## COURSE SYLLABUS

1. **Program of Study** Bachelor of Science (Chemistry)
   **Faculty** International College, Mahidol University

2. **Course Code** ICCH 316
   **Course Title** Modern methods of analysis

3. **Number of Credits** 4(3-2-7) (Lecture/Lab/Self-study)

4. **Prerequisite** ICCH 311

5. **Type of Course** Required major courses

6. **Semester / Academic Year** Second trimester 2005-2006

7. **Course Conditions** Number of students between 20-30

8. **Course Description**:
   Concepts of modern analytical methods for quantitative and qualitative analyses and molecular structure characterisation; gas and liquid chromatography, molecular absorption and emission spectroscopy; atomic absorption and emission spectroscopy.

9. **Course Objectives**:
   After successful completion of this course, students should be able to
   9.1 understand the working and output of modern analytical equipment;
   9.2 interpret the spectra and to use them effectively in structural determination of compounds;
   9.3 apply the technique and the interpretation skill to research.

**10. Course Outline**

| Week | Topics /Seminar | Hours | | | Instructor |
|---|---|---|---|---|---|
| | | Lecture | Lab | Self-study | |
| 1 | Introduction to absorption spectroscopy | 2 | - | 4 | |
| 2 | Molecular UV and visible absorption spectroscopy | 4 | 2 | 9 | |
| 3 | Atomic absorption spectroscopy | 4 | 2 | 9 | |
| 4 | Atomic emission spectroscopy | 4 | 2 | 9 | |
| 5 | Raman spectroscopy | 4 | 2 | 9 | |
| 6 | X-ray spectroscopy | 4 | - | 8 | |
| 7 | Electron spectroscopy | 4 | - | 8 | |
| 8 | Chromatographic separation | 4 | 2 | 9 | |
| 9 | Gas chromatography | 4 | 2 | 9 | |
| 10 | High performance chromatography | 4 | 2 | 9 | |
| 11 | Ion-exchange chromatography | 4 | 2 | 9 | |
| 12 | Ion-exchange chromatography | 2 | - | 4 | |
| | **Total** | 44 | 8 | 96 | |

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 to understand the working and output of modern analytical equipment;
    13.2 the ability to interpret the spectra and to use them effectively in structural determination of compounds;
    13.3 the ability to apply the technique and the interpretation skill to 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.
A minimum of;

| | |
|---|---|
| Midterm examination | 40% |
| Final examination | 50% |
| Quizzes | 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**

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 Morril, 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.

**16. Instructors**

Dr. Sirirat Chookieng

**17. Course Coordinator**

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