Study program	Level of studies		**First cycle**	
	Study program name		**Physics and Informatics Education**	
Course name	**INTRODUCTION TO ASTRONOMY**			
Course ID	Semester	Course status	ECTS credits	L+E
PHY6511	**VI**	**ELECTIVE**	**5**	**2+2**
Lecturer				
Aims and intended learning outcomes	The aim of the program is for future physics teachers to develop a profound conceptual understanding and basic skills in the field of astronomy. It is expected that a student who passes the course will be able to: ● Systematically describe the visible universe: the structure and theories of its origin and evolution. ● Describe and analyse the most important astronomical discoveries and have a good overview of the history of astronomy and its methods. ● Apply simple models to the description of astronomical phenomena. ● Solve simple tasks in astronomy using physical principles and mathematical models.			

Course content

History, utility, and relevance of astronomy for humanity. The Earth. The celestial sphere and coordinate systems. The constellations. Cartography (the planisphere and the astrolabe). Day and night. Time (the equation of time) and calendars. Precession. The Moon. Eclipses. The year. The Solar System (structure and origin). Kinematics of celestial bodies. Prograde and retrograde motion. Planetary dynamics. Ephemerides. Tides. Measurement of distances and units. Parallax. Light aberration. The Doppler effect. Exoplanets.

Stars. Hydrostatic equilibrium. Visibility of astronomical objects and flux (The Pogson scale). Photometry. Spectroscopy. Emission and absorption. Gas and dust clouds. Classification of stars. The Hertzsprung-Russell diagram. The birth, life, and death of stars. Stellar processes. Cepheids. Supernovae. Stellar remnants. The types of radiation found in space. Cosmic rays and neutrinos.

Open and globular star clusters. The Milky Way. Classification of galaxies. The composition of galaxies, their origin, and evolution. The centre of the galaxy. The problem of missing matter. Dark matter. Galaxy clusters.

The expansion of the universe. Redshift and scale factor. The Hubble-Lemaître law. Luminosity distance and angular diameter distance. The Big Bang theory. Epochs in the evolution of the universe and structure formation. Nucleosynthesis and the Cosmic Microwave Background Radiation.

Student workload (hours)		Grading	
Lectures and Exercises	60	Assessment method	Points
Exam preparation	65	Midterm exam	50
Total	125	Final exam	50
		Total	100

Literature

1. Lecture notes
2. Explorations: An Introduction to Astronomy, Sixth Edition; Thomas T. Arny, Stephen E. Schneider.
3. The Physical Universe: An Introduction to Astronomy; Frank H. Shu.
4. An Introduction to Modern Astrophysics, Second Edition; Bradley W. Carroll, Dale A. Ostlie.

Remarks