Study program: Electrical Power Engineering - Advanced Materials and Technologies in Electrical Engineering

Type and level of studies: Phd Studies

Course unit: Physics of Ceramic Materials - Selected Chapters

Teacher in charge: Jelena M. Purenovic

Language of instruction: English

ECTS: 10

Prerequisites: -

Semester: Summer

Course unit objective:
Acquiring fundamental knowledge in the field of materials physics primarily involves understanding the crystalline and amorphous structures of ceramics, composites, and dielectric materials, along with their properties.

Learning outcomes of Course unit:
The ability to apply acquired theoretical and practical knowledge for research work in the field of electrical and technical materials.

Course unit contents:

Theoretical classes

Crystal structure of materials. Amorphous and amorphized structure of materials. Kinetics of nucleation and crystal growth processes. Point defects. Linear defects and dislocations. Planar defects. Structure of ceramic materials. Structure of composite materials. Structure of dielectric materials. Mechanical properties of materials. Thermal properties of materials. Electrical properties of materials. Optical properties of materials. Crystal ceramics. Optical fibers. Liquid crystals.

Practical classes

Part of the course involves independent study and research work, which includes actively following, organizing, and analyzing scientific results within selected fields. It also involves writing scientific papers within the subject area and publishing them in conferences and journals.

Literature:

[1] W. D. Callister, JR., Materials Science and Engineering An Introduction, John Wiley & Sons, Inc., 2003.
[2] B. S. Mitchell, An introduction to materials engineering and science, John Wiley & Sons, Inc., 2004.
[3] H.t Czichos, T. Saito, L. Smith (Eds.), Springer Handbook of Materials Measurement Methods, Springer Science+Business Media, 2006.
[4] C. Barry Carter, M. Grant Norton, Ceramics Materials, Science and Engineering, Springer Science+Business Media, 2007.
[5] J. D. Patterson, B. C. Bailey, Solid-State Physics, Introduction to the Theory, Springer-Verlag Berlin Heidelberg, 2007.
[6] J. Purenović, Svojstva i primena multifunkcionalne mikrolegirane kompozitne alumo-silikatne keramike kao aktivnog dielektrika sa nanostrukturnim metalnim filmovima na amorfno-kristalnoj matrici, uz fraktalnu prirodu granice zrna, Institut za nuklearne nauke „Vinča“, 2016.

Number of active teaching hours: 7	**Lectures: 5**	**Practice: 2**

Teaching methods:
Interactive teaching, consultations, study and research work

Evaluation (maximum number of points 100)

Completed and defended seminar work: 50

Exam theoretical part: 50