ADMINISTRATION

DEAN
Professor Evangelos Grigoroudis

VICE DEAN
Professor Vassilis Kouikoglou

DEANERY
Professor Anargiros Delis
Professor Michalis Doumpos
Professor Ioannis Nikolos
Professor Constantin Zopounidis

Representative of the Laboratory Teaching Personnel
Message from the Dean

The School of Production Engineering and Management was founded as a Department in 1983 and admitted students for the first time in 1984. It is the first School in Greece that has been established in this particular field of engineering, trying to bridge the gap between production, technology, management and administration. The main goal is to educate engineers that, apart from their ability to cope with purely technical problems, will be able to handle administrative and management issues.

The School of Production Engineering and Management has been constantly growing over the last 40 years. Today, the school has 25 Faculty Members and 21 Laboratory Teaching and Technical Personnel, and each year it accepts about 150 first-year students. There are four academic divisions supporting multidisciplinary teaching and research: Sciences, Production Systems, Decision Sciences, and Engineering Management.

The School has a modern, broad and carefully designed curriculum that combines mathematics, physics, humanities, production systems, operational research, information systems, applied economics and management science. Such a broad-based education aims to empower students towards recognizing and solving complex technical problems, which require a holistic approach that covers technological, economic, societal, and environmental aspects. Undergraduate courses are offered in Greek for all students except for Erasmus exchange students who can attend courses and seminars offered in English and other languages.

In addition to the curriculum, students have the opportunity to acquire knowledge, skills and abilities through direct collaboration with the Faculty and participation in research and extroversion activities. The School keeps up with current trends in the scientific field of Production Engineering and Management and the labor market, and implements innovative changes in the curriculum to provide graduates with the necessary abilities and skills to foster their professional or academic career. Today, there are Production and Management Engineers in construction sectors, consulting companies, industry, public services, education, private businesses or even as freelance engineers or business owners.

The basic strategy of the School of Production Engineering and Management is to invest in human resources, as well as on the harmonic and creative cooperation between staff, students, and graduates to maintain a strong, modern, and progressive academic environment.

Professor Evangelos Grigoroudis
Dean of the School of Production Engineering and Management
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1. General Info about the School

1.1 School mission

The education at the School of Production Engineering and Management (PEM) provides students with knowledge and skills necessary to design, manage and operate production systems of goods and services. PEM is the first school established in Greece in this area and admitted the first students in September 1984.

A number of societal and economic developments favored the establishment of PEM:

- The need to maintain competitiveness at a national and international level by implementing cost-effective methodologies that enhance productivity and improve the production of goods and services.
- The inherent complexity of new technologies and innovations, their high acquisition costs and the impact they can have on humans and the environment, which create the need to adopt a holistic approach that ensures a technologically, economically, socially and environmentally acceptable way for their implementation.
- The requirement of Greek organizations (companies, industry, public services) for highly educated and skilled engineers who can successfully and efficiently handle not only technological/engineering problems, but also administrative and management issues.

The undergraduate curriculum of PEM comprises courses in mathematics, physics, humanities, production systems, operational research, information systems, applied economics, finance and management sciences. Students have also the opportunity to attend courses in universities across Europe via student exchange programs.

Today, production and management engineers are employed in construction, consulting companies, industry, public services, education, private businesses, and as freelance engineers. Indicative fields of employment are:

- Production systems design and management;
- Information systems design, development and management;
- Electrical and mechanical systems consulting;
- E-business, e-marketing and applications development;
- Computer-aided product design and rapid product design;
- Health and safety;
- Logistics and dynamic resource allocation;
- Robotics;
- Industrial operation and control of production plants;
- Project management;
- Supply chain and time planning;
- Enterprise resource and material requirements planning;
- Transportation systems;
- Quality management;
- Financial decision and investment planning;
- Financial engineering and financial risk management;
- Artificial intelligence;
- Machine learning and data mining;
• Decision support systems and intelligent systems;
• Environmental studies;
• Marketing;
• Consumer behavior analysis;
• Operational research and multi-criteria decision making;
• Business intelligence and business analytics;

The Diploma in Production and Management Engineering of the Technical University of Crete is recognized (Government Gazette 3900B/7-9-2018) as **Integrated Master** (level 7 of the National and European Qualifications Framework).

Additional detailed information on the professional rights of School graduates can be found on the website of the Panhellenic Association of PEM Graduates ([www.mpd.gr](http://www.mpd.gr)).

### 1.2 Administrative structure of the School

The School, officially founded with a single department of the same name, is administered by the Deanery and the School Assembly. The latter consists of all regular faculty members, the members of the Undergraduate Students Committee, and representatives of the laboratory teaching and technical personnel. The Dean bears the administrative and financial responsibilities of the department. The personnel of the School is divided into the following categories:

1. Faculty members hold a Ph.D. degree, teach undergraduate and graduate courses and conduct research; they are appointed at the following ranks: Professor, Associate Professor, tenured and tenure-track Assistant Professors.
2. Adjunct faculty consists of hired educators and instructors who support the undergraduate curriculum.
3. Laboratory-Teaching Personnel (LTP) provide instruction services at the departmental laboratories.
4. Specialized Technical Laboratory Personnel (STLP) provide technical support services.
5. Administrative staff perform bookkeeping activities essential to the educational and research objectives of the department.

The General Assembly receives recommendations from the following committees:

<table>
<thead>
<tr>
<th><strong>A. Undergraduate Studies Committee</strong></th>
<th><strong>C. Doctoral Program Committee</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>M. Konsolakis, Professor (coordinator)</td>
<td>V. Kouikoglou, Professor, coordinator</td>
</tr>
<tr>
<td>S. Papaefthimiou, Professor</td>
<td>C. Zopounidis, Professor</td>
</tr>
<tr>
<td>D. Ipsakis, Assistant Professor</td>
<td>I. Papamichail, Professor</td>
</tr>
<tr>
<td>Member of the Undergraduate Students Committee</td>
<td>M. Konsolakis, Professor</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>B. Graduate Program Committees</strong></th>
<th><strong>D. Alumni and Professional Rights Committee</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Master in Business Administration (MBA)</strong></td>
<td>E. Doitsidis, Assistant Professor</td>
</tr>
<tr>
<td>M. Doumpos, Professor (coordinator)</td>
<td>President of the Undergraduate Students’ Committee</td>
</tr>
<tr>
<td>C. Zopounidis, Professor</td>
<td></td>
</tr>
<tr>
<td>G. Atsalakis, Associate Professor</td>
<td></td>
</tr>
<tr>
<td>T. Kontogiannis, Professor</td>
<td></td>
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<tr>
<td>S. Tsafarakis, Associate Professor</td>
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<tr>
<th><strong>E. Summer Internship Committee</strong></th>
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<tbody>
<tr>
<td>A. Delis, Associate Professor</td>
</tr>
<tr>
<td>M. Marinaki, LTP</td>
</tr>
</tbody>
</table>
**Product Design and Manufacturing (PRODES)**
- I. Nikolos, Professor (coordinator)
- N. Tsourveloudis, Professor
- G. Stavroulakis, Professor
- E. Ioannidis, Associate Professor
- E. Doitsidis, Assistant Professor

**Production and Management Systems**
- V. Kouikoglou, Professor, coordinator
- S. Papaefthimiou, Professor
- A. Delis, Professor
- G. Atsalakis, Associate Professor
- G. Arampatzis, Associate Professor

**F. Public Relations Committee**
- K. Tsagarakis, Professor
- G. Arampatzis, Associate Professor
- S. Piperidis, LTP
- N. Spanoudakis, LTP

**G. ERASMUS+ Committee**
- S. Papaefthimiou, Professor
- E. Doitsidis, Assistant Professor (deputy)

**H. Library Committee**
- T. Kontogiannis, Professor
- E. Ioannidis, Associate Professor

**I. Health and Safety Committee**
- G. Arampatzis, Associate Professor
- N. Chairetis, STLP
- M. Bakatsaki, LTP
- I. Kontaxakis, STLP
- M. Partsakoulaki, Administrative Personnel

Since the academic year 2018-2019, Professor M. Konsolakis has been appointed as the Study Counselor. The responsibilities of the Study Counselor are to provide advice to students for a successful completion of their studies and to help those students facing difficulties during their study.

The members of the Internal Evaluation Team (OMEA) are: Professor M. Doumpos (coordinator), Professor V. Kouikoglou, and Professor K. Tsagarakis.
2. School Organization and People

2.1 School divisions

The School of Production Engineering and Management is organized into four divisions encompassing a number of interrelated scientific fields. The School divisions are:

2.1.1 Division of Sciences

The division’s scope lies on the scientific training of students in fundamental courses and promotes research in physical science, applied mathematics, social science, and humanities.

REGULAR FACULTY

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Education Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anargiros Delis</td>
<td>Professor</td>
<td>PhD, University of the West of England, Bristol, 1998; MSc, University of Manchester – UMIST, 1994; BS, Department of Mathematics, University of Crete, 1993. Specialty: Computational Mathematics</td>
</tr>
<tr>
<td>Michalis Konsolakis</td>
<td>Professor</td>
<td>PhD, Department of Chemical Engineering, University of Patras, 2001; Diploma, Department of Chemical Engineering, University of Patras, 1997 Specialty: Surface Analysis and Catalysis</td>
</tr>
<tr>
<td>Dimitrios Patelis</td>
<td>Professor</td>
<td>PhD, Lomonosov Moscow State University, 1991; BS, Department of Philosophy, Lomonosov Moscow State University, 1988. Specialty: Philosophy and History of Science</td>
</tr>
<tr>
<td>Yiannis Saridakis</td>
<td>Professor</td>
<td>PhD, in Applied Mathematics and Computer Science from Clarkson University, New York, 1985; MSc, in Applied Mathematics and Computer Science from Clarkson University, New York, 1983; BS, Department of Mathematics, University of Crete, 1981. Specialty: Applied Mathematics</td>
</tr>
</tbody>
</table>
SCiences Laboratories

Laboratory of Applied Mathematics and Computers
(Director: Y. Saridakis)

The laboratory with its modern electronic infrastructure, supports the educational and research work of the School in the areas of Mathematics. Its goal is the effective transfer of knowledge in the basic fields of Mathematics, but also its substantial promotion in cutting-edge fields of Applied and Computational Mathematics and Scientific Computing.

