ПОЛИТЕХ
Санкт-Петербургский
политехнический университет
Петра Великого

Открытое образование

COURSE CERTIFICATE

№ 02ADTMME-0222-1
Date of issue 11/01/2023

This is to certify that

Мхеидзе Диана Георгиевна

Successfully completed the course

ADDITIVE TECHNOLOGIES IN METALLURGY AND MECHANICAL ENGINEERING

2 credits

The description of the course and the achieved learning results are given in the appendix to this certificate.

E-CERTIFICATE
https://open.spbstu.ru/certificate/02ADTMME-0222-1.pdf

Vice-rector for academic affairs
Elena M. Razinkina

Мхеидзе
Диана Георгиевна

STUDENT ID 1713020

PETER THE GREAT ST. PETERSBURG POLYTECHNIC UNIVERSITY
http://www.spbstu.ru/

THE NAME OF THE COURSE ADDITIVE TECHNOLOGIES IN METALLURGY AND MECHANICAL ENGINEERING
https://openedu.ru/course/spbstu/ADTMME/

LEAD-TIME
From October 31, 2022 to December 30, 2022

Assessment, number of hours and credits per course

Credits	Hours		Assessment		
	General	Academic	100-point	5-point	Letter
2	54	72	93	5	A

GRADING POLICY

Evaluation scale ranges (100-point scale)	Score (5-point scale)	Letter
90-100	5	A
75-89	4	B
60-74	3	C
0-59	2	F

COURSE PROGRAM

Module 1. Metallurgical and mechanical engineering industries as an application of additive technologies

- Topic 1. Additive technologies: what is it?
- Topic 2. Mechanical Engineering and Metallurgy
- Topic 3. Application of additive technologies in mechanical engineering
- Topic 4. Application of additive technologies in metallurgy

Module 2. Object digitization and 3d prototyping

- Topic 1. 3D – scanning
- Topic 2. Prototyping: value and functions
- Topic 3. SLA (stereolithography laser) and SLS (selective laser sintering)
- Topic 4. FDM (Fused Deposition Modeling) and MJM (Multi-jet Modeling) technology

Module 3. Selective laser sintering

- Topic 1. Features of SLS, SLM and DMLS technologies
- Topic 2. Powder materials for SLM technology
- Topic 3. Microstructure and properties of SLM products
- Topic 4. SLM technologies in mechanical engineering

Module 4. Thermal spraying

- Topic 1. Gas-thermal spraying
- Topic 2. Detonation spraying
- Topic 3. Microstructure and properties of coatings produced by detonation spraying
- Topic 4. Detonation spraying application in metallurgy and mechanical engineering

Module 5. Laser metal deposition

- Topic 1. Laser cladding
- Topic 2. Restoration of parts and accessories with laser cladding
- Topic 3. Materials used for laser cladding
- Topic 4. Examples of how to recover worn parts cilities

Module 6. Direct metal deposition

- Topic 1. Methods of obtaining metal products with a complex shape
- Topic 2. Coaxial laser processing of powder materials
- Topic 3. Microstructure and properties during direct laser growth
- Topic 4. The areas of application of complex shape products obtained by direct laser growth

WHAT YOU'LL LEARN:

At the end of the course you will be able to:

- Additive technologies: what is it?
- Applications of additive technologies in mechanical engineering
- Applications of additive technologies in metallurgy
- Prototyping: value and functions
- Application of selective laser fusion in mechanical engineering
- Powder materials for SLM technology
- Gas-thermal spraying of functional coatings
- Detonation spraying application in metallurgy and mechanical engineering
- Microstructure and properties of coatings produced by detonation spraying
- Restoration of parts and accessories with laser cladding
- The areas of application of complex shape products obtained by direct laser
- The areas of application of complex shape products obtained by Direct Metal Dposition
- Microstructure and properties during Direct Metal Deposition

SCORING FORMULA:

№	Assessment Type	Points scored	Maximum score	Quotient
1	Test 1	93	100	0,05
2	Test 2	87	100	0,05
3	Test 3	100	100	0,10
4	Test 4	87	100	0,10
5	Test 5	93	100	0,20
6	Test 6	100	100	0,20
7	Final Exam	90	100	0,30
8	Final Score	93	100	1

Appendix to the certificate № 02ADTMME-0222-1
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