Program	Level of studies		First cycle	
	Program name		Educational Physics	
Course name	DEVELOPMENT OF MODERN THEORETICAL PHYSICS			
Course ID	Semester	Course status	ECTS credits	L+E
PTH8311	**VIII**	**ELECTIVE**	**3**	**2+0**
Lecturer	**Prof. dr. Elvedin Hasović**			
Aims and intended learning outcomes	The goal of the course is to provide students with basic knowledge in the areas of theoretical physics that developed in the second half of the twentieth century, such as particle physics, astrophysics and cosmology. At the end of the course the student should be able to: -know the classification of elemental particles; -understand the mechanism of creating bound states of elementary particles; -recognize and understand the basic stages in the life cycle of the stars;			

Course content

A brief history of the development of particle physics, astrophysics and cosmology. Photons, mezons, antiparticles, neutrinos, strange particles, fundamental forces in nature. The quark model, Standard model of elementary particles. Weak interactions, decay of particles and conservation laws. Symmetries and conservation laws. Violation of the CP symmetry, TCP theorem. Modern experiments in elementary particle physics. The principle of equivalence and the general theory of relativity, experimental confirmation of the general theory of relativity. Sources of energy in stars, nucleosynthesis, energy transport in stars. White dwarfs, neutron stars, black holes. Expansion of the Universe, Hubble's Law, Big Bang Theory, Cosmic Background Radiation.

Student workload (hours)		Grading	
Lectures and Exercises	30	Assessment method	Points
Exam preparation	45	Course Test	50
Total	75	Final Exam	50
		Total	100

Literature

1. Lecture Notes.
2. F. Close, *Svemirska lukovica : kvarkovi i priroda svemira*, Zagreb : Školska knjiga, 1997.
3. K. Krane, *Modern Physics* 2nd ed., John Wiley and Sons, NY, 1996.
4. W. Carroll, D. A. Ostlie, *An Introduction to Modern Astrophysics* 2nd ed. , Benjamin Cummings, Upper Saddle River, NJ, 2006.
5. D. J. Griffiths, *Introduction to Elementary Particles*, John Willey and Sons, NY, 1987.

Remarks