Laboratory of Matter Structure and Laser Physics
(Director: M. Konsolakis)

The laboratory provides both the educational laboratory support of Physics to the undergraduate students as well as research support for the completion of postgraduate studies. At the same time, intense research activity has been developed, both in basic and applied research.

2.1.2 Division of Production Systems

The division of production systems focuses on the analysis and optimization of production and energy systems and modern manufacturing and production technologies (flexible manufacturing systems, robotics, automatic control, computer-aided design, computer-aided manufacturing, material handling, environmental technology, thermodynamics, fluid mechanics etc.).

Regular Faculty

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panagiotis Alevras</td>
<td>Assistant Professor</td>
<td>PhD, Mechanical Engineering, Heriot-Watt University UK, 2015; Diploma, Mechanical Engineering, National Technical University of Athens, Greece, 2011; Diploma, Mechanical Engineering, National Technical University of Athens, Greece, 2011; Specialty: Machine Elements and Mechanical Structures.</td>
</tr>
<tr>
<td>Aristomenis Antoniadis</td>
<td>Professor</td>
<td>PhD, Department of Mechanical Engineering, Aristotle University of Thessaloniki, Greece, 1989; Diploma, Department of Mechanical Engineering, Aristotle University of Thessaloniki, Greece, 1984; Specialty: Production Systems</td>
</tr>
<tr>
<td>George Arampatzis</td>
<td>Associate Professor</td>
<td>PhD, Department of Chemical Engineering, National Technical University of Athens, Greece, 2000; Diploma, Department of Chemical Engineering, National Technical University of Athens, Greece, 1991; Specialty: Heat Transfer</td>
</tr>
<tr>
<td>Lefteris Doitsidis</td>
<td>Assistant Professor</td>
<td>PhD, School of Production Engineering and Management, Technical University of Crete, 2008; MSc, School of Production Engineering and Management, Technical University of Crete, 2002; Diploma, School of...</td>
</tr>
</tbody>
</table>
### Production Engineering and Management, Technical University of Crete, 2000
**Specialty:** Robotic Vehicles

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Education</th>
<th>Specialty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stratos Ioannidis</td>
<td>Associate Professor</td>
<td>PhD, Department of Production Engineering and Management, Technical University of Crete, Greece, 2004; MSc, Department of Production Engineering and Management, Technical University of Crete, Greece, 1997; Diploma, Department of Production Engineering and Management, Technical University of Crete, Greece, 1995</td>
<td>Specialty: Robotic Vehicles</td>
</tr>
<tr>
<td>Dimitris Ipsakis</td>
<td>Assistant Professor</td>
<td>PhD, Department of Chemical Engineering, Aristotle University of Thessaloniki, Greece, 2011; MSc, Department of Mathematics, Aristotle University of Thessaloniki, Greece, 2013; Diploma, Department of Chemical Engineering, Aristotle University of Thessaloniki, Greece, 2005</td>
<td>Specialty: Analysis and Optimization of Production Lines and Production Networks</td>
</tr>
<tr>
<td>Vassilis Kouikoglou</td>
<td>Professor</td>
<td>PhD, Department of Production Engineering and Management, Technical University of Crete, Greece, 1989; Diploma, Department of Electrical and Computer Engineering, National Technical University of Athens, Greece, 1985</td>
<td>Specialty: Production Networks</td>
</tr>
<tr>
<td>Ioannis Nikolos</td>
<td>Professor</td>
<td>PhD, Department of Mechanical Engineering, National Technical University of Athens, Greece, 1996; Diploma, Department of Mechanical Engineering, National Technical University of Athens, Greece, 1990</td>
<td>Specialty: Thermal and Hydrodynamic Machines.</td>
</tr>
<tr>
<td>Spiros Papaefthimiou</td>
<td>Professor</td>
<td>PhD, Department of Physics, University of Patras, Greece, 2001; MSc, Department of Physics, University of Patras, Greece, 1997; BS, Department of Physics, University of Patras, Greece, 1995</td>
<td>Specialty: Energy Management Systems and Energy Efficiency Technologies</td>
</tr>
<tr>
<td>Nikolaos Tsourveloudis</td>
<td>Professor</td>
<td>PhD, Department of Production Engineering and Management, Technical University of Crete, Greece, 1995; Diploma, Department of Production Engineering and Management, Technical University of Crete, Greece, 1990</td>
<td>Specialty: Manufacturing Technology</td>
</tr>
</tbody>
</table>
PRODUCTION SYSTEMS LABORATORIES

**Computer-Aided Manufacturing (CAM)**  
(Director: V. Kouikoglou)  
The laboratory serves educational needs and research activities in the areas of flexible production systems, production technology and production with the aid of computers.

**Intelligent Systems and Robotics Laboratory**  
(Director: N. Tsourveloudis)  
The laboratory serves educational needs and research activities in the areas of robotic systems, kinematics, use of vision systems, sensors and other peripherals, in the development of integrated robotic applications and systems, self-propelled robots, unmanned vehicles, autonomous navigation systems and navigation systems.

**Industrial, Energy and Environmental Systems**  
(Director: S. Papaefthimiou)  
The laboratory of Industrial, Energy and Environmental Systems provides training and promotes research in the field of automatic control and on the development of novel materials, systems and technologies for environmental and energy applications. Indicatively, the laboratory is active in the following scientific areas: fault diagnostics in industrial systems, control systems, energy savings in buildings (BEMS), sustainable management of water resources, research and development of advanced materials, technologies for the exploitation of conventional / alternative fuels, development of catalytic systems of environmental and energy interest, production of high value-added chemicals / fuels, gaseous pollution, air pollution management, intelligent energy management in ports, life cycle analysis, research on advanced solar panels / photovoltaic cells.

**Computer-Aided Design (CAD)**  
(Director: G. Stavroulakis)  
The laboratory supports educational needs and research activities related to product design and the use of Computer Aided Design tools. Its educational and research activities are related to various sectors, such as Mechanical, Textile, Leather, Garment and Footwear.

**Micromachining and Manufacturing Modeling (m3)**  
(Director: A. Antoniadis)  
Micromachining and Manufacturing Modeling Lab (m3) was created in 2010 in order to cover the educational and research needs in advanced manufacturing fields, and micromachining in particular. In addition, the m3 supports manufacturing subjects of mechanical engineers in general. m3 lab provides advanced scientific knowledge to students, while being actively involved in research collaborations with other Universities and Research Institutions, and promoting collaborations with enterprises for the resolution of practical problems. The research fields where m3 is actively involved, or provides services via the Special Research Fund Account of the Technical University of Crete, are: Simulation of manufacturing processes, Microtechnologies, CAD/CAM/CAE, Finite elements method analysis for production technologies, Reverse engineering and Specialized subjects of bioengineering and nanotechnology.

**Turbomachinery and Fluid Mechanics**  
(Director: I. Nikolos)  
The laboratory meets the training and research needs in the field of turbomachinery and fluid mechanics, focusing further on Computational Fluid Dynamics, Optimal Turbine Components Design, as well as, on the optimal design of systems, processes and systems related to turbines.

### 2.1.3 Division of Decision Sciences

The division of decision sciences specializes in the development of operational research methodologies and techniques that directly aim on decision making, and also on the design, control and optimization of production systems, telematic applications and service provision.
### REGULAR FACULTY

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Qualifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Michalis Doumpos</td>
<td>Professor</td>
<td>PhD, Department of Production Engineering and Management, Technical University of Crete, Greece, 2000; MSc, Department of Production Engineering and Management, Technical University of Crete, Greece, 1997; Diploma, Department of Production Engineering and Management, Technical University of Crete, Greece, 1995. Specialty: Computational Methods in Operations Research.</td>
</tr>
<tr>
<td>Yannis Marinakis</td>
<td>Professor</td>
<td>PhD, Department of Production Engineering and Management, Technical University of Crete, Greece, 2005; MSc, Department of Production Engineering and Management, Technical University of Crete, Greece, 2001; Diploma, Department of Production Engineering and Management, Technical University of Crete, Greece, 1999. Specialty: Stochastic Optimization and Applications.</td>
</tr>
<tr>
<td>Ioannis Papamichail</td>
<td>Professor</td>
<td>PhD, Department of Chemical Engineering and Chemical Technology, Imperial College London, United Kingdom, 2002; MSc, Process Systems Engineering, Imperial College London, United Kingdom, 1999; Diploma, Department of Chemical Engineering, National Technical University of Athens, Greece, 1998. Specialty: Mathematical Programming and Algorithms.</td>
</tr>
<tr>
<td>George Stavroulakis</td>
<td>Professor</td>
<td>PhD, Department of Civil Engineering, Aristotle University of Thessaloniki, Greece, 1991; Diploma, Department of Civil Engineering, Aristotle University of Thessaloniki, Greece, 1985; Habilitation, Department of Civil Engineering, Carolo-Wilhelmina Technical University, Braunschweig, Germany, 2000. Specialty: Non-smooth Mechanics and Optimization.</td>
</tr>
</tbody>
</table>
DECISION SCIENCES LABORATORIES

**Dynamic Systems and Simulation**
(Director: I. Papamichail)

The laboratory serves educational needs and research activities in the areas of dynamic systems, simulation, optimization and telematics applications.

**Decision Support Systems**
(Director: E. Grigoroudis)

The laboratory serves educational needs and research activities related to the areas of operational research, information systems and decision support systems, multi-criteria decision analysis, artificial intelligence, business analytics, e-marketing, e-business, multi-agent systems and logistics.

**Computational Mechanics and Optimization**
(Director: G. Stavroulakis)

The laboratory deals with the development and use of computational mechanics and optimization, with emphasis on non-smooth and non-convex problems. The laboratory supports the static and dynamic calculation of materials and constructions, the optimal design, the control of constructions (intelligent constructions) and the problems of parameter identification. Finite and borderline methods of optimization, loose programming and related software packages are developed.

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2.1.4 Division of Engineering Management

The division offers courses that cover a wide range of administrative systems and management operations that include, among others: systems administration, marketing, ergonomics, work safety, financial management, project management, information systems, e-business, artificial intelligence, quality control, contract management, technological economics, etc.

