

Subject Description Form

Subject Code	ABCT3759
Subject Title	ANALYTICAL CHEMISTRY II LABORATORY
Credit Value	1
Level	3
Pre-requisite	Chemistry Laboratory I
Co-requisite	Analytical Chemistry II
Objectives	This subject provides students with practical and operational experience on common instrumental methods of chemical analysis. The principles and techniques taught in Analytical Chemistry II provide the theoretical basis of this laboratory module.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. explain the operation principles of atomic absorption spectrophotometers, gas chromatographs and high-performance liquid chromatographs; b. operate the instruments mentioned in (a) in laboratory practicals; c. gain the ability to optimize instrumental parameters for analysis of real-life samples; d. recognize the operational advantages and limitations of each type of instruments commonly used in the chemical laboratory.
Subject Synopsis/ Indicative Syllabus	Determination of nickel in brass by flame atomic absorption spectrophotometry. Graphite furnace atomic absorption – determination of trace amounts of aluminium in beverages packed in a two-layered aluminium can. Fluorometric determination of riboflavin (vitamin B2) in Vitasoy. Analysis of phosphate by ion-exchange and potentiometric titrations. Qualitative analysis by gas chromatography: determination of aromatic hydrocarbons using a thermal conductivity detector. Quantitative analysis by gas chromatography: trace aromatics in industrial grade aliphatic hydrocarbon solvents. High-performance liquid chromatography of plastic plasticizers using a silica-gel adsorption column. C8 reverse-phase ion-pair HPLC separation of food dyes.

Teaching/Learning Methodology	Laboratory manuals will be provided to students and the manual will contain descriptions on the basics and background of the experiment. Stepwise instructions will guide the student through the experiment. Teaching staff will demonstrate the operation of more complicated instruments. Students will be questioned on the meaning of certain procedural steps in carrying out the experiments. Students have to hand in written reports and give answers to specific questions raised in the laboratory manual. Report writing is intended to develop the students' ability in technical and scientific writing.																																												
Assessment Methods in Alignment with Intended Learning Outcomes	<table border="1" data-bbox="469 680 1386 1111"> <thead> <tr> <th data-bbox="469 680 764 875" rowspan="2">Specific assessment methods/tasks</th> <th data-bbox="764 680 916 875" rowspan="2">% weighting</th> <th colspan="6" data-bbox="916 680 1386 808">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th> </tr> <tr> <th data-bbox="916 808 995 875">a</th> <th data-bbox="995 808 1075 875">b</th> <th data-bbox="1075 808 1155 875">c</th> <th data-bbox="1155 808 1235 875">d</th> <th data-bbox="1235 808 1315 875"></th> <th data-bbox="1315 808 1386 875"></th> </tr> </thead> <tbody> <tr> <td data-bbox="469 875 764 976">1. Lab performance and reports</td> <td data-bbox="764 875 916 976">70</td> <td data-bbox="916 875 995 976">√</td> <td data-bbox="995 875 1075 976">√</td> <td data-bbox="1075 875 1155 976">√</td> <td data-bbox="1155 875 1235 976">√</td> <td data-bbox="1235 875 1315 976"></td> <td data-bbox="1315 875 1386 976"></td> </tr> <tr> <td data-bbox="469 976 764 1043">2. Test</td> <td data-bbox="764 976 916 1043">30</td> <td data-bbox="916 976 995 1043">√</td> <td data-bbox="995 976 1075 1043">√</td> <td data-bbox="1075 976 1155 1043">√</td> <td data-bbox="1155 976 1235 1043">√</td> <td data-bbox="1235 976 1315 1043"></td> <td data-bbox="1315 976 1386 1043"></td> </tr> <tr> <td data-bbox="469 1043 764 1111">Total</td> <td data-bbox="764 1043 916 1111">100 %</td> <td colspan="6" data-bbox="916 1043 1386 1111"></td> </tr> </tbody> </table> <p data-bbox="469 1160 1386 1223">Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p data-bbox="469 1240 1386 1402">Students will be assessed by their written report and performance during the practical sessions, which will be carefully monitored by teaching staff. Written test will also be given to assess the students' understanding of the operation principles of the instruments and the merits/limitations of the different analytical methodologies.</p>							Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)						a	b	c	d			1. Lab performance and reports	70	√	√	√	√			2. Test	30	√	√	√	√			Total	100 %						
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Student Study Effort Expected	Class contact:																																												
	▪ Laboratory		21 Hrs.																																										
	Other student study effort:																																												
	▪ Laboratory report preparation		21 Hrs.																																										
	Total student study effort		42 Hrs.																																										
Reading List and References	<p data-bbox="469 1794 1386 1827">Essential:</p> <p data-bbox="469 1854 1386 1962">Skoog D A, Holler F J and Nieman T A Principles of Instrumental Analysis Saunders College Publishing, 5th edition, 1998</p>																																												

Sawyer D T, Heineman W R and Beebe J M
Chemistry Experiments for Instrumental Methods
John Wiley & Sons, 1984

Supplementary:

Larry G Hargis
Analytical Chemistry: Principles and Techniques
Prentice-Hall 1988

Rubinson K A and Rubinson J F
Contemporary Instrumental Analysis
Prentice Hall 2000