

BS Chemistry Semester-V					
Programme	BS Chemistry	Course Code	CHEM- 331	Credit Hours	2
Course Title	UV & IR Spectroscopy		Course Type	Major	
Course Introduction					
The course is designed to provide an adequate knowledge about the instrumentation, working and applications of UV/Visible and IR spectroscopy and role of these techniques for the characterization of organic compounds. Infra-Red (IR) Spectroscopy Electromagnetic radiations: IR; modes of vibration, sampling techniques, Vibration frequencies of different functionalgroups, factors influencing the vibration frequencies and applications of IR spectroscopy. Ultra-Violet (UV) and Visible Spectroscopy Ultraviolet (UV) or electronic spectroscopy: electronic transitions; factors influencing the λ_{max}. values, Woodward- Fisher rules for calculations of λ_{max}. Applications of UV-Vis. Spectroscopy.					
Learning Outcomes					
On the completion of the course: 14.1. The students are expected to be familiarized with the instrumentation, working and applications of UV/Visible and IR spectroscopy. 14.2. They will understand the role of these techniques for the characterization of organic compounds.Students will be able to differentiate compounds by using these spectroscopic techniques.					
Course Content			Assignments/Readings		
Week 1	Infrared Spectroscopy Electromagnetic Radiations		Enlist effects of EMR and their importance		
	Infrared Radiations				
Week 2	Introduction				
	Modes of vibration		Practice modes of vibration of assigned examples		
Week 3	Modes of vibration				
	Sample techniques		Literature survey		
Week 4	Sample techniques				
	Vibration frequencies of different functionalgroups		Problem set		
Week 5	Vibration frequencies of different functionalgroups				
	Factors influencing the vibration frequencies				
Week 6	Interpretation of spectra's		Practice problems		
Week 7	Interpretation of spectra's		Practice problems		
	Applications				
Week 8	Mid-Term Week				
Week 9	Ultraviolet Visible Spectroscopy Ultraviolet (UV) or electronic spectroscopy		Search harmful effects and uses of UV in structure elucidation.		

	Introduction	
Week 10	Electronic transitions	Practice problems
	Electronic transitions	Practice problems
Week 11	Factors influencing the λ_{max} values	
	Factors influencing the λ_{max} values	
Week 12	2.4 Factors influencing the λ_{max} values	
	Woodward- Fieser rules for calculations of λ_{max}	Memorize values
Week 13	Woodward- Fieser rules for calculations of λ_{max}	Memorize values
	Woodward- Fieser rules for calculations of λ_{max}	Memorize values
Week 14	Woodward- Fieser rules for calculations of λ_{max}	
	Applications of UV-Vis. Spectroscopy	Literature survey
Week 15	Applications of UV-Vis. Spectroscopy	Literature survey
	Applications of UV-Vis. Spectroscopy	
Week 16	Final-Term Week	
Textbooks and Reading Material		
1. Pavia, D.L; Lampman, G.M; Kriz, G.S; Vyvyan, J.R. Introduction to Spectroscopy. Brooks/Cole Cengage Learning, 2009; 4th Ed. 2. Williams, D. and I. Fleming, Spectroscopic Methods in Organic Chemistry, McGrawHill, New York 3. M.Younas, Organic Spectroscopy, Ilmi Kitab Khana, Lahore (2004). 4. Y.C. Ning, Spectral Identification of Organic Compounds with Spectroscopic Techniques, Wiley-VCH, Weinheim (2005). 5. Kemp, W. Organic Spectroscopy. W.H. Freeman & Company: New York, 1991; 3rd Ed. 6. Hollas, J.M. Modern Spectroscopy. John-Wiley & Sons, 2004; 4th Ed 7. M. Hesse, H. Meier and B. Zeeth, Spectroscopic Methods in Organic Chemistry, Georg Thieme Verlag, Stuttgart, Germany (1997). 8. R.M. Silverstein, F.X. Webster and D.J. Kiemle, Spectrometric Identification of Organic Compounds, John Wiley and sons Inc., USA (2005). 9. L.M. Harwood and T.D.W. Claridge, Introduction to Organic Spectroscopy, Oxford University Press Inc., New York (1997).		
Teaching Learning Strategies		
1. Lectures 2. Group Discussion 3. Laboratory work/Numerical problem sets 4. Seminar/ Workshop		
Assignments: Types and Number with Calendar		
1.Practice questions from the exercises from the recommended textbook. 2.Literature review based assignment relevant to the course will also be given during the course.		