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**REGULAR FACULTY**

**George Atsalakis**
Associate Professor
PhD, School of Production Engineering and Management, Technical University of Crete, Greece, 2006; MSc, School of Production Engineering and Management, Technical University of Crete, Greece, 1999; BS, Business Administration, Athens University of Economics and Business, Greece, 1986
Specialty: Technological Forecasting

**Evangelos Grigoroudis**
Professor
PhD, School of Production Engineering and Management, Technical University of Crete, Greece, 1999; MSc, School of Production Engineering and Management, Technical University of Crete, Greece, 1996; Diploma, School of Production Engineering and Management, Technical University of Crete, Greece, 1991
Specialty: Management of Quality Processes
# Undergraduate Program Student Guide 2022-2023

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Education</th>
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</table>
| Tom Kontogiannis      | Professor              | PhD, Department of Mechanical Engineering, Loughborough University of Technology, United Kingdom, 1988; MSc, Department of Mechanical Engineering, University College London, United Kingdom, 1986; Diploma, Department of Mechanical Engineering, Aristotle University of Thessaloniki, Greece, 1983  
                          |                        | Specialty: Ergonomics                                                      |
| Vassilis Moustakis     | Professor              | DSc, Department of Engineering Management, George Washington University, Washington, DC., United States of America, 1984; MEA, Department of Engineering Management, George Washington University, Washington, DC., United States of America, 1980; Diploma, Department of Mechanical and Aeronautical Engineering, University of Patras, Greece, 1978  
                          |                        | Specialty: Supply Chain Management, Entrepreneurship, Machine Learning, Management |
| Stelios Tsafarakis     | Associate Professor    | PhD, Technical University of Crete, Greece and Université Paris Dauphine, France, 2010; MSc, School of Production Engineering and Management, Technical University of Crete, Greece, 2007; MSc, in Management Information Systems, University of Southampton, UK, 2002; Diploma, Department of Electrical and Computer Engineering, National Technical University of Athens, Greece, 2000  
                          |                        | Specialty: Scientific Marketing                                             |
| Konstantinos Tsagarakis| Professor              | PhD, in Public Health from the School of Civil Engineering from the University of Leeds, UK, 1999; BS, Department of Economics of the University of Crete, Greece, 2002; Diploma, Department of Civil Engineering of the Democritus University of Thrace, 1995  
                          |                        | Specialty: Economics of Environmental Science and Technology                |
| Constantin Zopounidis  | Professor              | Doctorat d’État, Université de Paris–Dauphine (Paris IX), France, 1986; D.E.A., Université de Paris–Dauphine (Paris IX), France, 1982; BA, Department of Business Administration, University of Macedonia, Greece, 1981  
                          |                        | Specialty: Financial Management                                             |

## ENGINEERING MANAGEMENT LABORATORIES

<table>
<thead>
<tr>
<th>Laboratory</th>
<th>Director</th>
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<tbody>
<tr>
<td>Data Analysis and Forecasting</td>
<td>C. Zopounidis</td>
</tr>
<tr>
<td>Work Safety and Cognitive Ergonomics</td>
<td>T. Kontogiannis</td>
</tr>
<tr>
<td>Management Systems</td>
<td>V. Moustakis</td>
</tr>
<tr>
<td>Financial Engineering</td>
<td>C. Zopounidis</td>
</tr>
</tbody>
</table>

The laboratory serves educational needs and research activities related to:

- **Data Analysis and Forecasting** (Director: C. Zopounidis)
  - The laboratory serves educational needs and research activities related to data analysis, forecasting, marketing and quality systems.

- **Work Safety and Cognitive Ergonomics** (Director: T. Kontogiannis)
  - The laboratory serves educational needs and research activities related to the measurement of working variables, such as noise, lighting and temperature, anthropometric design of workplaces, the simulation of working activities and the development of educational programs with the aid of computers.

- **Management Systems** (Director: V. Moustakis)
  - The laboratory serves educational needs and research activities related to the use of information systems in management and supply chain management, entrepreneurship and management systems and processes.

- **Financial Engineering** (Director: C. Zopounidis)
  - The laboratory serves educational needs and research activities related to issues of financial analysis, investment planning, as well as infrastructure development in stock market decision studies, business viability, feasibility studies and general financial risk management studies.
2.1.5 Other educational activities, laboratories and provisions

**Machine Tools Laboratory**  
(Director: N. Tsourveloudis)

The laboratory is involved in educational and research activities in machine tools, manufacturing technology material processing, welding, drilling, and milling. This laboratory supports the manufacturing of experimental set-ups and prototypes at the Technical University of Crete.

**Language Research and Resource Centre**

The Language Centre at the Technical University of Crete, established in September 1997. Initially, the only offered language was English until the spring semester of 2002. Then, German language was included. The center is primarily a working environment with autonomous access to resources in English and German, for the successful completion of the required four semesters of foreign language during the five-year degree program. The tutorials/lectures involve a two-hour course on a weekly basis. Consequently, students have the opportunity to use the resources of the Centre, which include:

- workstations where students have access to online classroom and other online activities,
- forms of exercises that focus on improving the comprehension of texts, grammar, vocabulary and written language,
- collection of videos and DVDs in a combination with their watching media,
- commercial multimedia packages,
- a small library offering novels,
- possibility of guidance and supportive teaching on a personal level from the faculty,
- magazines (general and special topics).

The Language Research and Resource Centre participates in educational activities through the exchange of ideas on language teaching and through collaboration with other centers and teachers from all over Europe. It has welcomed visiting teachers and administrators of Language Centers from foreign and domestic universities. Examples include the Confucius Institute Headquarters (Office of the International Council of Chinese Language, Hanban), Helsinki University of Technology, the Louis Pasteur University and the University of Iceland, the University of Dortmund, the Language Centre and the Stuttgart City Library, the Ilmenau University, the Julich Research Center, the Evangelical Institute of Reutlingen-Ludwigsburg, as well, as the University of Ioannina and the Technological Institute of Piraeus.
2.2 Professors emeriti

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nikolaos Matsatsinis</td>
<td>Emeritus Professor</td>
<td>Dr. Matsatsinis was Professor of the School of PEM from 1998 to 2022. He is the president of Hellenic Operational Research Society, Editor-in-Chief in two scientific journals, and has served as head of the department for two terms, director of graduate studies and director of the Decision Support Systems Laboratory. PhD, Department of Production Engineering and Management, Technical University of Crete, Greece, 1995; BSc, Department of Physics, Aristotle University of Thessaloniki, Greece, 1980</td>
</tr>
<tr>
<td>Markos Papageorgiou</td>
<td>Emeritus Professor</td>
<td>Dr. Papageorgiou was Professor of the School of PEM from 1994 to 2021 and director of the Dynamic Systems and Simulation Laboratory. He has been accredited as a distinguished Visiting Professor and Scholar in a great number of international universities. He was awarded two ERC Advanced Investigator Grants. Dr.-Ing. (1981) and Dipl.-Ing. (1976) in Electrical Engineering, Technical University of Munich</td>
</tr>
<tr>
<td>Yannis Phillis</td>
<td>Emeritus Professor</td>
<td>Professor Phillis served as the Rector of the Technical University of Crete for four terms and 12 overall years and also as the Head of the Department of PEM. He founded the Laboratory of Computer Aided Manufacturing (CAM) and the Park for the Preservation of Flora and Fauna of the Technical University of Crete. PhD and Postgraduate Diploma, University of California Los Angeles, 1980 and 1978. Diploma in Mechanical and Electrical Engineering, National Technical University of Athens, 1973.</td>
</tr>
</tbody>
</table>

2.3 Other staff

2.3.1 Laboratory Teaching Personnel (LTP)

The 19 members of the Laboratory Teaching Personnel have laboratory teaching duties and also support other academic functions within the School and the University.

Nektarios Arnaoutakis  Industrial, Energy and Environmental Systems  MSc, School of Mineral Resources Engineering, Technical University of Crete, Greece. Diploma, School of Production Engineering and Management, Technical University of Crete, Greece.

Vangelis Vountourakis  Dynamic Systems and Simulation Laboratory  MSc in Production Engineering and Management, Technical University of Crete. BS in Physics, University of Crete.

Artemis Kalloataki  Matter Structure and Laser Physics Laboratory  MSc in Applied and Technological Physics and Laser Technology, Technical University of Crete. BS in Physics, University of Crete.

Pavlos Koulouridakis  Computer Aided Design Laboratory (CAD)  PhD, Technical University of Crete. MSc in Environmental Engineering, Technical University of Crete. BS in Physics, University of Crete.

Lia Krsassadaki  Decision Support Systems Laboratory  PhD and MSc in Production Engineering and Management, Technical University of Crete. MSc ICAMAS-Mediterranean Agronomic Institute of Chania. BS in Business Administration. University of Piraeus.

Aggeliki Liadaki  Financial Engineering Laboratory  BS and MSc, Department of Economics, University of Crete.
Magdalene Marinaki  
*Computational Mechanics and Optimization Laboratory*  
PhD, MSc and Diploma, Production Engineering and Management, Technical University of Crete.

Sotirios Batsakis  
*Decision Support Systems Laboratory*  
PhD and MSc in Electrical and Computer Engineering, Technical University of Crete.  
Diploma, Department of Computer Engineering and Informatics. University of Patras.

Bakatsaki Maria  
*Computational Mechanics and Optimization Laboratory and Managements Systems Laboratory*  
PhD, Technical University of Crete. MSc and Diploma in Production Engineering and Management, Technical University of Crete.

George Papadakis  
*Cognitive Ergonomics and Industrial Safety (CEIS) Laboratory*  
PhD and MSc, University of Manchester (UMIST). Diploma in Chemical Engineering, Aristotle University of Thessaloniki.

Marianna Papadomanolaki  
*Applied Mathematics and Computers Laboratory*  
PhD and MSc in Applied and Computational Mathematics, Technical University of Crete.  
BS in Mathematics, University of Crete.

Panagiotis Petrakis  
*Matter Structure and Laser Physics Laboratory*  
MSc, University of Kent, BS in Physics, University of East Anglia.

Savvas Piperidis  
*Intelligent Systems and Robotics Laboratory*  
MSc and PhD in Production Engineering and Management, Technical University of Crete. Diploma, Computer Engineering and Informatics, University of Patras.

Andreas Samaras  
*Decision Support Systems Laboratory*  
MSc in Production Engineering and Management, Technical University of Crete. Diploma in Electrical and Computers Engineering, Aristotle University of Thessaloniki.

Anastasios Sifalakis  
*Applied Mathematics and Computers Laboratory*  
PhD and MSc in Applied and Computational Mathematics, Technical University of Crete. BS in Mathematics, University of Crete.

