Course Specifications

General Information

Course name	Spectroscopic and microscopic analysis of chemical compounds
Course number	CHEM4334
Faculty	
Department	
Course type	Major Needs
Course level	4
Credit hours (theoretical)	3
Credit hours (practical)	0
Course Prerequisites	

Course Objectives

1 - 1. Provide students a general overview of molecular spectroscopy. Specifically, the underlying principles of spectroscopy are examined using quantum mechanics, the interaction of light and matter, and group theory as starting points. 2. The main focus of this course is the various forms of optical spectroscopy, including rotational, vibrational and electronic spectroscopy, as well as a brief look at photoelectron spectroscopy and lasers. 3. The course finishes with an introduction to radiofrequency spectroscopy techniques, including nuclear magnetic resonance and electron spin resonance.

Intended Learning Outcomes

Knowledge and Understanding	* Proton magnetic resonance spectrometry .1H NMR, instrumentation and sample handling chemical shift, simple spin coupling of proton to other nuclei, chemical shift equivalence and magnetic equivalence AMX, ABX AND ABC systems with three coupling constant. Strongly and weakly coupled spin systems effects of a chiral center vicinal and germinal coupling in rigid systems spin decoupling shift regents. 13C NMR spectrometry, Interpretation, chemical shifts, spin coupling, peak assignment problem quantitative analysis. New dimensional in NMR (2D3D) 1H-1H connectivity, 1H-13C connectivity, 13C-13C connectivity ultraviolet spectrometry. Theory, sample handling characteristics absorption of organic compounds.
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	* Final exam 50% Carry marks 30% Assignments 15% Attendance and participation 5%
	* Introduction to Spectroscopy 4th Edition, by Donald L. Pavia, Gary M. Lampman, George S. Kriz and James A. Vyvyan (Author)
Intellectual Skills	* Proton magnetic resonance spectrometry .1H NMR, instrumentation and sample handling chemical shift, simple spin coupling of proton to other nuclei, chemical shift equivalence and magnetic equivalence AMX, ABX AND ABC systems with three coupling constant. Strongly and weakly coupled spin systems effects of a chiral center vicinal and germinal coupling in rigid systems spin decoupling shift regents. 13C NMR spectrometry, Interpretation, chemical shifts, spin coupling, peak assignment problem quantitative analysis. New dimensional in NMR (2D3D) 1H-1H connectivity, 1H-13C connectivity, 13C-13C connectivity ultraviolet spectrometry. Theory, sample handling characteristics absorption of organic compounds.
Professional Skills	* Proton magnetic resonance spectrometry .1H NMR, instrumentation and sample handling chemical shift, simple spin coupling of proton to other nuclei, chemical shift equivalence and magnetic equivalence AMX, ABX AND ABC systems with three coupling constant. Strongly and weakly coupled spin systems effects of a chiral center vicinal and germinal coupling in rigid systems spin decoupling shift regents. 13C NMR spectrometry, Interpretation, chemical shifts, spin coupling, peak assignment problem quantitative analysis. New dimensional in NMR (2D3D) 1H-1H connectivity, 1H-13C connectivity, 13C-13C connectivity ultraviolet spectrometry. Theory, sample handling characteristics absorption of organic compounds.
General Skill	* Proton magnetic resonance spectrometry .1H NMR, instrumentation and sample handling chemical shift, simple spin coupling of proton to other nuclei, chemical shift equivalence and magnetic equivalence AMX, ABX AND ABC systems with three coupling constant. Strongly and weakly coupled spin systems effects of a chiral center vicinal and germinal coupling in rigid systems spin decoupling shift regents. 13C NMR spectrometry, Interpretation, chemical shifts, spin coupling, peak assignment problem quantitative analysis. New dimensional in NMR (2D3D) 1H-1H connectivity, 1H-13C connectivity, 13C-13C connectivity ultraviolet spectrometry. Theory, sample handling characteristics absorption of organic compounds.

Course Contents

1	- 1. IR- spectroscopy 2. 1H-NMR spectroscopy 3. 13C-NMR spectroscopy 4. 31P-NMR spectroscopy 5. Mass spectroscopy