# COURSE OUTLINE

## (1) GENERAL

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| **SCHOOL** | SCHOOL OF SCIENCES | | |
| **DEPARTMENT** | DEPARTMENT OF CHEMISTRY | | |
| **LEVEL OF STUDIES** | ISCED level 6 – Bachelor's or equivalent level | | |
| **COURSE CODE** | **EN23** | **SEMESTER** | 7th Semester |
| **COURSE TITLE** | Inorganic Materials Chemistry | | |

| **TEACHING ACTIVITIES** *If the ECTS Credits are distributed in distinct parts of the course e.g. lectures, labs etc. If the ECTS Credits are awarded to the whole course, then please indicate the teaching hours per week and the corresponding ECTS Credits.* | **TEACHING HOURS PER WEEK** | **ECTS CREDITS** |
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| *Please, add lines if necessary. Teaching methods and organization of the course are described in section 4.* | | |

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| **COURSE TYPE** *Background, General Knowledge, Scientific Area, Skill Development* | Skill Development |
| **PREREQUISITES:** | NO |
| **TEACHING & EXAMINATION LANGUAGE:** | GREEK |
| **COURSE OFFERED TO ERASMUS STUDENTS:** | |
| **COURSE URL:** | https://eclass2.emt.duth.gr/courses/CHEM_H110/ |

## (2) LEARNING OUTCOMES

**Learning Outcomes**
*Please describe the learning outcomes of the course: Knowledge, skills and abilities acquired after the successful completion of the course.*

Upon completion of the course, students will be able to:
- understand the concept of crystal structure in solid materials.
- understand the basic principles of the chemical structure of crystalline solids.
- understand the importance of imperfections in solids.
- understand the concept of dislocations and strengthening mechanisms in metals.
- understand phase diagrams of materials.
- understand the chemical properties and applications of metals and ceramics.
- understand the chemistry of composite materials.

**General Skills**
*Name the desirable general skills upon successful completion of the module*

*Search, analysis and synthesis of data and information,*
*ICT Use*
*Adaptation to new situations*
*Decision making*
*Autonomous work*
*Teamwork*
*Working in an international environment*
*Working in an interdisciplinary environment*
*Production of new research ideas*
*Project design and management*
*Equity and Inclusion*
*Respect for the natural environment*
*Sustainability*
*Demonstration of social, professional and moral responsibility and sensitivity to gender issues*
*Critical thinking*
*Promoting free, creative and inductive reasoning*

Search, analysis and synthesis of data and information, Adaptation to new situations, Decision making, Autonomous work, Teamwork, Working in an international environment, Working in an interdisciplinary environment, Production of new research ideas, Project design and management, Critical thinking, Promoting free, creative and inductive reasoning

## (3) COURSE CONTENT

Week 1: Introduction to the course and material properties.
Week 2: Basic crystallography.
Week 3: Chemical structure of crystalline solids - metals.
Week 4: Chemical structure of crystalline solids - ceramics.
Week 5: Solid imperfections - metals.
Week 6: Solid imperfections - ceramics.
Week 7: Dislocations.
Week 8: Metals strengthening mechanisms.
Week 9: Phase diagrams.
Week 10: Phase transitions.
Week 11: Chemical properties and applications of metals.
Week 12: Chemical properties and applications of ceramics.
Week 13: Chemistry of composite materials.

## (4) LEARNING & TEACHING METHODS - EVALUATION

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| **TEACHING METHOD**<br>*Face to face, Distance learning, etc.* | Face to face |
| **USE OF INFORMATION & COMMUNICATIONS TECHNOLOGY (ICT)**<br>*Use of ICT in Teaching, in Laboratory Education, in Communication with students* | Use of ICT in Teaching<br>Use of ICT in Communication with students |
| **TEACHING ORGANIZATION**<br>*The ways and methods of teaching are described in detail.*<br>*Lectures, Seminars, Laboratory Exercise, Field Exercise, Bibliographic research & analysis, Tutoring, Internship (Placement), Clinical Exercise, Art Workshop, Interactive learning, Study visits, Study / creation, project, creation, project. Etc.*<br><br>*The supervised and unsupervised workload per activity is indicated here, so that total workload per semester complies to ECTS standards.* | **Activity** / **Workload/semester**<br>Lectures: 39<br>Study: 33<br>Exams: 3<br>Total: 75 |
| **STUDENT EVALUATION**<br>*Description of the evaluation process*<br><br>*Assessment Language, Assessment Methods, Formative or Concluding, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Essay / Report, Oral Exam, Presentation in audience, Laboratory Report, Clinical examination of a patient, Artistic interpretation, Other/Others*<br><br>*Please indicate all relevant information about the course assessment and how students are informed* | Written final exam that includes problem solving from different sections of the course (no notes allowed). |

## (5) SUGGESTED BIBLIOGRAPHY


- Επιστήμη και Τεχνολογία των Υλικών, 10η Έκδοση, Callister Wılliam D., Rethwisch David G.
- Υλικά, δομή, ιδιότητες και Τεχνολογικές Εφαρμογές, 7η Έκδοση, Askeland Donald, Wendelin Wright
- Επιστήμη και τεχνολογία υλικών, Βατάλης Αργύρης Σ.
- Χημεία και Τεχνολογία Υλικών, Ignatowitz E., Fischer U.