Nikolaos Spanoudakis  
*Applied Mathematics and Computers Laboratory*  
PhD, Πανεπιστήμιο Paris Descartes. MSc in Production Engineering and Management, Technical University of Crete, Diploma in Computer Engineering and Informatics, University of Patras.

Polychronis Spanoudakis  
*Interdepartmental Machine Tools Laboratory*  
PhD and MSc in Production Engineering and Management, Technical University of Crete. Diploma in Mechanical and Aeronautical Engineering, University of Patras.

George Tsinarakis  
*Computer Aided Manufacturing Laboratory*  
PhD, MSc and Diploma in Production Engineering and Management, Technical University of Crete.

Nektarios Chairetis  
*Interdepartmental Machine Tools Laboratory*  
MSc and PhD in Production Engineering and Management, Technical University of Crete. Diploma in Mechanical Engineering, Aristotle University of Thessaloniki.

### 2.3.2 Specialized Technical Laboratory Personnel (STLP)

The following personnel provide administration and laboratory support:

**Iosif Kontaxakis**  
*Decision Support Systems*  
MSc and Diploma in Electrical and Computer Engineering, Technical University of Crete, Greece.

**Agapi Mavraki**  
*Secretariat*
2.3.3 Administrative personnel

The School administration is supported by permanent Personnel:

**Dorothea Fragomichelaki**  
*Head of Secretariat*  
BA in Business Administration, TEI of Crete (Hellenic Mediterranean University), Greece

**Maria Partsakoulaki**  
*Secretariat*  
BA in Economics, National and Kapodistrian University of Athens, Greece.

**Loukia Papadaki**  
*Postgraduate Programs Secretariat*  
BA in Business Economics, Anglia Polytechnic University (Anglia Ruskin University), UK. MSc in Tourism Business Administration, Hellenic Open University, Greece.
3. Other Information

3.1 Research and collaborations

The School faculty, postdocs, and graduate students carry out significant research work, both independently and in collaboration with national and international partners including universities, companies and other institutions.

The main goal of the School is pursuing joint research with companies to develop, improve, and modernize their assets.

The cooperation with Greek companies offers students with the opportunity to develop their skills through practical training, delving into specific problems and applying acquired knowledge in practice. This cooperation strengthens the connection with the job market and facilitates the professional career of graduates.

The School participates in European Union Research Programs, as well as in programs financed by the Greek General Secretariat for Research and Technology, which, among others, provide opportunities for exchanging students and faculty personnel between the collaborating Universities and companies.

3.2 Honorary doctorates and professors

The following honorary doctorates have been awarded by the School (in chronological order):

- 5 May 1993, Dr. Rudolf Kalman for contributions to the field of automatic control;
- 3 May 1996, Sir David Cox for contributions to the field of modern statistics;
- 10 June 2002, Dr. Bernard Roy for contributions to the field of decision support systems and multicriteria analysis;
- 15 December 2004, Dr. Mohammad Jamshidi for contributions to the field of automatic control;
- 1 September 2008, Dr. Pravin Varaiya for contributions to the field of automatic control and applications to production, communication and transportation systems;
- 10 November 2008, Dr. Roman Słowiński for contributions to the fields of decision support systems, rough sets and soft computing;
- 29 May 2009, Dr. Dimitri Bertsekas for contributions to the field of optimization and operational re-search.
- 12 September 2012, Dr. Asad Madni for contributions to the field of systems design and signal processing.
14 December 2012, Dr. Jaime Gil-Aluja for contributions to the field of decision support under uncertainty.

Also, the following honorary Professors have been awarded by the School (in chronological order):

- 13 November 2014, Dr. Asad M. Madni for contributions to the field of smart sensors, systems design and signal processing.
- 13 June 2018, Dr. Ioannis Siskos for contributions to the field of multicriteria decision analysis.
4. Undergraduate Program and Regulations

4.1 Structure

The academic year starts on September 1st and ends on August 31st of the following year. Each academic year has two semesters, the fall semester and the spring semester. Each course has duration of one semester and includes:

- lectures,
- tutorials,
- laboratory exercises,
- practical training,
- seminars (given by industry experts), and
- visits to production plants and companies.

The undergraduate program has a total duration of ten (10) semesters, with the first nine semesters devoted to coursework and the final semester to a diploma thesis. Courses are grouped into three categories: (a) core (obligatory) courses, (b) electives, and (c) general electives. The undergraduate degree is conferred upon the successful completion of all core courses, a specific number of elective courses and the diploma thesis.

4.2 Program compilation

The detailed curriculum to be adopted for each academic year comprises course offerings decided at the end of the previous spring semester. The detailed curriculum provides the following information for each of the courses to be offered:

- title of course (core and elective);
- number of lecture hours per week;
- number of tutorial hours per week;
- number of laboratory-exercise hours per week;
- credit units, ECTS.

In Section 5 of this document, the detailed curriculum for the academic year 2022-2023 is presented. To aid students with course selection, a study path is also provided giving recommendations for course selection per semester. To ensure successful completion in the allotted time, to account for interdependencies between courses, and to ensure a balanced workload, students are strongly advised to follow the suggested path.

4.3 Academic year and semester duration

The exact start and end dates of each semester and the exam periods can be found in the academic calendar available at https://www.tuc.gr/index.php?id=3624.

Each semester contains a total of 13 weeks of coursework. There is a break of one week between fall and spring semesters. There are no classes on the following holidays:
4.4 Course selection and attendance

Online registration for courses takes place during the first two weeks of each semester. Depending on the individual study plan, each student typically registers for 6 or 7 courses per semester; this represents a typical workload for a full-time student corresponding to 23-35 lecture, tutorial, and laboratory hours per week.

Depending on the semester of attendance, certain limits apply regarding the maximum number of courses that a student may register for credit. During the registration period students are allowed to add or drop courses, but no changes are permitted after the registration period expires. Students are not allowed to participate in labs, exams, or take credit for classes they have not registered. In the undergraduate syllabus fall semesters are odd-numbered and spring semesters are even-numbered.

4.5 Exams - Grading

In the beginning of each semester each instructor provides a course syllabus with the course description, office hours, grading policy, and course requirements. Topics to be covered have to match closely with the approved course contents contained in this student guide. Lecture and tutorial attendance is highly recommended but not mandatory. Students have to successfully complete the course requirements which may include midterm exams, assignments, projects, laboratories, and the final exam which is only given during the final exam period.

In each academic year there are three examination periods: the first, in January, after the end of the fall semester; the second, in June, after the end of the spring semester; and the third, in September, after the end of the summer break. The dates for the exam periods are included in the academic calendar; the exam schedule is announced in advance on the department and university websites. The winter examination period is for courses offered in the fall semester, whereas the summer examination period is for courses offered in the spring semester. Students who miss or fail the final exam of one or more courses, they can retake the final exam in the third examination period in September. Students who fail to pass a course during the two exam periods are required to enroll and repeat the course in the following academic year(s).

The final grade issued by the course instructor represents an overall performance assessment in midterm exams, assignments, projects, laboratory exercises, and the final exam. The grading policy is announced by the instructor at the beginning of each semester. The final grades are announced within a period of fifteen (15) days after the final exam and are given on a scale from zero (0) to ten (10), rounded to the nearest half (½). A grade of five (5) or higher is required for successful completion of the course. A linguistic grade is assigned to the final numerical grade according to the following table:
4.6 Diploma thesis

The diploma project and the writing of diploma thesis have a duration of at least one semester. Diploma thesis topics are assigned and supervised by regular and adjunct faculty members in relevant subject areas. Students can start their diploma theses in any semester, yet they can only defend their thesis after having successfully completed their coursework. Upon completion, students publicly present and defend their thesis before an examination committee comprising three faculty members. The thesis grade is the average of the grades assigned by the three committee members, based on 3 criteria: quality of work (50%), quality of the written text (30%), and quality of the oral presentation and defense (20%). At least two members of the thesis examination committee are regular faculty members of the school and at most one member can be a faculty member of another department or school, a member of the laboratory teaching personnel or adjunct faculty with a PhD, or a researcher of an accredited research institution with proven experience in the thesis topic.

4.7 Annual grade and annual success series

The annual grade of the student is calculated according to the following:

a. The student has successfully attended all the semester courses of the previous academic year (i.e., all the compulsory courses and the relevant number of elective courses as defined by the curriculum), taught by both the PEM School and the other Departments.
b. All semester courses are taken into account for the calculation of the annual grade.
c. To calculate the annual grade, the grade of each course is multiplied by a factor called the course weight and the sum of the individual products is divided by the sum of course weights. Course weights are calculated according to the ECTS credits of each course as it results from the following table:

<table>
<thead>
<tr>
<th>CREDITS (ECTS)</th>
<th>COURSE WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – 2</td>
<td>1.0</td>
</tr>
<tr>
<td>3 – 4</td>
<td>1.5</td>
</tr>
<tr>
<td>&gt;4</td>
<td>2.0</td>
</tr>
</tbody>
</table>

Annual class rankings are calculated every September, after the 2nd examination period. Each class rank corresponds to one of the five (5) years of study and comprises those students who have successfully attended all the semester courses provided in the study program. The four (4) academic years following the student’s first enrollment in the School are considered as the first four years of study. Students beyond these four years are considered to be in the 5th year of study. Annual class rankings are used for the award of scholarships, honorary distinctions, etc.
4.8 Degree requirements

An undergraduate degree is conferred upon successful completion of all the following requirements:

a. **Enrollment Residence Requirement**: Registration in the Department and attendance for at least 10 semesters.

b. **Required Coursework Requirement**: Successful completion (final grade ≥ 5) of all required courses, for a total of 300 ECTS.

c. **Elective Coursework Requirement**: Successful completion (final grade ≥ 5) of a certain number of required electives. Courses are grouped according to their subject areas in seven (7) groups:
   - Group I: Mathematical - Physical Sciences;
   - Group II: Humanities – Foreign Languages;
   - Group III: Electromechanical Systems;
   - Group IV: Information Systems;
   - Group V: Production Systems;
   - Group VI: Operations Research;

   Students should select and successfully complete exactly two (2) courses from electives in Group II and at least: one (1) course from electives in Group III; one (1) course from electives in Group IV; one (1) course from electives in Group V; one (1) course from electives in Group VI; one (1) course from electives in Group VII.

d. **Diploma Thesis Requirement**: Students should successfully complete and defend their diploma thesis.

