

| Course Code | 4st Semester | Hours | | | ECTS | Prerequisites |
|-------------|---|-------|-----|-----|-------|---------------|
| | | (Th) | (E) | (L) | | |
| 204 | Physics Laboratory II: Electricity-Optics | 0 | 0 | 3 | C 8 | 102 |
| 243 | Materials II: Polymers-Colloids | 4 | 0 | 0 | C 6 | - |
| 242 | Materials III: Microelectronic and optoelectronic materials | 4 | 0 | 0 | C 6 | - |
| 232 | Biochemistry & Molecular Biology | 3 | 0 | 0 | C 6 | 122 |
| 212 | Differential Equations II | 3 | 1 | 0 | CE1 6 | 211 |
| 213 | Computers II: Introduction to Numerical Analysis | 2 | 0 | 3 | CE1 6 | 114, 116 |
| 215 | Advanced Programming I C++ | 0 | 0 | 3 | E 5 | 114 |
| PAE-016 | Didactics of Materials Science I | - | - | - | E 3 | - |

| Course Code | 5st Semester | Hours | | | ECTS | Prerequisites |
|-------------|---|-------|-----|-----|-------|---------------|
| | | (Th) | (E) | (L) | | |
| 343 | Laboratory Course: Soft Materials | 1 | 0 | 5 | C 8 | 243 |
| 305 | Solid-State Physics: An Introduction | 3 | 2 | 0 | C 6 | 201 |
| 301 | Electromagnetism | 3 | 2 | 0 | C 6 | 102, 112 |
| 335 | Molecular Cell Biology | 3 | 0 | 0 | C 6 | 122 |
| 391 | Materials IV: Science of Natural Biomaterials | 3 | 0 | 0 | C 6 | 122 |
| 202 | Modern Physics II: Matter and Light | 3 | 1 | 0 | CE1 6 | 201, 116 |
| PAE-017 | Didactics of Materials Science II | - | - | - | E 3 | - |
| PAE-001 | Practice I | - | - | - | E 5 | - |

| Course Code | 6st Semester | Hours | | | ECTS | Prerequisites |
|-------------|---|-------|-----|-----|------|---------------|
| | | (Th) | (E) | (L) | | |
| 344 | Laboratory course: Solid Materials | 1 | 0 | 5 | C 8 | 204 |
| 362 | Materials V: Ceramic and Magnetic materials | 3 | 0 | 0 | C 6 | 201 |
| 302 | Optics & Waves | 3 | 0 | 0 | E 5 | 102, 112 |
| 306 | Solid State Physics II: | | | | | |

| | | | | | | |
|----------|---|---|---|---|-----|-----|
| | Electronic and magnetic properties of materials | 3 | 0 | 0 | E 5 | 201 |
| 340 | Transport phenomena in Materials Science | 3 | 0 | 0 | E 5 | 211 |
| 346 | Nanomaterials Surface Science | 3 | 0 | 0 | E 5 | 141 |
| PAE-018 | Didactics of Materials Science III | - | - | - | E 3 | - |
| PRAC-002 | Practice II | - | - | - | E 5 | - |

| Course Code | 7st Semester | Hours | | | ECTS | Prerequisites |
|-------------|---|-------|-----|-----|-------|---------------|
| | | (Th) | (E) | (L) | | |
| 447 | Computational Materials Science | 2 | 0 | 3 | CE2 6 | 114 |
| 461 | Elements of Ceramics Science | 3 | 0 | 0 | CE2 6 | - |
| 481 | Elements of Semiconductor Physics | 3 | 0 | 0 | CE2 6 | 242 |
| 483 | Elements of Magnetic Materials | 3 | 0 | 0 | CE2 6 | 362 |
| 491 | Biological Materials and Synthetic Biomaterials | 3 | 0 | 0 | CE2 6 | 232 |
| 443 | Laboratory course: Nanomaterials & Biomaterials | 0 | 0 | 5 | E 6 | 343 |
| 500 | Symmetry in Materials Science | 3 | 0 | 0 | E 5 | 116, 305 |

| Course Code | 8st Semester | Hours | | | ECTS | Prerequisites |
|-------------|---|-------|-----|-----|-------|---------------|
| | | (Th) | (E) | (L) | | |
| 410 | Laboratory Course: Control and Automation of Systems Through the Computer | 2 | 0 | 2 | E 5 | 114 |
| 440 | Laboratory Course: Mechanical Drawing | 2 | 0 | 2 | E 5 | - |
| 442 | Diploma Thesis | - | - | - | E 12 | - |
| 445 | Fluid Dynamics | 3 | 0 | 0 | E 5 | 211 |
| 446 | Electron Microscopy | 3 | 0 | 0 | E 5 | - |
| 448 | Special topics in Computational Materials Science | 2 | 0 | 3 | E 5 | - |
| 450 | Polymer Physics | 3 | 0 | 0 | CE2 6 | 243 |
| 452 | Polymer Synthesis | 3 | 0 | 0 | E 5 | 243 |

