

<b>Study programmes:</b> PhD Studies - Astronomy and Astrophysics			
<b>Course name:</b> Stellar Physics			
<b>Lecturer:</b> Bojan Arbutina			
<b>Status:</b> optional			
<b>ECTS:</b> 9			
<b>Attendance prerequisites:</b> None			
<b>Course aims:</b> Acquiring advanced knowledge about structure and evolution of non-rotating and rotating stars.			
<b>Course outcome:</b> At the end of the course, student has enough skills to start a research on stellar structure and evolution, numerical modeling and stability problems concerning non-rotating and rotating stars.			
<b>Course content:</b> PHYSICAL PRINCIPLES OF STELLAR STRUCTURE. Introduction. Structure of spherically symmetric stars. Stellar hydrodynamics. Euler and Lagrange variables, magnetohydrodynamics, virial theorem. Stationary rotation. Barotropes, pseudo-barotropes, baroclines, spheroidal stratification, outer gravitational field. Small oscillations and dynamical stability. Von Zeipel paradox. Solberg and Holland criterion. Thermal imbalance in baroclines. Meridional circulation. Circulation in radiative and convective zones, turbulent motions in stars. Uniform and differential rotation. Polytropic stars. Solar rotation. METHODS IN STELLAR MODELING. MODELS. Complete set of equations. Differential equations and boundary conditions. Chandrasekhar-Milne model, quasi-spherical configurations, Kippenhahn and Thomas technique, self-consistent field method. Specific angular momentum distribution, mass loss and dynamical stability. Stellar evolution of spherical and rotating stars. Fragmentation and formation of binary and multiple stars, pre-main sequence evolution, main sequence and post-main sequence phases, pulsation instability, stationary rotating white dwarf models. Effects of rotation on observational characteristics of stars.			
<b>Literature:</b> 1. Chandrasekhar S., 1969, <i>Ellipsoidal Figures of Equilibrium</i> , New Haven, Yale Univ. Press.; 2. Cox J. P., Giuli R.T., 1968, <i>Principles of Stellar Structure I &amp; II</i> , New York: Gordon and Breach; 3. Hansen C. J., Kawaler S. D., Trimble V., 2004, <i>Stellar Interiors - Physical Principles, Structure, and Evolution</i> , New York: Springer; 4. Tassoul J.-L., 1978, <i>Theory of Rotating Stars</i> , Princeton Univ.Press, Princeton, New Jersey; 5. Tassoul J.-L., 2004, <i>Stellar Rotation</i> , Cambridge: Cambridge University Press			
<b>Excercises:</b> Hansen C. J., Kawaler S. D., Trimble V., 2004, <i>Stellar Interiors - Physical Principles, Structure, and Evolution</i> , New York: Springer;			
<b>Number of hours:</b> 10	<b>Lectures:</b> 4	<b>Tutorials:</b> 6	
<b>Teaching and learning methods:</b> Ex cathedra, group work, student research			
<b>Grading system (maximum number of points: 100)</b>			
<b>Pre-exam requirements</b>	points	<b>Final exam</b>	points
Lectures	10	Written exam	-
Excercises / Tutorials	30	Oral exam	60
Colloquia	-	Written-oral exam	-
Essay/Project	-		