A total of 300 ECTS are required for the undergraduate degree. The coursework Grade Point Average (GPA) is computed as a weighted average of the grades received for each of the courses successfully completed. The course weights depend on the course ECTS, as tabulated in Section 4.7. The Diploma Grade is computed by adding the course GPA multiplied by a coefficient of 4/5 and the diploma thesis grade multiplied by 1/5.

According to Greek Regulation, the Diploma of Production Engineering and Management is recognized as Integrated Master degree.
5. Undergraduate Curriculum

5.1 Undergraduate Curriculum

### 1st SEMESTER

<table>
<thead>
<tr>
<th>Code</th>
<th>Courses</th>
<th>Lecture</th>
<th>Hours/Week</th>
<th>Credits/ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΜΑΘ 101</td>
<td>Differential and Integral Calculus I</td>
<td>4</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>ΦΥΣ 101</td>
<td>Physics I</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>ΜΠΔ 101</td>
<td>Methodology of Computer Programming</td>
<td>2</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>ΜΠΔ 102</td>
<td>Methodology of Operations Research</td>
<td>2</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>ΜΗΧ 101</td>
<td>Mechanical Drawing</td>
<td>2</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>ΜΑΘ 201</td>
<td>Linear Algebra</td>
<td>3</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

**TOTAL** 15 5 8 30

**General electives**

<table>
<thead>
<tr>
<th>Code</th>
<th>Courses</th>
<th>Lecture</th>
<th>Hours/Week</th>
<th>Credits/ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΓΛΣ 101</td>
<td>English I or German I</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

### 2nd SEMESTER

<table>
<thead>
<tr>
<th>Code</th>
<th>Courses</th>
<th>Lecture</th>
<th>Hours/Week</th>
<th>Credits/ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΜΑΘ 102</td>
<td>Differential and Integral Calculus II</td>
<td>4</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>ΦΥΣ 102</td>
<td>Physics II</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>ΜΗΧ 102</td>
<td>Mechanics – Statics</td>
<td>3</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>ΧΗΜ 103</td>
<td>Chemistry</td>
<td>2</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>ΜΠΔ 121</td>
<td>Electric Circuits</td>
<td>3</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>ΜΠΔ 122</td>
<td>Algorithms and Data Structures</td>
<td>2</td>
<td>2</td>
<td>5</td>
</tr>
</tbody>
</table>

**TOTAL** 16 2 8 30

**General electives**

<table>
<thead>
<tr>
<th>Code</th>
<th>Courses</th>
<th>Lecture</th>
<th>Hours/Week</th>
<th>Credits/ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΓΛΣ 102</td>
<td>English II or German II</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
### 3rd SEMESTER

<table>
<thead>
<tr>
<th>Code</th>
<th>Courses</th>
<th>Lecture</th>
<th>Hours/Week</th>
<th>Credits/ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΝΑΘ 203</td>
<td>Ordinary Differential Equations</td>
<td>3</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>ΜΠΔ 204</td>
<td>Probability for Engineers</td>
<td>3</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ΜΗΧ 201</td>
<td>Mechanics – Strength of materials</td>
<td>3</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>ΜΠΔ 202</td>
<td>Science and Technology of Materials</td>
<td>3</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>ΜΠΔ 208</td>
<td>Environmental Analysis and Planning</td>
<td>3</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>ΓΛΣ 201</td>
<td>English III or</td>
<td>2</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>ΓΛΣ 203</td>
<td>German III</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Required electives: Students should select one (1) course from the following list:*

<table>
<thead>
<tr>
<th>Code</th>
<th>Courses</th>
<th>Lecture</th>
<th>Hours/Week</th>
<th>Credits/ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΚΕΠ 203</td>
<td>Philosophy and History of Science (III)</td>
<td>3</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ΜΠΔ 203</td>
<td>Electronics (III)</td>
<td>3</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>ΚΕΠ 101</td>
<td>Sociology (II)</td>
<td>3</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**TOTAL**  

<table>
<thead>
<tr>
<th></th>
<th>Lecture</th>
<th>Hours/Week</th>
<th>Credits/ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20</td>
<td>5</td>
<td>1-3</td>
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</tbody>
</table>

*General electives*

<table>
<thead>
<tr>
<th>Code</th>
<th>Courses</th>
<th>Lecture</th>
<th>Hours/Week</th>
<th>Credits/ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΚΙΝ 101</td>
<td>Chinese I</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

### 4th SEMESTER

<table>
<thead>
<tr>
<th>Code</th>
<th>Courses</th>
<th>Lecture</th>
<th>Hours/Week</th>
<th>Credits/ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΝΑΘ 202</td>
<td>Numerical Analysis</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>ΜΠΔ 228</td>
<td>Engineering Statistics</td>
<td>3</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ΜΠΔ 221</td>
<td>Linear Programming</td>
<td>2</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>ΜΠΔ 305</td>
<td>Machine Elements</td>
<td>2</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>ΓΛΣ 202</td>
<td>English IV or</td>
<td>2</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>ΓΛΣ 204</td>
<td>German IV</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Required electives: Students should select one (1) course from the following list:*

<table>
<thead>
<tr>
<th>Code</th>
<th>Courses</th>
<th>Lecture</th>
<th>Hours/Week</th>
<th>Credits/ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΚΕΠ 102</td>
<td>Political Economy (II)</td>
<td>3</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ΚΕΠ 202</td>
<td>History of Civilization (II)</td>
<td>3</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ΚΕΠ 302</td>
<td>Industrial Sociology (II)</td>
<td>3</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ΜΠΔ 407</td>
<td>Game Theory (VI)</td>
<td>3</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>ΚΕΠ 104</td>
<td>Introduction to Philosophy (II)</td>
<td>3</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**TOTAL**  

<table>
<thead>
<tr>
<th></th>
<th>Lecture</th>
<th>Hours/Week</th>
<th>Credits/ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>15</td>
<td>7</td>
<td>1-3</td>
</tr>
</tbody>
</table>

*General electives*

<table>
<thead>
<tr>
<th>Code</th>
<th>Courses</th>
<th>Lecture</th>
<th>Hours/Week</th>
<th>Credits/ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΚΙΝ 102</td>
<td>Chinese II</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
# 5th Semester

<table>
<thead>
<tr>
<th>Code</th>
<th>Courses</th>
<th>Lecture</th>
<th>Hours/Week</th>
<th>Credits/ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΜΠΔ 301</td>
<td>Production Technology I</td>
<td>4</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>ΜΠΔ 303</td>
<td>Stochastic Processes</td>
<td>4</td>
<td>-</td>
<td>5</td>
</tr>
<tr>
<td>ΜΠΔ 222</td>
<td>Management Systems and Processes</td>
<td>3</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>ΜΠΔ 224</td>
<td>Thermodynamics</td>
<td>3</td>
<td>1</td>
<td>5</td>
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<tr>
<td>ΜΠΔ 426</td>
<td>Combinatorial Optimization</td>
<td>3</td>
<td>2</td>
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</tbody>
</table>

*Required electives: Students should select one (1) course from the following list:*

<table>
<thead>
<tr>
<th>Code</th>
<th>Courses</th>
<th>Lecture</th>
<th>Hours/Week</th>
<th>Credits/ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΚΕΠ 201</td>
<td>Micro-Macro Economics (II)</td>
<td>3</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>ΚΕΠ 301</td>
<td>Art and Technology (II)</td>
<td>3</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>ΜΠΔ 230</td>
<td>Electronic Business</td>
<td>2</td>
<td>-</td>
<td>4</td>
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<tr>
<td>ΜΠΔ 505</td>
<td>Ergonomic Work Analysis (VII)</td>
<td>2</td>
<td>1</td>
<td>4</td>
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<tr>
<td>ΜΠΔ 432</td>
<td>Structural Dynamics, Vibrations and Control (III)</td>
<td>2</td>
<td>2</td>
<td>4</td>
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</table>

**TOTAL**

<table>
<thead>
<tr>
<th>Code</th>
<th>Courses</th>
<th>Lecture</th>
<th>Hours/Week</th>
<th>Credits/ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>19-20</td>
<td>2-4</td>
<td>4-6</td>
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</table>

*General electives*

<table>
<thead>
<tr>
<th>Code</th>
<th>Courses</th>
<th>Lecture</th>
<th>Hours/Week</th>
<th>Credits/ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΚΙΝ 103</td>
<td>Chinese III</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

# 6th Semester

<table>
<thead>
<tr>
<th>Code</th>
<th>Courses</th>
<th>Lecture</th>
<th>Hours/Week</th>
<th>Credits/ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΜΠΔ 321</td>
<td>Production Technology II</td>
<td>4</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>ΜΠΔ 322</td>
<td>Production Systems</td>
<td>4</td>
<td>-</td>
<td>5</td>
</tr>
<tr>
<td>ΜΠΔ 324</td>
<td>Decision Support Systems</td>
<td>2</td>
<td>-</td>
<td>5</td>
</tr>
<tr>
<td>ΜΠΔ 325</td>
<td>Non-Linear Programming</td>
<td>2</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>ΜΠΔ 223</td>
<td>Fluid Mechanics</td>
<td>3</td>
<td>-</td>
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</tr>
</tbody>
</table>

*Required electives: Students should select one (1) course from the following list:*

<table>
<thead>
<tr>
<th>Code</th>
<th>Courses</th>
<th>Lecture</th>
<th>Hours/Week</th>
<th>Credits/ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΜΠΔ 306</td>
<td>Introduction to Artificial Intelligence (IV)</td>
<td>3</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>ΜΠΔ 323</td>
<td>Data Analysis (VII)</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>ΜΠΔ 302</td>
<td>Human Resource Management (IV)</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>ΚΕΠ 204</td>
<td>Elements of Law and Technical Legislation (II)</td>
<td>3</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>ΜΠΔ 436</td>
<td>Technical Design of Building Electromechanical Services (III)</td>
<td>2</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>ΜΠΔ 329</td>
<td>Sustainable Finance (VII)</td>
<td>2</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>ΜΠΔ 327</td>
<td>Power Electronics and Applications (III)</td>
<td>3</td>
<td>-</td>
<td>4</td>
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</tbody>
</table>

**TOTAL**

<table>
<thead>
<tr>
<th>Code</th>
<th>Courses</th>
<th>Lecture</th>
<th>Hours/Week</th>
<th>Credits/ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>17-18</td>
<td>2-4</td>
<td>4-6</td>
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</tbody>
</table>

