Study programmes: Astronomy and Astrophysics - PhD studies	
Course name: Numerical Methods in Radiative Transfer	
Lecturers: Olga Atanacković	
Status: Optional	
ECTS: 9	
Attendance prerequisites: None	
Course aims: Acquiring advanced knowledge of the numerical methods for solving various radiative transfer problems	
Course outcome: At the end of the course, student has enough skills to start a research in the numerical methods for solving radiative transfer problems: spectrum synthesis and stellar atmospheres modeling	

Course description:
Numerical methods in radiative transfer. Classification of the methods according to the form of the radiative transfer equation. Method of discrete ordinates. Formal solution. Short characteristics method. Classical Lambda iteration. Feautrier's method. Rybicki's method. Complete linearization method. Core saturation method. Cannon's operator perturbation method. Accelerated (approximated) lambda iteration methods (ALI). Scharmer's method. OAB operator. Iteration factors method. Implicit methods. Implicit integral method. Forth-and-Back Implicit Lambda Iteration (FBILI). Convergence acceleration methods. Numerical codes for the spectrum synthesis and stellar atmosphere modeling.

Literature:
1. Kalkofen, W. (Ed.), 1984, *Methods in Radiative Transfer*, Cambridge Univ. Press
2. Kalkofen, W. (Ed.), 1987, *Numerical Radiative Transfer*, Cambridge Univ. Press
3. Kourganoff, V.: 1963, *Basic methods in transfer problems*, New York: Dover Publ.
4. Crivellari, L., Hubeny, I., Hummer, D.G.: 1991, *Stellar atmospheres: Beyond classical models*, NATO ASI Series.
5. Atanacković,O.: 2019, Numerical Methods in Radiative Transfer, in "*Radiative Transfer in Stellar and Planetary Atmospheres*", XXIX Canary Islands Winter School of Astrophysics, La Laguna, Tenerife, Spain, November 13-17, 2017, Eds. L. Crivellari, S. Simon-Diaz, M.J. Arevalo, pp. 81-116.

Number of hours: 10	**Lectures**: 4	**Tutorials**: 6 (exercises+project)

Teaching and learning methods: Ex cathedra, group work, online

Assessment (maximal 100 points)			
Course assignments	**points**	**Final exam**	**points**
Lectures	-	Written exam	-
Exercises / Tutorials	20	Oral exam	60
Colloquia	-	Written-oral exam	-
Essay / Project	20		