

METAL ALLOYS, THEIR APPLICATIONS AND ADVANCED METALLIC MATERIALS

INNOVATION SCIENCES AND TECHNOLOGIES PhD program

I semester of 2021/2022 a.y. (October-November 2021)

Lecturer: PhD E.Pakhomova

Taking into account the epidemiological situation related to COVID-19, the course will be held online (in the form of lectures in streaming or records available online).

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. Metallic alloys for aerospace applications

2.3. Metallic alloys for biomedical applications

2.4. Non-equilibrium alloys

2.5. Metal foams

2.6. Steels with controlled composition for structural applications in future fusion reactors

2.7. Functionally graded metallic materials

2.8. High-entropy alloys

2.9. Additive manufacturing