Course Title	Course Code	Number of Study Hours			Year	Level	Prerequisites
		Theoretical	Laboratory	Credit			
Quantum Mechanics 2	451PHYS	3	---	3	4th	7th	352PHYS

(1) Brief Course Description

This course is the continuation of Quantum Mechanics1. It mainly encompasses approximation techniques such as perturbation theory, variational principle, WKB method and Born approximation. These approximation techniques will be applied to calculate the energy and wave corrections to perturbed simple harmonic oscillator, relativistic correction to hydrogen atom and to study interaction of radiation with matter and scattering.

(2) Course Objectives

This course is designed to provide students with:

- Quantum mechanics that can be used in obtaining the first and second order energy and wave function corrections for nondegenerate and degenerate cases.
- Determination the transition probabilities for two-level system using time-dependent perturbation theory approximately obtain the lowest ground state energy by optimizing variational parameters of the trial function.
- Generatation of scattering amplitudes and cross sections using Born approximation.

(3) Course Contents

- Short review of quantum formulation.
- Time-dependent perturbation.
- Time-independent perturbation.
- Vartional principle.
- WKB approximation.
- Born's approximation (Scattering theory).

(4) Assessment Criteria

- Periodic Exams: 40%
- Oral, Student Activity and Essay: 10%
- Final Exam: 50%

(5) Course Teaching Strategies

- Lectures, Reports and Essay Assignments, Homeworks, and Web-based assignments.

(6) Text Book

- Introduction to quantum mechanics, David J. Griffiths, Prentice Hall Inc., 1995

(7) Reference Books

- Introductory Quantum Mechanics; R. Liboff, 4th Edition, Addison Wessely, 2002.
- Quantum Mechanics; Sara M. Mc Murry, Addison Wessely, 1994.