Aim of the course:

The purpose of the course is to teach advanced Quantum Mechanics.

Details of subjects to be covered:

Detailed teaching program for all classes:

I. BASICS OF QUANTUM MECHANICS

A. Schrodinger Equation
B. Rectangular Potential Well
C. Harmonic Oscillator
D. The Transmission Coefficient
E. Plane Rotator
F. Central potential
G. Relative and Center-of-Mass Coordinates
H. The Hydrogen Atom

II. SPIN-1/2

A. Two-Level Systems
B. Pauli Matrices
C. Precession in a Magnetic Field
D. Magnetic Resonance
E. Nuclear Magnetic Resonance

III. Ammonia Molecule

A. The Molecule in a Static Electric Field
B. The Molecule in a Time-Dependent Electric Field
C. The Ammonia Maser
Prerequisites:
The prerequisite for the course is the course Quantum Mechanics I.

**Course mandatories:**
To pass the exams the student will have to show his/her ability to solve the problems similar to those which were taught at the lectures and/or assigned as a home task.

**Grading:**
The exams will consist of 4 problems assigned to the student. Correct solution of all problems will correspond to the grades 100. There will be an additional bonus problem (more difficult than the above-mentioned ones), which can bring additional points in case the grading of the 4 problems was less than maximal.

**Bibliography:**

(Recommended textbooks)

J. S. Townsend, A modern approach to quantum mechanics;

Landau and Lifshitz, Quantum mechanics;

R. Feynman, Feynman's Lectures on Physics, vol. III.