

Course Specifications

Valid as from the academic year 2024-2025

Metal Processing and Technology (E066270)

Course size	(nominal values; actual value	s may depend on prog	gramme)		
Credits 6.0	Study time 180 h				
Course offerings and tea	ching methods in academic y	ear 2024-2025			
A (semester 2)	English Gent I		lecture		
			pra	ctical	
B (semester 2)	Dutch	Gent			
Lecturers in academic ye	ar 2024-2025				
Kestens, Leo TW08			lecturer-in-charge		
Nguyen Minh, Tuan			TW08	co-lecturer	
Offered in the following programmes in 2024-2025				crdts	offering
Bridging Programme Master of Science in Sustainable Materials Engineering				6	А
Master of Science in Electromechanical Engineering(main subject Control Engineering an Automation)				d 6	А
Master of Science in Electromechanical Engineering(main subject Electrical Power Engineering)				6	А
Master of Science in Industrial Engineering and Operations Research(main subject Manufacturing and Supply Chain Engineering)				6	А
Master of Science in Electromechanical Engineering(main subject Maritime Engineering)				6	Α
Master of Science in Electromechanical Engineering(main subject Mechanical Construction)				6	А
Master of Science in Electromechanical Engineering(main subject Mechanical Energy Engineering)				6	А
Master of Science in Industrial Engineering and Operations Research(main subject Transport and Mobility Engineering)				6	А
Master of Science in Materials Engineering				6	A, B
Master of Science in Sustainable Materials Engineering				6	Α

Teaching languages

English, Dutch

Keywords

Metal processing, metal technology, casting, rolling, forging, extrusion, sheet forming.

Position of the course

The course aims to give the student an insight in the processing principles and production technologies of the main metallic groups for wide industrial application namely steel, cast iron and non-ferrous metals and their alloys. Both theoretical principles and practical applications of base metal forming technologies – casting, rolling, forging, extrusion, and sheet forming are given together with details for microstructure –properties control of the final product.

Contents

Metal processing technologies: basic principles, devices, mechanics, possibilities for microstructure and properties control

- Casting
- Fundamentals of rolling and rolling technologies
- Forging
- Extrusion

- Drawing
- Sheet forming technologies

Initial competences

Introductory course on materials Science, basic principles of mechanics.

Final competences

- 1 Understanding principles and methods for control of metal forming processescasting, rolling, forging, extrusion, deep drawing
- 2 Understanding the basic principles of the heat treatment and thermo-chemical treatment
- 3 Understanding the criteria for selection of appropriate technology for different type of products and gaining a fundamental knowledge for application of the technology
- 4 Approaching in scientific and practical way to an appropriate technology design
- 5 Solving practical technological problems with special steels, cast irons, nonferrous alloys

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Lecture, Practical

Study material

None

References

 Dieter G. E. Mechanical Metallurgy; SI metric edition. McGraw –Hill Series in Materials Science and Engineering. Third Edition (1988).-basis book
Thermo-Mechanical Processing of Metallic Materials , Bert Verlinden, Julian Driver, Indradev Samajdar, Roger D. Doherty, Pergamon Materials Series 2006.
"Fundamentals of Steel Product Metallurgy" B. C. De Cooman, J. G. Speer, N. Yoshinaga, I. Y. Pychmintsev, Ed. 2005-selected chapters.

Course content-related study coaching

Assessment moments

end-of-term and continuous assessment

Examination methods in case of periodic assessment during the first examination period

Oral assessment

Examination methods in case of periodic assessment during the second examination period

Oral assessment

Examination methods in case of permanent assessment

Skills test

Possibilities of retake in case of permanent assessment

examination during the second examination period is possible in modified form

Calculation of the examination mark

Exam: Oral exam after written **closed book** preparation. Supporting materials for solution of the problems will be provided during the exam. Final evaluation consists of 2 parts.

Formation of the final evaluation:

Part 1

During the semester

Results of the work during the semester (practicum), evaluated by assistants based on the work and the quality of the written report. The reports should be submitted to the assistants before the start of the examination period: **max: 4 points**. During the exam

Part 2: Results from 2 or more theoretical questions (oral exam): **max: 16 points** Total: **20 points**

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