*General electives*

<table>
<thead>
<tr>
<th>Code</th>
<th>Courses</th>
<th>Lecture</th>
<th>Hours/Week</th>
<th>Credits/ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΜΠΔ 328</td>
<td>Practical Training I</td>
<td></td>
<td>5/μήνα</td>
<td></td>
</tr>
<tr>
<td>ΚΙΝ 104</td>
<td>Chinese IV</td>
<td>2</td>
<td>2</td>
<td>3</td>
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</table>
### 7th Semester

<table>
<thead>
<tr>
<th>Code</th>
<th>Courses</th>
<th>Lecture</th>
<th>Hours/Week</th>
<th>Credits/ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΜΠΔ 401</td>
<td>Control Systems I</td>
<td>3</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>ΜΠΔ 402</td>
<td>Financial Management</td>
<td>2</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>ΜΠΔ 405</td>
<td>Quality Control</td>
<td>2</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>ΜΠΔ 406</td>
<td>Marketing</td>
<td>3</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>ΜΠΔ 304</td>
<td>Heat Transfer</td>
<td>3</td>
<td>1</td>
<td>-</td>
</tr>
</tbody>
</table>

**Required electives:** Students should select one (1) course from the following list:

- ΜΠΔ 504  1 Environmental Science and Technology  2  2  -  4
- ΜΠΔ 517  2 Energy and Environmental Economics (III)  2  -  2  4
- ΜΠΔ 435  3 Enterprise Resource-Planning Systems (ERP/CRM) (IV)  2  -  2  4
- ΜΠΔ 410  4 Occupational Health and Safety at Work (VII)  2  1  -  4

**TOTAL** 15  4-6  6-8  30

### 8th Semester

<table>
<thead>
<tr>
<th>Code</th>
<th>Courses</th>
<th>Lecture</th>
<th>Hours/Week</th>
<th>Credits/ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΜΠΔ 421</td>
<td>Production Networks (CAM)</td>
<td>4</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>ΜΠΔ 422</td>
<td>Decision Investment Analysis</td>
<td>2</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>ΜΠΔ 423</td>
<td>Computer-Aided Design (CAD)</td>
<td>3</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>ΜΠΔ 424</td>
<td>Ergonomics</td>
<td>3</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>ΜΠΔ 326</td>
<td>Hydrodynamic and Combustion Engines</td>
<td>3</td>
<td>1</td>
<td>-</td>
</tr>
</tbody>
</table>

**Required electives:** Students should select two (2) courses from the following list:

- ΜΠΔ 434  1 Microscale Manufacturing Technologies (III)  1  -  3  4
- ΜΠΔ 425  2 Dynamic Programming (VI)                       | 2       | 1          | 2            | 4            |
- ΜΠΔ 430  3 Control Systems II (V)                         | 3       | -          | 2            | 4            |
- ΜΠΔ 515  4 Computational Mechanics (III)                  | 3       | -          | 2            | 4            |
- ΜΠΔ 408  5 Total Quality Management (VII)                 | 3       | -          | -            | 4            |
- ΜΠΔ 433  6 Small and Medium Enterprises (SMEs) and Innovation (VII) | 2       | -          | 2            | 4            |
- ΜΠΔ 506  7 Strategic Planning (VII)                       | 3       | -          | -            | 4            |
- ΜΠΔ 516  8 Renewable Energy Sources (III)                | 3       | -          | -            | 4            |
- ΜΠΔ 428  9 Non-Metallic Materials Technology (III)        | 2       | 1          | -            | 4            |
- ΜΠΔ 438  10 Environmental Impact Assessment Studies (V)   | 2       | 1          | -            | 4            |

**TOTAL** 18-21  1-3  9-14  30

**General electives**

- ΜΠΔ 437  Practical Training II  5/month

**Field Trip**
### 9th SEMESTER

<table>
<thead>
<tr>
<th>Code</th>
<th>Courses</th>
<th>Lecture</th>
<th>Hours/Week</th>
<th>Credits/ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΜΠΔ 502</td>
<td>Introduction to Robotics</td>
<td>3</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>ΜΠΔ 409</td>
<td>Project and Production Management and Scheduling</td>
<td>2</td>
<td>2</td>
<td>-</td>
</tr>
</tbody>
</table>

**Required electives:** Students should select four (4) courses from the following list:

<table>
<thead>
<tr>
<th>Code</th>
<th>Courses</th>
<th>Lecture</th>
<th>Hours/Week</th>
<th>Credits/ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΜΠΔ 431</td>
<td>Mechatronics (V or VI)</td>
<td>2</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>ΜΠΔ 501</td>
<td>Simulation (V)</td>
<td>4</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>ΜΠΔ 518</td>
<td>Business Intelligence, Analytics and Big Data</td>
<td>2</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Analysis (IV)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΜΠΔ 519</td>
<td>Product Modeling and Manufacturing (V)</td>
<td>2</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>ΜΠΔ 514</td>
<td>Design and Optimization in Supply Chain Management (VI)</td>
<td>3</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>ΜΠΔ 427</td>
<td>Financial Engineering (VII)</td>
<td>2</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>ΜΠΔ 507</td>
<td>Technological Forecasting (VII)</td>
<td>2</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>ΜΠΔ 510</td>
<td>Engineering Economics and Business Plan Analysis (VII)</td>
<td>3</td>
<td>-</td>
<td>2</td>
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</tbody>
</table>

**TOTAL**

<table>
<thead>
<tr>
<th></th>
<th>Lecture</th>
<th>Hours/Week</th>
<th>Credits/ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>13-17</td>
<td>2-5</td>
<td>6-10</td>
</tr>
</tbody>
</table>

**General electives**

| ΣΕΜ 101 | 3D Scanning | 2 | - | 2 | 3 |

### 10th SEMESTER

<table>
<thead>
<tr>
<th>Code</th>
<th>Courses</th>
<th>Lecture</th>
<th>Hours/Week</th>
<th>Credits/ECTS</th>
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</thead>
<tbody>
<tr>
<td>ΔΙΠ</td>
<td>Diploma Thesis</td>
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</table>

**TOTAL**

<table>
<thead>
<tr>
<th></th>
<th>Lecture</th>
<th>Hours/Week</th>
<th>Credits/ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**General electives**

| ΣΕΜ 102 | 3D Printing | 2 | - | 2 | 3 |

**TOTAL ECTS**

|                  | 300      |

300 ECTS are required to fulfill the requirements for the Diploma of Production Engineering and Management. Students must successfully complete at least one (1) and no more than two (2) courses from the electives in Group II and at least one (1) course from the electives of each Group III, IV, V, VI and VII.
<table>
<thead>
<tr>
<th>Group II</th>
<th>Group III</th>
<th>Group IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humanities - Foreign Languages</td>
<td>Electromechanical Systems</td>
<td>Information Systems</td>
</tr>
<tr>
<td>1. Art and Technology</td>
<td>1. Electronics</td>
<td>1. Electronic Business</td>
</tr>
<tr>
<td>2. Micro-Macro Economics</td>
<td>2. Dynamics, Vibrations and Control of Structures</td>
<td>2. Introduction to Artificial Intelligence</td>
</tr>
<tr>
<td>5. Philosophy and History of Science</td>
<td>5. Computational Mechanics</td>
<td></td>
</tr>
<tr>
<td>8. Introduction to Philosophy</td>
<td>8. Power Electronics and Applications</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10. Microscale Manufacturing Technologies</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group V</th>
<th>Group VI</th>
<th>Group VII</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production Systems</td>
<td>Operational Research</td>
<td>Engineering Management</td>
</tr>
<tr>
<td>1. Simulation</td>
<td>1. Game Theory</td>
<td>1. Data Analysis</td>
</tr>
<tr>
<td>2. Συστήματα Ελέγχου II</td>
<td>2. Dynamic Programming</td>
<td>2. Occupational Health and Safety at Work</td>
</tr>
<tr>
<td>5. Environmental Analysis and Planning</td>
<td></td>
<td>5. Small and Medium Enterprises (SMEs) and Innovation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7. Strategic Planning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8. Technological Forecasting</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9. Engineering Economics and Business Plan Analysis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11. Sustainable Finance</td>
</tr>
</tbody>
</table>

Group I, not listed above, consists of core (obligatory/required) courses in mathematics and natural sciences.
5.2 Course descriptions

<table>
<thead>
<tr>
<th>Group I (Mathematical-Physical Sciences)</th>
<th>Required Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIFFERENTIAL AND INTEGRAL CALCULUS I (ECTS 5)</td>
<td>(ΜΑΘ 101)</td>
</tr>
<tr>
<td>DIFFERENTIAL AND INTEGRAL CALCULUS II (ECTS 5)</td>
<td>(ΜΑΘ 102)</td>
</tr>
<tr>
<td>LINEAR ALGEBRA (ECTS 5)</td>
<td>(ΜΑΘ 201)</td>
</tr>
<tr>
<td>NUMERICAL ANALYSIS (ECTS 5)</td>
<td>(ΜΑΘ 202)</td>
</tr>
<tr>
<td>ORDINARY DIFFERENTIAL EQUATIONS (ECTS 5)</td>
<td>(ΜΑΘ 203)</td>
</tr>
<tr>
<td>PROBABILITY FOR ENGINEERS (ECTS 5)</td>
<td>(ΜΠΔ 204)</td>
</tr>
<tr>
<td>ENGINEERING STATISTICS (ECTS 6)</td>
<td>(ΜΠΔ 228)</td>
</tr>
</tbody>
</table>
STOCHASTIC PROCESSES (ECTS 5) (ΜΠΔ 303)


PHYSICS I (ECTS 5) (ΦΥΣ 101)


Laboratory: Familiarization with the operation and use of measuring instruments, the methods of experimental data analysis. Application of error theory, graphical representation of data using the least squares method. Topics covered during the experimental exercises include: mechanics, kinematics, heat - calorimetry and hydrodynamics. Introduction to the use of spreadsheets (Excel) for use in experimental data processing and graphical representations.

PHYSICS II (ECTS 5) (ΦΥΣ 102)


Laboratory: Training in the use of electronic and electrical measuring instruments such as: oscilloscope, frequency generators, multimeter, power supply, spectrometer, and Mickelson’s interferometer. Topics covered during the experimental exercises include: electric circuits, RLC circuits, electromagnetism, wave theory, optics and optoelectronics.

