with study spectroscopy		
2.3	Compare between methods spectroscopy .		
2.4	Explain the different Benefits for study organic spectroscopy		
2.5	Summarize the spectroscopy of organic compounds		
2.6	development Reverse thinking skill (back thinking)		
3.0	**Competence**		
3.1	Use the spectroscopy for Discovers the structure of compound .	• Library visits • Scientific discussion Web-based study	• web-based student performance systems individual and group presentations
3.2	justify the structure of compound according to spectroscopy		
3.3	Ability to communicate results of work to classmates.		
3.4	Ability to work in a team to perform a specific task.		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Homework or activities.	--	10 %
2	Midterm Exam.	8	20 %
3	Practical Exam.	14	30 %
4	Final Exam.(2 hours exam)	16	40 %
5	**Total**		**100 %**

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice : • We have faculty members to provide counseling and advice. • Office hours: During the working hours weekly. • Academic Advising for students.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	• Pavia, D.; Lampman, G.M.; Kriz, G.S.; Vyvyan, J.R. Introduction to Spectroscopy, 4 th edition, 2009, Belmont : Brooks/Cole, Cengage Learning. • Silverstein, R.M.; Webster, F.X.; Kiemle, D.J. Spectrometric Identification of Organic Compounds. 7th edition, 2005, N.Y. : John Wiley & Sons, Inc. • Prof.Dr.AbdullahM.Asiri, MahaM.Al-Otaibi"*Spectroscopic Methods in Organic Chemistry, 1st Edition*, 2012
Essential References Materials	Prof.Dr.Abdullah M.Asiri,Dr.Abood Bahajaj " *Principles of Spectroscopic Analysis of Organic Compounds*"
Electronic Materials	• **http://www.chemweb.com** • **http://www.sciencedirect.com** • **http://www.rsc.org** • **http://stream.hebust.edu.**
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	• **Classrooms capacity (30) students.**
Technology Resources (AV, data show, Smart Board, software, etc.)	**Providing hall of teaching aids including computers,TV, and projector**
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	**No other requirements**

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Observations and the assistance of colleagues.	Students, Faculty, Program Leaders, Peer Reviewer	▪ **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.**
Independent evaluation for extent to achieve students the standards.		
independent advice of the duties and tasks.		

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	
Date	

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date: 20/12/2019**