| Course Code | 8st Semester | Hours | | | ECTS | Prerequisites | |
|-------------|---|-------|-----|-----|------|---------------|------------|
| | | (Th) | (E) | (L) | | | |
| 454 | Rheology and Polymer Processing Methods | 3 | 0 | 0 | E | 5 | 211 |
| 462 | Ceramic Materials and Propert. | 3 | 0 | 0 | E | 5 | 362 |
| 464 | Special Topics in Ceramic Materials | 3 | 0 | 0 | E | 5 | 362 |
| 470 | Synthesis & Characterization of Colloidal Dispersions | 3 | 0 | 0 | E | 5 | 243 |
| 471 | Elements of Colloidal Dispersions | 3 | 0 | 0 | CE2 | 6 | 243 |
| 472 | Physical Chemistry of Colloidal Systems | 3 | 0 | 0 | E | 5 | |
| 480 | Heterostructures, Nanostructures & Nanotechnology of Semiconductors | 3 | 0 | 0 | E | 5 | 242 |
| 482 | Introduction to Microelectronics 3 | 3 | 0 | 0 | E | 5 | 242 |
| 484 | Optoelectronic and Photonic Materials | 3 | 0 | 0 | E | 5 | 242 |
| 486 | Semiconductor Processing Technology | 3 | 0 | 0 | E | 5 | 242 |
| 488 | Special Topics in Magnetic Materials | 3 | 0 | 0 | E | 5 | 362 |
| 490 | Photonic Materials | 3 | 0 | 0 | E | 5 | - |
| 492 | Cell Biology | 3 | 0 | 0 | E | 5 | 232, 335 |
| 494 | Introduction to Biomedical Engineering | 3 | 0 | 0 | E | 5 | 232 or 335 |
| 512 | Computational Materials Science II: Electronic Structure Laboratory | 2 | 0 | 3 | E | 5 | 305 |
| 570 | Special Topics in Soft Materials | 3 | 0 | 0 | E | 5 | 243 |
| 580 | Optoelectronics & Lasers | 3 | 0 | 0 | E | 5 | 242 |
| 582 | Special Topics in Optoelectronic Materials | 3 | 0 | 0 | E | 5 | 242 |
| 584 | Spintronics | 3 | 0 | 0 | E | 5 | 362 |
| 590 | Special Topics in Bio-Engineering | 3 | 0 | 0 | E | 5 | - |

| | | | | | | | |
|-----|---------------------------------------|---|---|---|---|---|---------------|
| 594 | Protein Motion and Molecular Machines | 3 | 1 | 0 | E | 5 | 335 |
| 596 | Molecular Imaging | 3 | 0 | 0 | E | 5 | - |
| 598 | Bio-Organic Nanostructures | 3 | 0 | 0 | E | 5 | 121, 122, 012 |
| 911 | Publication I | - | - | - | E | 5 | - |
| 912 | Publication II | - | - | - | E | 5 | - |

The Core-Elective courses of the Department are divided into two groups: Core-Elective courses 1 and 2 (CE1 and CE2) from which the student is obliged to get at least 6 and 18 ECTS credits, respectively, in order to receive his/her degree. Moreover, up to 10 ECTS credits are given for student internships (Practice I and II of Table II), as described in detail below.

The total weight of core-elective and elective courses is 58 ECTS credits, which can be obtained by either courses of the MST Department (at least 44 ECTS credits), or from courses of other Departments (up to 20 ECTS credits – with up to 12 ECTS credits being from courses from the Departments of Philosophy and Education).



Courses from other departments of the University of Crete

MST students can attend courses of other Departments of the University of Crete, as mentioned above. These courses are decided each year by the Undergraduate Studies Committee, based on the courses offered by the other Departments

Examination periods and exams

There are three examination periods: for the winter semester it is usually in January), for the spring semester it is usually in June) and the September examination period. In January and in June the students can be examined only in the courses in which they were registered in the corresponding semester. In September (the so-called second exam period) they can be examined in all courses in which they were registered both previous semesters. Besides, the students have also the possibility to be examined in courses of previous years in which they had failed and have not registered in the current academic year if they submit to the Secretariat of the Department a "Request for course addition", not later than July 20 of each year.