CHEMISTRY (ECTS 5) (ΧΗΜ 103)


Group II (Humanities-Foreign Languages)

Required Courses

ENGLISH III OR GERMAN III (ECTS 3) (ΓΛΣ 201 ή ΓΛΣ 203)

English III: English III combines an independent study program in the Language Center with a series of department- and field-of-study-specific work modules. These modules focus on developing verbal, written and comprehension language skills. Students are required to register and participate in the e-class of this course as
well as use the required or recommended resources of the Language Center. The final grade is determined by a series of assignments and quizzes throughout the semester and a final exam.

**German III:** In German III special emphasis is placed on the introduction of students to technical terminology both in verbal and written communication. In this class students are trained using articles and technical texts properly adapted to the type of exercise and their field of study. The goals of the class are to further enhance writing and comprehension skills developed as part of the German I and II courses. Complementary to regular lectures, students are encouraged to utilize department- and field-of-study-specific audio-visual material available at the Language Center as well as electronically available exercises.

**ENGLISH IV OR GERMAN IV (ECTS 3)**

**English IV:** Students in English IV will be required to study texts and vocabulary using material related to their fields of study. Students are expected to register and participate in the e-class of the class and use the required or recommended resources of the Language Center. Assignments and quizzes in the duration of the semester in conjunction with a final exam are used to determine the student's final grade.

**German IV:** Students following the sequence of German courses in the Technical University of Crete have significantly developed their German language skills. The aim of this course is to further enhance language skills through complex texts and exercises, and help students reach a language competence at the level of Mittelstufe (ZMP). Complementary to regular lectures, students are encouraged to utilize department- and field-of-study-specific audio-visual material available at the Language Center as well as electronically available exercises.

Students can register in practice groups to further enhance verbal and writing communication skills.

### Elective Courses

#### Group II (Humanities-Foreign Languages)

**Sociology (ECTS 4)**

The course is an introduction to Sociology, with detailed and combining study of concepts related to basic components of the social context within which the human productive activity is taking place. Concepts elaborated include: society, social positions and roles, social change, social stratification and mobility, social categories and classes, socio-political institutions, socio-economic institutions and transformations.

**Political Economy (ECTS 4)**

Includes an analysis of basic notional categories and relations in Political Economy, as well as a brief review of recent economic history. Particular references are made to: the theory of valuation, surplus value, pricing, the relationship between competition and distribution, the fundamental trends and incongruities of amplification, and financial crisis phenomena.

**Micro-Macro Economics (ECTS 4)**

Includes an analysis of commodity supply and demand, consumer theory and corporate theory. On a macroscopic level the issues analyzed include the income and employment determination, inflation, the role of investments, and the problems or development trends within the world economy.

**History of Civilization (ECTS 4)**

The objective of the course is the introduction to the history of culture and the critical analysis of basic concepts and theories of philosophy and of social sciences on culture. Philosophy and culture, theoretical and interdisciplinary approach to the structure and history of culture. The relation between “culture” and “civilization”, the mental and the material culture. Continuity and discontinuity, modernism and traditions, progress, and regression in the history of culture, evolution, and development. Socioeconomic formations and types of culture in history. Causality and determinism and historical inevitability. Activity and communication in forming and developing culture and personality. Periodisation criteria. Global, general, and specific, panhuman, national, and local. Freedom and necessity. Cultural identity, dialogism of cultures and multiculturalism. Alienation and “mass culture”. Nationalism, xenophobia, racism, cosmopolitism, “globalization”, cultural imperialism, and internationalization. Ideology, value orientations, values, evaluations, meritocracy, and crisis of values. Modernity and post-modernity.
PHILOSOPHY AND HISTORY OF SCIENCE (ECTS 4)  
Science as a social-cultural phenomenon. The role of science within the social structure. Theoretical issues concerning knowledge, logic and methodology of scientific research. Sciences in History. Differentiation, integration and interdisciplinarity of science. Traditions and innovations in the development of science. The subject of scientific activity. Philosophy of science: theories, trends, and different approaches.

INTRODUCTION TO PHILOSOPHY (ECTS 4)  
A brief review of the history of philosophy. From myth to logos. Fundamental philosophical concepts, categories, and dialectical laws in the areas of theory of knowledge, ontology, and logic (formal and dialectical). Philosophy, science, and technology. Elements of social philosophy: the structure of the development of society as an organic whole, the social consciousness, and its forms. Philosophy as: a necessary element of personality consciousness, self-awareness, and self-consciousness of the culture of each era.

ELEMENTS OF LAW AND TECHNICAL LEGISLATION (ECTS 4)  
Introduction to legal systems (the role of law, the legal theory of state, ASP of human rights), industrial relations (introductions to the individual contract of employment, trade union rights, collective bargaining, industrial accidents and hygiene and safety at work), introduction to the law of environment protection (principles of environment protection constitutional and general law protection), introduction to the law of natural resources (principles of rights for exploration and exploitation of natural resources in the constitution and the general law).

ART AND TECHNOLOGY (ECTS 4)  
Technology and Art within the social structure. Technology as objectification, as a framework for human impact on nature and for the relations among people, as a forerunning conception-knowledge and as an instrument implicated upon Nature. The particularity of the aesthetic moment. The aesthetic moment as a specific activity in the division of labor (Art). Art and technology in the. Metaphysical discourse on “Appolloniean” and “Dionysean” elements.

INDUSTRIAL SOCIOLOGY (ECTS 4)  
The scope of the course falls within the field of Sociology of Labor and of Development and has at its core the changes of the productive systems in general and more specifically in the processing sector (crafts, industry), in combination with related sectors of productive and scientific activity. Issues related to industrial relations, productive processes, research, and development (R&D), know-how, industrial policy, inter-sectoral and inter-industrial relations are investigated in detail and in a combinational manner, on several scales (international, national, local-regional).

**Group III (Electromechanical Systems)**  
**Required Courses**

MECHANICAL DRAWING (ECTS 5)  
(MΗΧ 101)

MECHANICS – STATICS (ECTS 5)  
(MΗΧ 102)

MECHANICS – STRENGTH OF MATERIALS (ECTS 5)  
(MΗΧ 201)
ELECTRIC CIRCUITS (ECTS 5)  

Laboratory: Simulation of electric circuits using the LTSPICE software.

SCIENCE AND TECHNOLOGY OF MATERIALS (ECTS 4)

FLUID MECHANICS (ECTS 5)

THERMODYNAMICS (ECTS 5)

HEAT TRANSFER (ECTS 5)

Machine Elements (ECTS 6)

HYDRODYNAMIC AND COMBUSTION ENGINES (ECTS 4)
volute. Isentropic efficiencies, flow coefficient, load coefficient, degree of reaction. Shaft-power gas turbines; ideal and non-ideal air standard basic cycles (Joule-Brayton); modified cycles (preheat, steam injection, water injection, air intercooling, reheat). Closed-cycle gas turbines. Radial flow pumps; general principles of design and operation, velocity triangles, ideal efficiency, optimum flow rate, ideal and actual impeller’s characteristic curve, hydraulic efficiency, volumetric efficiency, mechanical efficiency. Characteristic curves and their modification with rotation speed. Pump’s operating point, pump selection, combination of pumps (serial, parallel, mixed designs).

**ROBOTICS (ECTS 5)**


**Laboratory:** Analysis of robotic manipulators in a simulated environment (Using Matlab/Octave). Develop simulated models (ROS/Gazebo). Robotics actuators and sensors. Mobile robots (using simulated and real TurtleBot robots).

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**Group III (Electromechanical Systems)**

**Elective Courses**

**Electronics (ECTS 4)**


**POWER ELECTRONICS AND APPLICATIONS (ECTS 4)**


**Structural Dynamics, Vibrations and Control (ECTS 4)**


**Laboratory:** Solution of dynamics and vibration examples using educational software (codes in MATLAB/SIMULINK and compatible software). Demonstration of specialized software for dynamics and vibrations of multi-body-dynamics and the finite element method.
TECHNICAL DESIGN OF BUILDING ELECTROMECHANICAL SERVICES (ECTS 4) (ΜΠΔ 436)


**Laboratory:** Introduction to AutoCAD. Description of the environment of the software and basic commands for drawing and editing. Drawing of Blocks. Advanced drawing commands. Electromechnical installations drawing. Basics of AutoLisp programming language.

ENVIRONMENTAL SCIENCE AND TECHNOLOGY (ECTS 4) (ΜΠΔ 504)


COMPUTATIONAL MECHANICS (ECTS 4) (ΜΠΔ 515)


**Laboratory:** Solution of computational mechanics examples using the finite element method and educational software (MATLAB and compatible software codes, or alternatively FORTRAN, C, BASIC codes). Solution of more complicated examples using general purpose finite element software (free codes like Z88, code aster) and demonstration of commercial codes (COMSOL).

RENEWABLE ENERGY SOURCES (ECTS 4) (ΜΠΔ 516)


ENERGY AND ENVIRONMENTAL ECONOMICS (ECTS 4) (ΜΠΔ 517)


NON-METALLIC MATERIALS TECHNOLOGY (ECTS 4) (ΜΟΠ 428)

MICROSCALE MANUFACTURING TECHNOLOGIES (ECTS 4) (ΜΠΔ 434)


**Laboratory:** Manufacturing of mold with free form surfaces using CNC Machine Tools and CAD/CAM software.

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**Group IV (Information Systems)**

**Required Courses**

Methodology of Computer Programming (ECTS 5) (ΜΠΔ 101)

Introduction to computer science, evolution of computers (hardware and software), structure and operation of a computer system, architectures, operating systems. Introduction to algorithms and data structures. Development environments, programming languages, program development methodologies (pseudocode, flow charts). Constants and variables, basic data types. Assignment statements. Input/output statements. Control statements. Operators and precedence. Loops. Structured data types. User defined data types.

**Laboratory:** Programming applications in C language.

ALGORITHMS AND DATA STRUCTURES (ECTS 5) (ΜΠΔ 122)

Analysis of algorithms, C programming (pointers, input/output from/to files, structures, unions, enumerations). Abstract data types, stacks, queues, lists, trees, binary trees, binary search trees. Recursive algorithms. Search and sorting algorithms.

**Laboratory:** Programming exercises using the C language for pointers, input/output from/to files, structures, recursive algorithms, Abstract data types stacks, lists, sorting algorithms.

