The course of lectures: METAL ALLOYS, THEIR APPLICATIONS AND ADVANCED METALLIC MATERIALS

INNOVATION SCIENCES AND TECHNOLOGIES PhD program

I semester of 2022/2023 a.y. (November 2022)

Lecturer: PhD E.Pakhomova

The course consists of 30 hours of lectures in presence. The final verification is foreseen.

Part 1. Ferrous and non-ferrous alloys for metallurgical use (15 hours)

1.1. Steels for different applications, their properties and classification:

Classification of steels

Structural steels

Spring steels

Tool steels

Hardened and tempered steels

INOX steels: ferritic, martensitic, duplex and austenitic.

1.2. Non-ferrous alloys, properties and classification:

Aluminium alloys

Copper alloys

Nickel alloys

Titanium alloys

Magnesium alloys

Refractory metals and their alloys

Part 2. Development and improvement of new materials and their applications (15 hours)

2.1. Powder metallurgy and sustainable metallurgy

2.2. Additive manufacturing

2.3. Functionally graded metallic materials

2.4. Metal foams

2.5. Non-equilibrium alloys

2.6. High-entropy alloys

2.7. Metallic alloys for aerospace applications

2.8. Metallic alloys for energy applications

2.9. Metallic alloys for biomedical applications