Subject Description Form

Subject Code	ABCT3712
Subject Title	Physical Chemistry II
Credit Value	3
Level	3
Pre-requisite	ABCT2712 Physical Chemistry I or ABCT2702 Physical Chemistry I or ABCT2772 Introductory Physical Chemistry
Objectives	This module aims to familiarize students with fundamental concepts of quantum chemistry and electrochemistry
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. determine the electronic structure of an atom according to the modern quantum theory b. relate the electronic structure of an atom to its properties and interactions with light c. demonstrate a better understanding on the fundamental principles of electrochemistry as well as their contemporary applications d. identify and solve problems on learned topics in related areas of chemistry and other fields as well as real-life cases
Subject Synopsis/ Indicative Syllabus	<u>Quantum Chemistry</u> Schrodinger equation. Simple systems with exact solution: particle-in-a-box and its application to conjugated systems, solution of the hydrogen atom. Many-electron atoms: Hartree-Fock self-consistent-field method, angular momentum coupling, term symbols. Atomic Spectroscopy: emissions, absorption and selection rules. Qualitative molecular orbital theory and Huckel theory. <u>Electrochemical properties and Electrolyte Solutions</u> Electrolyte and properties of ions: Activity, conductivity, ionic mobility, ionic strength, Debye-Huckel theory. Electrochemical properties: Electromotive force (emf) and free energy, Nernst equation and its applications, applications of emf measurements.
Teaching/Learning Methodology	Lectures will provide students with basic outlines of key concepts and guidance on further reading. Examples in Physical Chemistry itself as well as other chemistry subjects and real-life examples are utilized to illustrate the principles taught. Students are encouraged to present their answers to questions posed in lectures and problem sets in tutorial sessions.

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. Quizzes	40 %	√	√	√	√		
2. Examination	60 %	√	√	√	√		
Total	100 %						

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

The course aims at provide basic trainings in atomic quantum theory and electrochemistry so that students are able to understand the basic functions and theories as well as to apply them to solve problems. Thus, written quizzes and examination are suitable for assessing their progress.

Student Study Effort Expected

Class contact:	
▪ Lecture	31 Hrs.
▪ Tutorial	8 Hrs.
Other student study effort:	
▪ Self Study	56 Hrs.
▪ Preparation of Tutorials	16 Hrs.
Total student study effort	111 Hrs.

Reading List and References

1. Peter W. Atkins and J. de Paula, Physical Chemistry (9th Ed.), Oxford University Press, 2010
2. Peter W. Atkins and J. de Paula, Elements of Physical Chemistry (4th Ed.), Oxford University Press, 2005
3. I.N. Levine, Physical Chemistry (6th Ed.), McGraw-Hill 2009
4. Thomas Engel, Physical Chemistry (2nd Ed.), Pearson 2010