For laboratory courses, whether and under what conditions there will be a final exam is decided by the instructor and is announced to the students at the beginning of the course.

The specific examination procedures (e.g., final exam, mid-term exams, etc.) must be announced by the instructor at the beginning of each semester and within two weeks after the first lecture.

Re-examinations

Students who succeeded in a course in the first examination periods (January or June) and want to increase their grade in a particular course can participate in the second examination period (September) of the same academic year if they declare this intention to the secretariat by July 20 of each year. In this case the grade assigned is the highest among the two.

In case the student re-registers for the same course in another academic semester, then his/her first grade is deleted and the grade assigned is the last one.

Rating and conditions for graduation

The requirements to be fulfilled for receiving the MST Department degree are as follows:

1. Register in the Department and coursework for at least eight (8) semesters.
2. Acquire at least 240 ECTS credits in total, of which at least 226 from courses of the MST Department. The ECTS credits received from courses of other Departments are subject to the restrictions of the next table, Table III.
3. Successful completion of all core courses of the Department (listed in Table I) corresponding to 182 ECTS credits (8 ECTS credits from the English language courses and 174 from other courses). The requirements for each student to receive his/her degree are those described in the Studies Guide that was in force during the year of first registration of the student in the MST Department. The requirements of the current Studies Guide are described in the following table.

Table III:
Requirements to receive the MST Department degree

| Courses | ECTS | Details |
|--|------------|--|
| Total | ≥240 | |
| Total from the MST Department | ≥226 | Table II |
| Core courses: | | |
| From MST Department (other than English) | 174 | Table II |
| English | 8 | |
| Core-Elective 1 | ≥6 | Table II |
| Core-Elective 2 | ≥18 | Table II |
| Elective | | |
| From MST Department | ≥20 | Table II |
| Philosophical/Pedagogical ¹ | ≤12 | Given by other Schools of the University |

| | |
|---|-----|
| From other Departments of School of Sciences & Engineering and School of Medicine 1 | ≤20 |
| Practice1 | ≤10 |

¹ the sum of ECTS credits from internship, philosophical-educational cycle courses, and courses from other departments must be less than or equal to 30.

Detailing:

There are two groups of Core-Elective courses (CE1 and CE2) from which the student is obliged to take at least 6 and 18 ECTS credits, respectively. Elective courses can include courses from other Departments of the University. The maximum number of ECTS credits allowed from courses of the Departments of Philosophy, Social Sciences or Education is 12. From courses from the other departments of the School of Sciences and School of Medicine the maximum number of ECTS credits allowed is 20.

The Undergraduate Studies Committee can decide the replacement of a specific elective course of the MST Department by a course of another Department of the University.

It is also possible for an undergraduate student to register in a postgraduate course of the Department but only after permission from the postgraduate course instructor. The ECTS credits of the graduate courses are added to the credits of the undergraduate courses.

Distribution of courses/ Curriculum Example

In the next few tables an example of a curriculum is given:

| 1st Semester | | | ECTS | 2nd Semester | | | ECTS |
|--------------|---|--|-------------------|--------------|---|--|-----------|
| 101 | General Physics I | | 6 | 102 | General Physics II | | 6 |
| 111 | General Mathematics I | | 6 | 112 | General Physics II | | 6 |
| 121 | General Chemistry | | 6 | | | | |
| 141 | Materials I: Introduction to Materials Science | | 6 | 116 | Applied Mathematics | | 6 |
| 011 | English I | | 4 | 122 | Organic Chemistry | | 6 |
| 114 | Computers I: Introduction to programming | | 6 | | | | |
| | | | | 124 | Chemistry Laboratory Course | | 8 |
| | | | | 012 | English II | | 4 |
| | | | Total ECTS | | | | 36 |
| | | | 34 | | | | |
| 3rd Semester | | | ECTS | 4th Semester | | | ECTS |
| 201 | Modern Physics I: Introduction to Quantum Mechanics | | 6 | 204 | Physics Laboratory II: Electricity-Optics | | 8 |
| 223 | Inorganic Chemistry | | 6 | 232 | Biochemistry and Molecular Biology | | 6 |

3rd Semester ECTS

| | | |
|-------------------|--|-----------|
| 225 | Laboratory Course: Materials Chemistry | 8 |
| 203 | Physics Laboratory I: Mechanics-Heat | 8 |
| 211 | Differential. Equations I | 6 |
| 260 | Thermodynamics | 6 |
| Total ECTS | | 40 |

