Study programme: Astronomy and Astrophysics - PhD Studies

Course: Classical Cosmology

Teacher or teachers: Bojan Arbutina

Status: optional

ECTS credits: 9

Requirements: none

Course objective: The acquisition of advanced knowledge of classical cosmology.

Course outcome: Upon completion of the course, PhD student is capable of understanding problems in modern cosmology and the capability for further research work in this field.

Course description:

Large scale structures. Metric theory of the gravitation and its role in cosmology. Einstein's equations. Empirical foundation of modern cosmology. Expansion of the Universe and Hubble's law. Cosmological red shift and its properties. Friedman's solutions of Einstein's equations. Robertson-Walker metrics: basic quantities, scale factor, curvature, density parameter Ω. Cosmological constant. De Sitter model. Cosmology nowadays. Discovery of quasars; discovery of background microwave radiation. Standard model of the Big Bang. Anthropic principles in cosmology. Problems of standard model. Basics of quantum cosmology. Cosmological inflation.

Reccomended literature:

J. N. Islam, 2002, *An Introduction to Mathematical Cosmology (2nd ed.),*
Cambridge University Press
P.J.E. Peebles 1993, *Principles of Physical Cosmology*, Princeton University Press,
J.A. Peacock: 1999, *Cosmological Physics*, Cambridge University Press

Total number of classes: 10	**Theoretical classes**: 4	**Practical classes:** 6

Teaching methods: Frontal, Group, Individual Research Approach

Grading system (maximum number of points: 100)

Pre-exam requirements	points	**Final exam**	points
Activity in class	10	Written exam	
Practical work		Oral exam	50
Colloquia	40		
Seminars			