a) General			
School	ENGINEERING		
Academic unit	MECHANICAL ENGINEERING		
Level of studies	Undergraduate		
Course code	MM003Y05	*Semester*	3
Course title	**Technology of metallic materials**		

Independent teaching activities	*Weekly teaching hours*	*ECTS*
Lectures	3	6.0
Laboratory exercises	2	

Course type	General background
Course category	Compulsory
Prerequisite courses	-
Language of instruction and examinations	Greek
Is the course offered to Erasmus students	Yes
Course website (url)	https://eclass.uniwa.gr/courses/MECH117

b) Learning outcomes and general competences

b1. Learning outcomes

Upon successful completion of this course, the student will be able to:

- Distinguish the most common metals and alloys, based on their chemical composition
- Identifies the properties of metals and alloys
- Analyzes and recognize microstructure of metallic materials using specific techniques
- Measures mechanical properties of metal materials using standard testing
- Evaluates the critical mechanical properties of metal materials - Understands the basic principles related to fractured surfaces
- Selects the proper metallic material for a particular mechanical application

b2. General competences

- Search for, analysis and synthesis of data and information with the use of the appropriate technology
- Autonomous work
- Decision making
- Team work
- Design and assessment of a given project
- Ability to critize and self- criticism

c) Syllabus

Introduction to metal materials, Chemical bonds, Effect of chemical bonds on material properties, Crystalline structure, Imperfections of crystalline structure, Atoms diffusion, Work hardening - Recovery-Recrystallization, Phase diagrams in equilibrium of two components of complete solubility, Phase diagram, Binary Isomorphous Systems, Binary Eutectic Systems, Peritectic Reactions, Eutectoid Reactions, Peritectoid Reaction, Congruent Phase Transformations, Phase Diagrams with Intermediate Phases, Phase Diagrams with Intermetallic Compounds, The Iron–Iron Carbide Phase Diagram, Steels (microstructure, classification), Effect of alloying elements steels properties, Heat treatment of metallic materials, Cast Iron, Cooper Alloys, Aluminum Alloys, Magnesium Alloys, Titanium Alloys, Zinc Alloys, Lead Alloys, Superalloys.

d) Teaching and learning methods - Evaluation

Delivery	Face-to-face	
Use of information and communications technology	- Commercial/free/open source software - Multimedia applications - MS Teams/Moodle/eclass - Open courses	
Teaching methods	*Activity*	*Semester workload*
	Lectures	36
	Tutorials	13
	Laboratory exercises	36
	Computational exercises	13
	Individual work	36
	Course total	134
Student performance evaluation	- Theory (60%): Open book written exam - Lab (40%): Two open book written exam (20% and 20%).	

e) Suggested bibliography

1. Callister D. W. Jr., Rethwisch G. D. (2014). *Materials science and engineering*, 8th Ed., John Wiley & Sons, Inc.,USA.