

Course Description

Discipline/Course: General Materials Science

Direction of PLO 22.03.01 "Material Science and Materials Technologies"

Profile of training Material Science and Materials Technology in Mechanical Engineering; Nanostructural materials

Instructor: Vaulina O.Yu., PhD

Contact details: +7 3822 606 153, email: kolgay@tpu.ru

Learning Outcomes:

The purpose of studying the discipline "General Material Science" is the formation of knowledge in the field of materials science (acquiring knowledge about the structure, properties and applications of metallic and nonmetallic materials, obtaining the necessary knowledge about the classification, the physical essence of materials), applied in various fields of technology and production on the basis of regularities Formation of the structural-phase state of alloys, their properties depending on the features of the technologies used

Course Outline:

Section 1. Goals and objectives of the course. Methods of research. Aggregate state of matter

Section 2. Crystal structure of the material. The real structure of metals. Defects.

Section 3. Classification of materials

Section 4. Properties of metals and alloys

Section 5. Iron-carbon state diagram. Metallic materials. Cast iron.

Section 6. Marking of steels and cast irons

Section 7. Heat treatment and chemical-thermal treatment of steel

Section 8. Non-ferrous metals

Section 9. Polymers and composite materials

Section 10. Nanomaterials and nanotechnologies

Course Delivery: one semester, 16 weeks

Prerequisites: "Physics", "Chemistry", "Fundamentals of Crystallography."

Co-requisites: "Fundamentals of the solid", "Corrosion and protection of metals", "General Metallurgy".

Final Assessment: exam

Course Developer: Vaulina O.Yu, PhD