

Subject Description Form

Subject Code	ABCT2701
Subject Title	Analytical Chemistry I
Credit Value	3
Level	2
Co-requisite	ABCT1741 General Chemistry I
Objectives	This module aims to educate students to understand the basic principles and the applications of sampling techniques, titrimetric analysis and molecular spectroscopy like UV-Visible, IR and fluorescence spectrophotometry
Intended Learning Outcomes	Students who satisfactorily complete this subject should be able to a. demonstrate the knowledge of different sampling techniques; b. describe aqueous solution chemistry, and perform quantitative analysis using various titrimetric methods; c. master the principles of UV, IR and fluorescence techniques, and apply them in industrial/testing laboratory; d. recognise the advantages and limitations of each analytical method discussed; e. conduct statistical analysis of data and understand the concepts of basic analytical chemistry.
Subject Synopsis/ Indicative Syllabus	<p><u>Data treatment</u> Significant figures, accuracy and precision, determinate and indeterminate errors, propagation of error. Normal distribution and standard deviations. Linear least squares and correlation coefficient.</p> <p><u>Sampling Techniques</u> Methods of sampling liquids, solutions and solids; techniques in solid sample preparation.</p> <p><u>Titrimetric Analysis</u> Ionic equilibrium and pH. Theory of titrimetric analysis involving acid-base, oxidation-reduction, solubility equilibria, precipitation and complexometric reactions, and the theory of indicators. .</p> <p><u>Spectrophotometric Techniques</u> UV-Visible spectrophotometry: the electromagnetic spectrum, Beer's Law; methodologies in quantitative analysis; instrumentation Infrared spectrophotometry: sample preparation, instrumentation and application. Fluorescence spectroscopy: principle; instrumentation; applications.</p>

Teaching/Learning Methodology	<p>Lecture: basic concepts and principles will be introduced and discussed. Examples will be used to illustrate the applications of various methods and techniques.</p> <p>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.</p>																																							
Assessment Methods in Alignment with Intended Learning Outcomes	<p>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.</p>																																							
Student Study Effort Expected	<p>Class contact:</p> <table border="1" data-bbox="516 1024 1453 1434"> <thead> <tr> <th rowspan="2">Specific assessment methods/tasks</th> <th rowspan="2">% weighting</th> <th colspan="6">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th> </tr> <tr> <th>a</th> <th>b</th> <th>c</th> <th>d</th> <th>e</th> <th></th> </tr> </thead> <tbody> <tr> <td>1. Exam</td> <td>50</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> </tr> <tr> <td>2. Test</td> <td>50</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> </tr> <tr> <td>Total</td> <td>100 %</td> <td colspan="6"></td> </tr> </tbody> </table>		Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)						a	b	c	d	e		1. Exam	50	√	√	√	√	√		2. Test	50	√	√	√	√	√		Total	100 %						
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Student Study Effort Expected	<p>Lecture</p> <ul style="list-style-type: none"> ▪ Tutorial ▪ Other student study effort: 	<p></p> <p>33 Hrs.</p> <p>6 Hrs.</p>																																						

	<ul style="list-style-type: none"> ▪ Self study 	56 Hrs.
	<ul style="list-style-type: none"> ▪ Homework assignment 	16 Hrs.
	Total student study effort	111Hrs.
Reading List and References	<p><u>Essential:</u> Fundamentals of Analytical Chemistry (9th ed.) Skoog, D. A.; West, D. M.; Holler, F. J.; Crouch, S.R. Brooks/Cole, 2014.</p> <p><u>Supplementary:</u> Principles of Instrumental Analysis (6th ed.) Skoog, D. A.; Holler, F. J. and Nieman, T. A. Brooks/Cole, 2007.</p> <p>Analytical Chemistry (6th ed.) Christian, G. D. Wiley, 2003.</p>	