

Subject Description Form

Subject Code	ABCT4713
Subject Title	Physical Chemistry Laboratory
Credit Value	1
Level	4
Pre-requisite	ABCT2704 Chemistry Laboratory I
Co-requisite	ABCT4712 Physical Chemistry III
Objectives	The aim of this module is to provide students with more practical operational experiences in Physical Chemistry with emphasis on spectroscopy, surface probing techniques and computational techniques.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. deploy the knowledge learned for exploring the basic principles of quantum mechanics, molecular spectroscopy, and surface probing techniques through experimentation b. conduct and modify experiments as well as to critically evaluate, analyze and interpret experimental results c. function effectively in team work d. integrate methods, skills and techniques for solving related chemistry problems
Subject Synopsis/ Indicative Syllabus	Experiments involved may included 1. Vibration-Rotation Spectrum of Diatomic molecule 2. Dissociation Energy of Iodine from Visible Absorption Spectrum 3. Determination of Surface Coverage of Bromobenzene Adsorbed on Silica 4. The Bonding Properties of Hydrogen Molecular Ion 5. Molecular Modeling Laboratory 6. Estimation of Acidity Constant of 2-Naphthol in the First-Excited Singlet State
Teaching/Learning Methodology	Experiments will be carried out by students to explore and apply what they learned in lecture sessions. Students work together in teams using basic chemical techniques, operating various instruments, and running software packages to solve problems on topics discussed as well as presenting their experimental results. Report writing is required for individual students to scrutinize their analytical, problem solving, communication, judgement and other skills.

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	d	
	1. Performance	25 %		√	√		
	2. Laboratory Reports	45 %	√	√		√	
	3. Test	30 %	√	√			
Total	100 %						
<p>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p>This is a laboratory subject and how the students perform in the laboratory would be an important aspect of assessment. In this course, performance in the laboratory is a mark given by the demonstrators and/or instructors to indicate whether the students prepared well before the laboratory session and his or her ability to conduct the experiments effectively and safely. It is also important for the students to analyze and evaluate experimental data obtained (outcome b). Thus, students are required to submit experiments reports which included a description of the background and procedure, presentation of data and analysis of the data as well as discussion which evaluate the reliability of the data, compare the results obtained from previous measurements or literature values, and discuss possible source of errors and discrepancies.</p>							
Student Study Effort Expected	Class contact:						
	▪ Laboratory		18 Hrs.				
	Other student study effort:						
	▪ Laboratory Preparation (reading manuals and related background materials)		6 Hrs.				
	▪ Writing Laboratory Reports		18 Hrs.				
	Total student study effort		42 Hrs.				
Reading List and References	<ol style="list-style-type: none"> 1. A. M. Halpern, Experimental Physical Chemistry (3rd Ed.) W.H. Freeman, 2006 2. C. W. Garland, J. W. Nibler, D. P. Shoemaker, Experiments in Physical Chemistry, (8th Ed.) McGraw Hill 2009 3. Peter W. Atkins and J. de Paula, Physical Chemistry (9th Ed.) Oxford University Press, 2010 4. Peter W. Atkins and J. de Paula, Elements of Physical Chemistry (4th Ed.) Oxford University Press, 2005 						