5th Semester ECTS

| | | |
|-------------------|---|-----------|
| 301 | Electromagnetism | 6 |
| 305 | Solid State Physics: An Introduction | 6 |
| 335 | Molecular Cell Biochemistry | 6 |
| 343 | Laboratory Course: Soft Materials | 8 |
| 391 | Materials IV: Science of Natural Biomaterials | 6 |
| Total ECTS | | 32 |

7th Semester ECTS

| | | |
|-------------------|---|-----------|
| | Core-Elective course or Elective Course | 16 |
| Total ECTS | | 16 |

4th Semester ECTS

| | | |
|-------------------|--|-----------|
| 242 | Materials III : Microelectronic and Optoelectronic Materials | 6 |
| 243 | Materials II: Polymers-Colloids | 6 |
| | Επιλογής Υποχρεωτικό | 16 |
| Total ECTS | | 32 |

6th Semester ECTS

| | | |
|-------------------|---|-----------|
| 362 | Materials V: Ceramic and Magnetic Materials | 6 |
| 344 | Laboratory Course: Solid Materials | 8 |
| PRAG-001 | Practice I | 5 |
| | Elective Courses | 15 |
| Total ECTS | | 34 |

8th Semester ECTS

| | | |
|-------------------|------------------|-----------|
| | Elective Courses | 16 |
| Total ECTS | | 16 |

Diploma thesis

A student can carry out a small research project under the guidance of a Professor/ Adviser, which he/she will have to present as a Diploma thesis and receive up to 12 ECTS credits (sum of credits of Diploma thesis I and II in Table II). The Diploma thesis work should be presented in a public presentation, followed by an oral examination by a two-member Committee, one has to be a faculty member of the Department whereas the other can be a Researcher of a recognized research center or a member of the Department holding a PhD or a member of another Department of the UoC also holding a PhD. In any case, the members of the Committee are appointed by the Undergraduate Studies Committee.

The grade of the Diploma thesis is assigned by the Professor/Adviser. The ECTS credits of the thesis are credited as ECTS of an elective course of the MST Department.

Internship (Practice)

After the end of the fourth semester, preferably during the summer vacation period, students can perform an internship in Greek, and international organizations and companies, of the public or the private sector with the aim of getting working or research expertise in materials science and related technological applications. The duration of the internship is typically 2 months with the possibility of extension in cases where the internship is performed outside Greece. The Internship Committee of the department is responsible for approving proposed internships and corresponding the interested parties (student and company/organization). After the end of the internship the student should submit an "activity report", which will be assessed by the Internship Committee, which will then decide on the final grade and ECTS credits (up to 5 ECTS credits per internship, with a maximum of 2 internships in total). In this way students can get up to 10 ECTS credits. The ECTS credits achieved from the Internship belong to the category of ECTS credits from other Departments of the Universities, which can be up to 30.

Any further obligations of the participating parties (student, company/organization and the Department) that may arise due to the financing scheme on the Internship Program will be regulated by the Internship committee.

Foreign language

Nowdays, more than ever, within the framework of a United Europe with all the emerging work and education possibilities (e.g. international student exchange programmes such as ERASMUS, etc.), foreign language skills, and especially English, are essential. The students of the MST Department are required to successfully complete two courses of English, which will give a total of 8 ECTS in order to receive their degree. The main aim of these two courses is to teach the students the basic scientific terminology used in Materials Science, as well as to prepare them for the study of scientific textbooks and publications.

Certificate of proficiency in computer

The certificate of proficiency in computer can be given by the department to the students if they succeed in the course ETY – 114 Computers I: Introduction to programming and in at least three of the following courses:

ETY – 113 Computers 0

ETY – 204 Physics Laboratory II: Electricity-Optics

ETY – 215 Advanced Programming I C++

ETY – 213 Computers II: Introduction to Numerical Analysis

ETY – 343 Laboratory Course: Soft Materials

ETY – 344 Laboratory course: Solid Materials

ETY – 410 Laboratory Course: Control and Automation of Systems Through the Computer

ETY – 440 Laboratory Course: Mechanical Drawing

ETY – 447 Computational Materials Science

ETY – 512 Computational Materials Science II: Electronic Structure Laboratory

Teaching competence certificate:

The students of MST Department can obtain the teaching certificate of competence, which will allow them to teach in public schools, following at the third and fourth year of their study the Interdepartmental Teaching Certification Program (PTCP). The program consists of three groups of courses: a) Training and Education, b) Teaching and Learning, c) Special Teaching - Internship. To obtain the certificate of teaching competence the students should attend one course from each of the above groups plus the internship. The courses which will be available each semester in the framework of the PTCP and their ECTS credits for MST Department students will be announced on the website <http://www.materials.uoc.gr/el/undergrad/syllabus/ppde.pdf>.

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