# Quantum Mechanics

**Sequence of Ph. 401**

**Chapter one**: Quantum Mechanics in three dimensions
1- Schrodinger Equation in Spherical coordinates
2- The Hydrogen Atom
3- Angular momentum
4- Spin

**Chapter Two** : The matrix formulation of quantum mechanics
1- The harmonic oscillator
2- Operators as matrices for the harmonic oscillator
3- Some matrix definitions and general properties
4- pure matrix treatment of the simple harmonic oscillator

**Chapter Three**: Time- independent Perturbation theory
1- non degenerate perturbation theory
2- Stark effect of the linear harmonic oscillator
3- Degenerate Perturbation Theory
4- Zeeman effect in Hydrogen atom

Chapter Four: The variational Principle
1- Theory
2- Applications
The ground state of the harmonic oscillator
Variational method for the excited state

Text books:
1- Introduction to quantum mechanics (second edition) by David J. Griffiths (2005)
2- Quantum mechanics: (Crash Course) by Eliahu Zaarur
3- Basic quantum mechanics by R. L. White

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