

Study programmes: BACHELOR STUDIES – Astronomy and Astrophysics			
Course name: Quantum Mechanics 2			
Lecturers: Milan Damnjanović and other lecturers			
Status: Optional			
ECTS: 6			
Attendance prerequisites: Mathematical physic 2, Quantum mechanics 1.			
Course aims: Completion of the quantum mechanical concepts and methods. Preparation for higher specialized courses based on quantum theory.			
Course outcome: Elaborated quantum mechanical ideas and methods at the level allowing understanding of research in most of the fields of physics.			
Course content:			
1. Addition of angular momenta			
1.1. General problem			
1.2. Orbital and spin moment in hydrogen			
1.3. Clebsch-Gordan decomposition			
2. Identical particles			
2.1. Permutations			
2.2. (Anti)symmetrization of states			
2.3. Fermi and Bose statistics, Pauli principle, Slater determinants			
2.4. Kinematical correlation of identical particles			
3. Second quantization for fermions and bosons			
3.1 Fock space			
3.2 Creation and annihilation operators			
3.3 Single- and two-particle operators.			
4. Approximate methods 2:			
4.1. Time dependent perturbations (transition probability, constant and periodic perturbation, Fermi golden rule)			
4.2. Hartree-Fock method (description),			
4.3. Density functional method (description),			
5. Elementary introduction to scatterings.			
Literature:			
1. C. Cohen-Tannoudji, B. Diu, F. Laloe, Quantum Mechanics, (J. Wiley & Sons, New York, 1977)			
2. M. Damnjanović, Lecture notes			
3. L.D. Landau, E.M. Lifshitz, "Quantum Mechanics" (Pergamon: Oxford 1977)			
Number of hours: 5	Lectures: 3	Tutorials: 2	Laboratory: -
Research: -			
Teaching and learning methods:			
Exercises, discussions, seminars, homeworks.			
Assessment (maximal 100 points)			
Course assignments	points	Final exam	points
Lectures	10	Written exam	50
Exercises / Tutorials	-	Oral exam	40
Colloquia	-	Written-oral exam	-
Essay / Project	-		