Module code	SP-4309		
Module Title	Introduction to Chemical Physics		
Degree/Diploma	Bachelor of Science (Applied Physics)		
Type of Module	Major Option		
Modular Credits	4	**Total student Workload**	12 hours/week
		Contact hours	4 hours/week
Prerequisite	None		
Anti-requisite	None		

Aims

This module aims to introduce students to the fields of chemical physics and physical chemistry, and to demonstrate the application of physical methods and theories to chemical systems.

Learning Outcomes

On successful completion of this module, a student will be expected to be able to:

Lower order :	0%	
Middle order :	30%	- describe the main fields of study in chemical physics and physical chemistry - appreciate the relevance of physical methods and theories to chemical systems
Higher order:	70%	- solve chemical problems using the principles of thermodynamics and chemical kinetics - interpret the absorption and emission spectra of simple molecules - demonstrate an understanding of basic electrochemistry and electron transfer theories - choose appropriate experimental techniques for the measurement of specific physical properties - work independently and also collaboratively in a team - interpret the results of analyses, and make appropriate reports and presentations for effective communication

Module Contents

The main contents of the module are:

- introductory thermodynamics and chemical kinetics (the laws of thermodynamics; kinetic theory of gases; rate equations; reaction order)
- introductory molecular spectroscopy and photophysics (electronic, vibrational, and rotational spectra; fluorescence and phosphorescence; Jablonski diagrams; the Franck–Condon principle)
- electrochemistry (cell thermodynamics; electrochemical kinetics; the Butler–Volmer equation; Fick’s first and second laws)
- electron transfer theory (Marcus–Gerischer theory; Marcus–Hush theory)
- selected experimental techniques (UV-Vis-NIR; transient absorption; voltammetry; impedance spectroscopy)

Assessment	Formative assessment	In-class questions and homework problems will be used to test and give feedback on learning.
	Summative assessment	Examination: 0%
		Coursework: 100% - Two (2) class tests (50%) - Three (3) written assignments (30%) - One (1) literature survey (10%) - One (1) oral presentation (10%)