

Study programmes: BACHELOR STUDIES – Astronomy and Astrophysics				
Course name: Physics of Ionized Gases				
Lecturers: Srđan Bukvić and other lecturers				
Status: Optional				
ECTS: 6				
Attendance prerequisites: Atomic Physics.				
Course aims: Getting to know basic ideas of switching gas from dielectric to conductive state. Study of the most important gas breakdown models and experimental techniques for their realization.				
Course outcome: Upon completion of the course students are trained for independent laboratory work, development of diagnostic methods and models of interest in physics of ionized gases.				
Course content:				
Lectures: Cross-sections for collisions, rate coefficients, transport cross-sections. Drift and diffusion of electrons and ions. Einstein's formula, ambipolar diffusion. Townsend's breakdown model. Breakdown condition. Secondary electron emission. Selfsustained discharges, glow discharge. Cathode fall region and positive column. Arc discharge. Pulsed discharges. Basic diagnostic methods. Spectroscopic diagnostic methods for continuous and pulsed discharge. Optically thin plasma. Profiles of spectral lines.				
Examples/ practical classes: Elastic and non-elastic collisions of electrons with inert gas atoms. Breakdown. Dependence of the breakdown potential on the product of the gas pressure and the gap length, $V = f(pd)$. Spectrum of the emission from the cathode region and positive column. Spectroscopic determination of electron temperature and density. Determination of electron temperature by Langmuire's probe.				
Literature:				
1. Y.P. Raizer, Gas Discharge physics, Springer 1991.				
2. J.A.M. van der MULLEN, EXCITATION EQUILIBRIA IN PLASMAS; A CLASSIFICATION, North-Holland 1989.				
Number of hours: 5	Lectures: 2	Tutorials: 0	Laboratory: 3	Research: -
Teaching and learning methods:				
Lectures, experimental exercises, seminar.				
Assessment (maximal 100 points)				
Course assignments	points	Final exam	points	
Lectures	5	Written exam	-	
Exercises / Tutorials	15	Oral exam	65	
Colloquia	-	Written-oral exam	-	
Essay / Project	15			