Course Unit Descriptor

**Study Programme:** Production engineering

**Course Unit Title:** Engineering Materials

**Course Unit Code:** ZC004

**Name of Lecturer(s):** Dragan Rajnović

**Type and Level of Studies:** Bachelor level

**Course Status (compulsory/elective):** elective

**Semester (winter/ summer):** winter+summer

**Language of instruction:** english

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

**Number of ECTS Allocated: 7**

**Prerequisites:**

**Course Aims:**.

Obtaining new knowledge from the field od materials science and materials applied in electroenergetic plants and mechanical engineering.

**Learning Outcomes:**

Obtained knowledge is applied in relating the materials structure and properties, as well as application in various engineering devices and plants, including materials selection for achieving an increased effectiveness.

**Syllabus**.

Introduction to materials science. property dependance from atomic, crystal micro- and macrostructure. Imperfections in crystals. Alloying theory. Phase diagrams, one- and two-component systems. Phase transformations in liquid/solid and solid/solid. reinforcing mechanisms and fracture mechanics. Engineering materials characteristics: a) Metallic materialsi. Mechanical properties and testing. FErrous metallic materials, copper and aluminium; properties and applications. b) Ceramic materials - structure, properties and applications. c) Polymers - structure, properties and applications. g) Composite materials (nano, micro and macro composites), properties and applications. Materials selection. Methods of mechanical and microstructural testing of materials.

**Required Reading:**

Callister, W.D.: Materials Science and Engineering: an Introduction, John Wiley & Sons, New York, 2007
Martin, John W. : Materials for engineering, Cambridge: Woodhead publishing limited, 2006
D. R. Askeland and P. P. Fulay : Essentials of Materials Science and Engineering, Cengage Learning, 2010

| **Weekly Contact Hours:** | **Lectures: 3** | **Practical work: 3** |
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**Teaching Methods:**

Lectures and exercises are interactive. On lectures, materials science theory and practical applications are presented, to enable a more effective knowledge transfer. Laboratory exercises enable practical applications of lecture obtained knowledge on testing equipment.

**Knowledge Assessment (maximum of 100 points):**

| **Pre-exam obligations** | points | **Final exam** | points |
|---|---|---|---|
| Attendance | | | |
| Computer exercises | | | |
| Tests (4x) | | | |