COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF ENGINEERING		
ACADEMIC UNIT	DEPARTMENT OF MINERAL RESOURCES ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	MRE915	SEMESTER	9
COURSE TITLE	METALLURGY – INDUSTRIAL ALLOYS		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	WEEKLY TEACHING HOURS	CREDITS
LECTURES	2	2
IN-CLASS EXERCISES	2	2
TOTAL	4	4
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialised knowledge
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	https://eclass.uowm.gr/courses/MRE182/

(2) LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

The course aims to enable students to:

- know the techniques and technology of metallurgy
- know the basic theoretical principles of metallurgical processes
- know about the products and ways of production of metallurgy
- know about iron metallurgy
- know about the various industrial alloys
- design metallurgical plants and choose the appropriate metallurgical process methods

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Decision-making
Working independently
Team work
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas
Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
Production of free, creative and inductive thinking
……
Others…
…….

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Adapting to new situations
- Decision-making
- Working independently
- Teamwork
- Working in an international environment
- Working in an interdisciplinary environment
- Production of new research ideas
- Project planning and management

(3) SYLLABUS

Introduction
Metallurgical Compounds
Mechanism, technique and technology of drying
Chemistry, technique and technology of calcination, roasting, melting, distillation
Heating of metallurgical reactors
Balances of mass and heat
Cleaning of fumes
Refractory linings
Hydrometallurgical processes
Cleaning of metals
Electro-acquisition of metals
Recycling of metals
Iron metallurgy
Classification of steels, stainless steels, tool steels, nickel alloys, titanium alloys

Exercises: Thermodynamic and other calculations of various metallurgical processes.

(4) TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Face-to-face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td>Use of projection system, organization and programming of the course and communication with students through the asynchronous e-learning platform open eclass.</td></tr>
<tr><td>TEACHING METHODS
The manner and methods of teaching are described in detail.
Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.

The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>28</td></tr>
<tr><td>Home study</td><td>30</td></tr>
<tr><td>In-class exercises</td><td>28</td></tr>
<tr><td>Exercise study and bibliography research</td><td>34</td></tr>
<tr><td>Course total</td><td>120</td></tr>
</table>
</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION
Description of the evaluation procedure

Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other

Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td>Mid-term written exam (40%), final written exam (60%).
The evaluation criteria are given on the relevant page of the course on the asynchronous e-learning platform open e-class and are analyzed to the students at the beginning of the semester.</td></tr>
</table>

(5) SUGGESTED BIBLIOGRAPHY

- Suggested bibliography:

Ζευγώλης Ε, 2014, Μεταλλουργία Σιδήρου: Θεωρία και Τεχνολογία, 632 σελ.

Λεκάτου Α., Λεκάτος Σ., 2009, Εισαγωγή στη Φυσική Μεταλλουργία, Εκδόσεις Θεοδωρίδη, 304 σελ.

Μαυροειδής Π., 2005, Χάλυβες Οπλισμού Σκυροδέματος, Εκδόσεις Παπασωτηρίου, 257 σελ.

Τριανταφυλλίδης Γ., 2014, Μεταλλογνωσία: για το Μεταλλουργό Μηχανικό και τον Τεχνολόγο Υλικών, Εκδόσεις Τζιόλα, 957 σελ.

Χαϊδεμενόπουλος Γ., 2020, Φυσική Μεταλλουργία, 2η έκδοση, Εκδόσεις Τζιόλα, 712 σελ.

- Related academic journals:

International Journal of Minerals, Metallurgy and Materials, Springer

Journal of Sustainable Metallurgy, Springer