

## ADVANCED METALLIC MATERIALS AND ENGINEERING

### PROGRAM STRUCTURE (Curriculum)

<b>Total: 120 ECTS</b>				
<b>39</b> ECTS	Core and required courses		<b>25</b> ECTS	Elective courses
<b>6</b> ECTS	Internships		<b>50</b> ECTS	Research and MSc Thesis project
<b>First year</b>	<b>First semester</b>			<b>30 ECTS</b>
	Foreign Language (English / Russian)			4
	Management of Quality			3
	Project Management			3
	Metallic Materials: Structure, Properties and Application			5
	Thermodynamics and kinetics in materials science		Advanced methods of coatings and nanofilms deposition	3
	Modern Methods of Structural Characterization of Micro- and Nano-Systems	Material Selection	New Methods for Studying Mechanical Properties and Standards	3
	Modern Equipment and Techniques for Investigation of Structure and Properties of Metallic Alloys	SHS Process as a Basis of Synthesis of Inorganic Materials	Methods of Surfaces and Interfaces Investigation	5
	Research			4
	<b>Second semester</b>			<b>30 ECTS</b>
	Thermodynamic Computation and Analysis of Phase Diagrams of Multicomponent Systems			5
	Modelling and Optimization in Physical Metallurgy			5
	Thermal and Thermomechanical Treatment of Special Steels and Alloys			5
	Amorphous Metallic Alloys	Metal Matrix Composites	Disperse-Strengthened by Nanoparticles Tribological Coatings. Nanofilms for Mechanical Engineering and Medicine	5
	Corrosion and Protection of the Metallic Materials	Friction and Wear of Coatings	Advanced Technologies of the Metallic Materials Production	5
Research			5	

<b>Second year</b>	<b>Third semester</b>		<b>30 ECTS</b>	
	Foreign Language (English / Russian)		4	
	Development of Metallic Materials		5	
	Mechanical Spectroscopy of Metallic Materials	Diffusion in Solids	Nanofilms: Fundamental Principles, Characterization, Testing, and Application. Methods of Contact and Non-Contact Characterization of Surface Topography	4
	Internship		6	
	Research		11	
	<b>Fourth semester</b>		<b>30 ECTS</b>	
	Research		21	
	State final attestation (incl. MSc Thesis defense)		9	