



Name of the course - Metal and Polymer Matrix Composite Materials

Version Effective from (date of when the course was developed)	2023
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ECTS Credits	4
Level/Year	5
Teaching (contact) hours	32
Total learner managed hours (incl. self-work)	112
Total hours of student learning	144

Pre-requisites	Students from different area (material science, mechanical engineering, physics, etc) finishing a Bachelor or in Master, PhD students
Co-requisites	None
Alignment to graduate profiles	Basic knowledge of material science, mechanical engineering. At least 4 years of University level studies (technical directions) Fluent English
Course aim	The program aims to provide advanced techniques of metal and polymer matrix composite materials processing and understanding the basic principles related to their microstructure evolution. Additive manufacturing problems are also considered during the program in addition to technological topics.
Indicative Course content	The course consists of advanced topics on advanced technologies based on state-of-the-art practice-based activities in research laboratories of Moscow Aviation Institute and Peter the Great St. Petersburg Polytechnic University and deep aspects of the metal and polymer matrix composite materials microstructure evolutions during processing. The examples of topics for the several lectures are listed below: - Metal and Polymer Matrix Composite Materials classification and their properties; - Advanced technologies for aviation structures manufacturing based on the Metal and Polymer Matrix Composite Materials; - Modern advanced techniques for joining of Metal and Polymer Matrix Composite Materials; - Basics of Additive technologies; - Equipment for Additive manufacturing and functional properties of the produced details.

LEARNING OUTCOMES

On successful completion of this course students will be able to:	
1	Work in materials processing field,
2	Basics of Metal and Polymer Matrix Composite Materials,
3	Get familiar with equipment for additive manufacturing,
4	Study advanced techniques of additive manufacturing,
5	Develop real technological cycle

ASSESSMENTS

Basis of assessment			
Methods of assessment	Learning Outcomes	Pass criteria (Minimum)	% Weightings
Summative review	Max score 80	40	50
Portfolio – summative of practices	Max score 20	10	50

REQUIREMENTS FOR SUCCESSFUL COURSE COMPLETION



Requirements	Attend at least half lectures and practices. Final test.
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RESULTS

Assessment results	Results for assessments are given in points marks
Course results	Students will learn Metal and Polymer Matrix Composite Materials and understanding the basic principles related to their microstructure evolution during production and processing. Additive manufacturing problems are also considered during the program in addition to technological topics. The theoretical courses cover microstructure and advanced physical properties of the materials, equipment description. Students will train their practical skills during an interactive practices.

LEARNING AND TEACHING

Learning and teaching approaches	Active learning, Collaborative learning, Problem-based learning, Interdisciplinary learning
Learning and teaching resources	Textbooks, journals and library resources; use of Internet; computer software Software requirements: <ul style="list-style-type: none">• MS Teams (free access will be provided for all students),• Microsoft Office 2007 or newer.
Learner managed activities	Completion of course work, set assignments Reading of course materials Study group work Preparation for classes Practicing relevant skills/methods/techniques Self-evaluation of course work Gathering relevant contextual information/ issues/ideas to build knowledge of the subject