Course Unit Descriptor

Study Programme: Physics

Course Unit Title: Physics and Techniques of Lasers

Course Unit Code: M18FTL

Name of Lecturer(s): Full Professor Stevica Đurović

Type and Level of Studies: Master Academic Degree

Course Status (compulsory/elective): Elective

Semester (winter/summer): Winter

Language of instruction: English

Mode of course unit delivery (face-to-face/distance learning): Face-to-face

Number of ECTS Allocated: 8

Prerequisites: Quantum mechanics, Atomic physics

Course Aims:

Students should learn and master the basic knowledge on the laser and laser techniques.

Learning Outcomes:

After completing the course, students should possess:

- General skills: knowledge which is useful in various areas related to the application of lasers.

- Specific skills: mastered principles of different types of lasers. Students are familiar with the characteristics of laser radiation and the interaction of radiation with matter.

Syllabus:

Theory

Stimulated emission of radiation. Optical amplifier and generator. Generation of laser radiation. Characteristics of laser radiation. Optical resonators and oscillation modes. Types and characteristics of the lasers. Gas lasers. Ion lasers. Liquid lasers. Solid state lasers. Semiconductor lasers. Powerful lasers. The interaction of laser radiation with matter. Protection from laser radiation. Detectors of laser radiation.

Practice

Electrical Power supply and trigger system. Structural elements of the laser. Experimental determination of the radiation properties of helium-neon laser. Protection from laser radiation.

Required Reading:

1. O. Svetlo, Principles of lasers, Plenum Press, 1976.
2. M. J. Beesly, Lasers and their applications, Taylor and Francis, 1976.
3. L. Goldman, Lasers in medicine, CRC Press, 2001.

Weekly Contact Hours:	**Lectures:** 3	**Practical work:** 2

Teaching Methods:

Lectures and students group work

Knowledge Assessment (maximum of 100 points): 100

Pre-exam obligations	points	**Final exam**	points
Active class participation	5	written exam	20

Test I and Test II		oral exam	50
Preliminary exam(s)	10	…….	
Seminar(s)	15		
The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.			