Subject Description Form

Subject Code	ABCT3623
Subject Title	Analytical Spectroscopy
Credit Value	3
Level	3
Pre-requisite	Chemical Principles for Testing and Analysis
Objectives	This module aims to educate students to understand the basic principles, instrumentation and applications of molecular spectroscopy and atomic spectroscopy.
Intended Learning Outcomes	Students who satisfactorily complete this subject should be able to a. master the principles of spectroscopic techniques, and apply them in industrial/testing laboratory; b. recognise the advantages and limitations of each spectroscopic technique discussed; c. conduct statistical analysis of data and understand the concepts of basic analytical chemistry.
Subject Synopsis/ Indicative Syllabus	<u>Molecular Spectroscopy</u> UV-Visible spectroscopy: the electromagnetic spectrum; Beer's Law; methodologies in quantitative analysis; instrumentation. Infrared spectroscopy: sample preparation; instrumentation; absorption wavelengths of common functional groups; applications; near infrared spectroscopy; Fourier-transform infrared spectroscopy. Raman spectroscopy: principle; instrumentation; applications. Fluorescence spectroscopy: principle; instrumentation; applications. Nuclear magnetic resonance spectroscopy: principle, proton NMR, carbon-13 NMR, applications. <u>Atomic Spectroscopy</u> Atomic Emission and Absorption Spectrophotometry: review of Beer's Law of light absorption; components of an atomic absorption/emission spectrophotometer; the flame and graphite furnace atomizer; the inductively-coupled plasma excitation source; interference effects; applications.
Teaching/Learning Methodology	**Lecture**: basic concepts and principles will be introduced and discussed. Examples will be used to illustrate the applications of various methods and techniques. **Tutorials:** a set of tutorial problems will be given to allow students to apply the knowledge acquired from the lecture. Students are encouraged to solve the problems before seeking assistance. These will help students consolidate what they have learned and develop a deeper understanding of the subject.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c			
1. Exam	50	✓	✓	✓			
2. Test	30	✓	✓	✓			
3. Laboratory	20	✓		✓			
Total	100 %						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Test and examination are used to evaluate how much students have learned in basic concepts, principles and applications of various methods and techniques.

Student Study Effort Expected

Class contact:	
▪ Lecture	27 Hrs.
▪ Tutorial	6 Hrs.
▪ Laboratory	12 Hrs.
Other student study effort:	
▪ Self study	72 Hrs.
Total student study effort	117 Hrs.

Reading List and References

Essential:

Skoog, D. A.; West, D. M.; Holler, F. J.
Fundamentals of Analytical Chemistry (8th ed.) Saunders College 2004.

Supplementary:
Skoog, D. A.; Holler, F. J. and Nieman, T. A.
Principles of Instrumental Analysis (6th ed.) Brooks/Cole 2007.

Christian, G. D.
Analytical Chemistry (6th ed.) Wiley 2003.