Course Unit Descriptor

Study Programme: Physics

Course Unit Title: Amorphous materials

Course Unit Code: F18AM

Name of Lecturer(s): dr Svetlana Lukić Petrović

Type and Level of Studies: Bachelor Academic Degree

Course Status (compulsory/elective): elective

Semester (winter/summer): summer

Language of instruction: English

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

Number of ECTS Allocated: 6

Prerequisites: Introduction to Condensed Matter Physics

Course Aims:

Introducing students with the properties of non-crystalline systems**.**

Learning Outcomes:

- Knowledge about specificity of the particular types of amorphous materials

- Knowledge in processing and technology of materials

-General ability to follow the professional literature

-Ability to implement certain technical solutions

Syllabus:

Theory

Non-crystalline materials. Amorphous materials. Physicochemical properties of amorphous materials. The procedure of obtaining glasses and amorphous films. Amorphous semiconductors and glass-ceramics. General properties. Amorphous silicon and germanium. The electron state theory in amorphous semiconductors. Electrical and dielectric properties. Application of amorphous semiconductors and glass-ceramics in optoelectronics.
Optical and spectroscopic characteristics of amorphous materials. Thin films. Photo-induced changes. Holography. Application of amorphous materials in the forms of bulk and film for optical mediums. Amorphous selenium and tellurium. Amorphous metals. Complex amorphous systems.

Practice

Experimental measurements and preparation and defence of seminar works that follow and supplement the lecture program.

Required Reading:

1. D.M. Petrović, S.R. Lukić, *Eksperimentalna fizika kondenzovane materije,* Edicija "Univerzitetski udžbenik", Univerzitet u Novom Sadu, Novi Sad, 2000.
2. S.R.Lukić, D.M.Petrović, *Složeni amorfni halkogenidi*, PMF Novi Sad - Grafo atelje, Novi Sad, 2002.
3. M.A. Popescu, *Non-crystalline Chalcogenides,* Kluwer Academic Publishers, New York, 2002.
4. M. Fox, *Optical Properties of Solids*, University Press, Oxford, 2005.
5. W.Vogel, *Kemija stakla,* Zagreb, 1985.
6. Э.А. Сморгонская, К.Д. Цэндин, u: *Электронные явления в халькогенидных стеклообразных полупроводниках*, ред.: Цэндин К.Д., Наука, Санкт-Петербург, 1996.
7. N.F. Mott and E.A. Davis, *Electronic Processes in Non-Crystalline Materials*, (Clarendon Press, Oxford, 1971.
8. L.P. Kazakova, E.A. Lebedev, E.A. Smorgonskaya at al., *Electronic Phenomena in Chalcogenide Glassy Semiconductors*, p.486, (in russian), (Nauka, Sankt-Peterburg, 1996)

9. A. Feltz, *Amorphe und Glasartige Anorganische Festkörper*, p.556, (Akademie – Verlag, Berlin, 1983.
10. Z.U.Borisova, *Glassy Semiconductors,* Plenum Press, New York, 1981.
11. A. Madan, M. P. Shaw, *The Physics and Applications of Amorphous Semiconductors*, Academic Press, Inc., Boston - San Diego, 1988.
12. A. Zakery S.R. Elliott, *Optical Nonlinearities in Chalcogenide Glasses and their Applications*, Springer Berlin, 2007

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

Teaching Methods:

Knowledge Assessment (maximum of 100 points):

Pre-exam obligations	points	**Final exam**	points
Active class participation		written exam	
Practical work	10	oral exam	70
Preliminary exam(s)		…….	
Seminar(s)	20		

The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.