

COURSE SYLLABUS

- 1. Program of Study Faculty** Bachelor of Science (Chemistry)
International College, Mahidol University
- 2. Course Code** ICCH 321
Course Title Organic Spectroscopy
- 3. Number of Credits** 4 (4-0-8) (Lecture/Lab/Self-study)
- 4. Prerequisite** ICCH 222
- 5. Type of Course** Required major courses
- 6. Semester / Academic Year** Third trimester 2005-2006
- 7. Course Conditions** Number of students between 20-30
- 8. Course Description:**
Concepts and applications of spectroscopy used in organic molecular structure determination; mass spectrometry, UV-Visible spectroscopy; Infrared spectroscopy; proton and carbon-13 nuclear magnetic resonance.
- 9. Course Objectives:**
After successful completion of this course, students should be able to
 - 9.1 understand in detail the concepts, theories and the application of spectroscopy in organic chemistry;
 - 9.2 utilise the concepts and understanding of spectroscopy in organic structure determination;
 - 9.3 apply the theories, concepts and analytical ability in research.

10. Course Outline

Week	Topics	Hours			Instructor
		Lecture	Lab	Self-study	
1	Review of organic molecular orbital theory	2	-	4	Dr. Pakorn Bovonsombat
2	Review of basic organic functional groups and their reactions	2	-	4	
3	Structure elucidation by analysis of spectra Mass spectrometry; theory	4	-	8	

4	Mass spectrometry; theory Mass spectrometry; analysis, interpretation	4	-	8	Dr. Pakorn Bovonsombat
5	UV Spectroscopy; theory UV Spectroscopy; analysis, interpretation	4	-	8	
6	Infrared spectroscopy; theory Infrared spectroscopy; analysis, interpretation	4	-	8	
7	Theory of ^1H -NMR (proton spin)	4	-	8	
8	Analysis and interpretation of ^1H - NMR	4	-	8	
9	Theory of ^{13}C -NMR	4	-	8	
10	Analysis and interpretation of ^{13}C - NMR	4	-	8	
11	Analysis and interpretation of spectra	4	-	8	
12	Structure determination from spectra	4	-	8	
	Total	44	-	88	

11. Teaching Methods:

- 11.1 Lecturing and problem solving through analysis of spectra
- 11.2 Self-study
- 11.3 Group discussion and presentation

12. Teaching Media:

Transparencies, handouts and lecturing from boards.

13. Measurement and Evaluation of Student Achievement:

Student achievement is measured and evaluated by

- 13.1 the ability in understanding in detail the concepts, theories and the application of spectroscopy in organic chemistry;
- 13.2 the ability to utilise the concepts and understanding of spectroscopy in organic structure determination;
- 13.3 the ability to apply the theories, concepts and analytical ability in research.

Student's achievement will be graded according to the College and University standard using the symbols: A, B+, B, C+, C, D+, D and F. Students must attend at least 80% of the total class hours of this course.

Assessment made from the set-forward criteria: student who gets 85% and above will have Grade A.

- There will be homework assignments. The assignments will not have to be handed in or graded, but will be discussed periodically in class. Failure to do the homework or to discuss the assignments in class may affect the deliberation of the final Grade.
- A minimum of;

Midterm examination	40%
Final examination	50%
Class participation	10%

14. Course Evaluation:

14.1 Students' achievement as indicated in number 13 above.

14.2 Students' satisfaction towards teaching and learning of the course using questionnaires.

15. References:

Pavia, D.L., Lampman, G.M. and Kriz, G.S. **Introduction to Spectroscopy**, USA: Brooks Cole; 2000.

Skoog, D.A., West, D.M., James Holler, F. and Crouch, S.R. **Fundamentals of Analytical Chemistry**, 8th Edition, USA: Brooks/Cole; 2004.

Silverstein, R.M., Clayton, G. and Morrill, T.C. **Spectrometric Identification of Organic Compounds** 6th Edition, USA: John Wiley & Sons; 2005.

Skoog, D.A., James Holler, F. and Nieman, T.A. **Principles of Instrumental Analysis** 5th Edition, USA: Brooks/Cole; 1998.

Günther, H. **NMR Spectroscopy: Basics, Principles, Concepts and Application in Chemistry**, USA: John Wiley & Sons; 1995.

Roberts, J.D. **Nuclear Magnetic Resonance application to organic chemistry**, USA: McGraw-Hill; 1959.

16. Instructors:

Dr. Pakorn Bovonsombat

17. Course Coordinator:

Dr. Pakorn Bovonsombat

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