Elective Course Description (1. Fall Semester)

Subject (English)	Introductory Quantum Mechanics	Semester	Fall	Day/Slot	
科目名 (日本語)	量子力学				
Course Code		Course Numbering	TEI-QTME301	Period	Oct. – Feb.
Instructor (Post)	Assoc. Prof. Simon J. Greaves			Campus	
				Building	
Faculty	Department of Electrical, Information and Physics Engineering	Credits	2	Class Room	

Class subject	

Object and summary of class

Beginning with a review of some early 20th century experiments, this course aims to develop an understanding of the basic concepts of quantum mechanics and how they differ from classical mechanics. The Schrödinger equation will be used to solve one-dimensional problems and show that quantum mechanics can be used to predict the existence of physical phenomena such as quantum mechanical tunneling, discrete energy levels and energy band-gaps in solids. Students are assumed to have introductory college-level physics, calculus, and linear algebra.

Keywords	-

Goal of study

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Contents and progress schedule of class

1. Introduction. What is quantum mechanics? Double slit experiments
2. Blackbody radiation, photoelectric effect
3. Compton scattering, Franck and Hertz experiment
4. Bohr's model of the hydrogen atom, de Broglie theory
5. Schrödinger equation, wave functions
6. Operators, eigenvalue equations, expectation values
7. The infinite potential well
8. Pauli exclusion principle, particle in a box, Heisenberg uncertainty principle
9. Delta-function potential, scattering and tunneling
10. One dimensional barrier problems
11. Solids, band gaps, angular momentum
12. The harmonic oscillator
13. Free particles and wave packets

Preparation	-
Record and evaluation method	Course grades are based on homework, mid-term and final examinations.
Textbook and references	There is no set text. Many textbooks cover the topics discussed in the course, e.g. David J. Griffiths, Introduction to Quantum Mechanics, Prentice Hall International. Richard L. Liboff, Introductory Quantum Mechanics, Addison Wesley. B. H. Bransden & C. J. Joachain, Quantum Mechanics, Prentice Hall.
Self study	-
In addition	-