DECISION SUPPORT SYSTEMS (ECTS 5) (ΜΠΔ 324)


**Laboratory:** Training and use of the following software packages: Excel: Pivot Tables – Solver; Expert Choice, UTASTAR, MUSA and MUSA Plus, MARKEX.

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**Group IV (Information Systems)**

**Elective Courses**

ELECTRONIC BUSINESS (ECTS 4) (ΜΠΔ 230)


**Laboratory:** Programming and applications development in web environment (Java, HTML, Active X).

**INTRODUCTION TO ARTIFICIAL INTELLIGENCE (ECTS 4)** (ΜΠΔ 306)


**ENTERPRISE RESOURCE PLANNING SYSTEMS (ECTS 4)** (ΜΠΔ 435)

Introduction to Information Systems, Enterprise resource planning systems (ERPs), Customer Relationship Management Systems (CRMs), System architectures, components, modules and technical infrastructure of ERPs, System’s analysis and design, Business processes in ERPs, Business Process Reengineering, Specific ERP components (Manufacturing, Financials, Supply chain management, Warehouse Management, Distribution, Marketing, Sales, Human Resources Management, Logistics), Operations that ERP support, pros and cons of using ERPs, E-commerce and ERP, Business Intelligence and ERP, ERP and Data Warehouses – OLAP, Success factors of ERPs, Feasibility study of getting an ERP, Evaluating, selecting, installing, configuring and customizing an ERP, Production Planning through ERPs, Material requirements and resource planning (MRP I and MRP II), Demonstration of the MBS Navision ERP, MBS Navision CRM. Special issues: Enterprise Application Integration, Interoperability, Service-Oriented Computing, Web Services.

**BUSINESS INTELLIGENCE AND BUSINESS ANALYTICS. KNOWLEDGE MANAGEMENT (ECTS 5)** (ΜΠΔ 518)


**Group V (Production Systems)**

**Required Courses**

**MANUFACTURING TECHNOLOGY I (ECTS 6)** (ΜΠΔ 301)


**MANUFACTURING TECHNOLOGY II (ECTS 6)** (ΜΠΔ 321)


**PRODUCTION SYSTEMS (ECTS 5)** (ΜΠΔ 322)

Introduction. Inventory systems with static and dynamic demand. Production planning: static mixing problems, aggregate production planning, process planning. Stochastic demand, single-replenishment (newsvendor) model. Multi-item economic lot sizing and sequence-dependent setup scheduling problems. Demand forecasting: linear regression, moving average, simple exponential smoothing, minimum mean square error,
Bayes estimation, Box-Jenkins (ARMA) models. Production scheduling: sequencing of n jobs in one machine and in two- and three-machine flow lines. Single-machine sequencing with due dates and with required precedence among jobs.

CONTROL SYSTEMS I (ECTS 6)  

Laboratory: Introduction to MATLAB, Control-related functions and computational codes, Design and Simulation of control-based problems, Individual student projects.

QUALITY CONTROL (ECTS 5)  

PRODUCTION NETWORKS (CAM) (ECTS 6)  
Production Networks (CAM): Introduction. Continuous time Markov chains, Kolmogorov equations. Birth-death models, steady state, stability. M/M/1 system and extensions. Non-birth-death Markovian models: Erlang distribution, z transform, batch arrivals/service, Burke theorem, open Jackson networks. Advanced models: M/G/1, M/G/m/m, G/G/1, G/G/m. Introduction to flexible manufacturing systems (FMS) – analytical tools and control issues.

Laboratory: Review of mathematical tools used in the theoretical part of the course. Introduction to CNC machines programming. G and M code CNC programming. Denford Orac lathe and Haas Minimill CNC machines programming for the manufacturing of products with given specifications.

COMPUTER-AIDED DESIGN (CAD) (ECTS 4)  

Laboratory: Siemens NX

ENVIRONMENTAL ANALYSIS AND PLANNING (ECTS 5)  

Group V (Production Systems)  
Elective Courses

CONTROL SYSTEMS II (ECTS 4)  
Laboratory: Advanced model-based control simulations, applications on engineering aspects (energy, environmental and mechanical related).

**SIMULATION (ECTS 5)**  
(MΠΔ 501)

Laboratory: Introduction to simulation software. Simulation of simple queuing systems with one server and several servers in parallel and production lines.

**MECHATRONICS (ECTS 5)**  
(MΠΔ 431)

Laboratory: Simulation of NeuroFuzzy systems and applications in mechatronic systems (Using Matlab/Octave).

**PRODUCT MODELLING AND MANUFACTURING (ECTS 5)**  
(MΠΔ 519)

Laboratory: CAD Shape Studio Siemens NX and NC Manufacturing, NX- manufacturing turning, milling, post builder. MK Rapid Tooling system. Rapid prototyping machines (FDM) and Metal prototyping (DED).

**ENVIRONMENTAL IMPACT ASSESSMENT STUDIES (ECTS 4)**  
(MΠΔ 438)
The Greek legal framework for environmental permitting is presented, involving the steps required for an Environmental Impact Assessment Study. A thorough discussion on Articles of the L.4014/11 “Environmental Permitting of Projects and Operations” takes place. Students are evaluated on their ability to classify projects in the basic categories and subcategories (A1, A2, B) specified in the legal framework. The Environmental Permit Process for Small Project and Activities (B class) is analyzed and representative projects, from those more relevant to the students’ field of study, are studied: hydraulic, environmental infrastructure, commercial centres, parking - sport –education facilities, electric power production, car service stations, renewable energy, and high voltage centres. The content of the environmental impact assessment studies is detailed. Finally, public consultation legal framework for environmental impact assessment studies is presented.

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**Group VI (Operational Research)**

**Required Courses**

**METHODOLOGY OF OPERATIONS RESEARCH (ECTS 5)**  
(MΠΔ 102)
Methodological framework of operations research. Introduction to graph theory with applications to project management. Inventory control. Wilson’s model and extensions. Introduction to linear programming. Multiple-criteria decision making, Case studies.

**LINEAR PROGRAMMING (ECTS 6)**  
(MΠΔ 221)
NON-LINEAR PROGRAMMING (ECTS 5)  (ΜΠΔ 325)

PROJECT AND PRODUCTION MANAGEMENT AND SCHEDULING (ECTS 5)  (ΜΠΔ 409)

COMBINATORIAL OPTIMIZATION (ECTS 5)  (ΜΠΔ 426)

Group VI (Operational Research)

Elective Courses

GAME THEORY (ECTS 4)  (ΜΠΔ 407)

DYNAMIC PROGRAMMING (ECTS 4)  (ΜΠΔ 425)

MECHATRONICS (ECTS 5)  (ΜΠΔ 431)

Laboratory: Simulation of NeuroFuzzy systems and applications in mechatronic systems (Using Matlab/Octave).

DESIGN AND OPTIMIZATION IN SUPPLY CHAIN MANAGEMENT (ECTS 5)  (ΜΠΔ 514)
Group VII (Engineering Management)

Required Courses

**MANAGEMENT SYSTEMS AND PROCESSES (ECTS 5)**


**FINANCIAL MANAGEMENT (ECTS 5)**


**MARKETING (ECTS 5)**


**Decision Investment Analysis (ECTS 4)**


**ERGONOMICS (ECTS 4)**

Ergonomic approaches to occupational safety, safety management systems, factors affecting human performance, human information processing and mental processes, task analysis and human reliability, risk assessment using failure and event trees, occupational hazards, musculoskeletal disorders, accident analysis techniques, ergonomic design of safety measures, staff training in high-risk facilities, participatory ergonomics, business safety culture.

Elective Courses

**DATA ANALYSIS (ECTS 4)**

OCCUPATIONAL HEALTH AND SAFETY AT WORK (ECTS 4)  (ΜΠΔ 410)
Principles of safety in the workplace, legal framework for the HSE, methodologies for assessing occupational hazards, hierarchical framework for considering safety measures and good practices, accident analysis, risks from work at heights, precautions against machinery hazards, safety measures for heavy vehicles, hazards of electricity and electromagnetic radiation, fires and explosive atmospheres, manual handling, noise and oscillation hazards, temperature environment, chemical and biological hazard control, welding work and work at confined spaces.

TOTAL QUALITY MANAGEMENT (ECTS 4)  (ΜΠΔ 408)

FINANCIAL ENGINEERING (ECTS 5)  (ΜΠΔ 427)

SMALL AND MEDIUM ENTERPRISES (SMES) AND INNOVATION (ECTS 4)  (ΜΠΔ 433)

ERGONOMIC WORK ANALYSIS (ECTS 4)  (ΜΠΔ 505)
General model of ergonomic interventions, ergonomic work analysis, human reliability analysis, design of noise reduction measures, design of thermal environment, design of control panels and lighting environment, anthropometry and workplace design, design of computer workstations, design of hand tools, musculoskeletal loads, human information processing, skills and decision making, mental models of attention and memory, design of mental work support techniques, trends in work organization.

STRATEGIC PLANNING (ECTS 4)  (ΜΠΔ 506)

TECHNOLOGICAL FORECASTING (ECTS 5)  (ΜΠΔ 507)

ENGINEERING ECONOMICS AND BUSINESS PLAN ANALYSIS (ECTS 5)  (ΜΠΔ 510)

SUSTAINABLE FINANCE (ECTS 4)  (ΜΠΔ 329)
Business finance, financial decisions, time value of money, investment assessment criteria, socially responsible investment, ESG criteria, environmental analysis, social behavior, business management, new approach to risk assessment, ecological leverage, multicriteria decision analysis, case studies.
Laboratory: Financial analysis software, ESG multicriteria analysis models.

**HUMAN RESOURCE MANAGEMENT (ECTS 4) (ΜΠΔ 302)**


**Laboratory:** Laboratory work via the use of case studies, experiential organizational games and practical exercises aiming toward the development of soft skills.

**Practical Training I and II**

General Elective Courses without grades

Internship of students in public organizations or private sectors, lasting up to two (2) calendar months during the summer vacation period and during the 6th or 8th semester of studies. The Internship is declared as a free elective at the beginning of the respective semester. Aim of the Internship is to get the students to familiarize with their future working environment and the requirements of a full professional, dealing with real problems related to the science of Production Engineering and Management in the market.

**Seminars**

General Elective Courses without grades

The curriculum also includes seminars on various topics. The seminars aim to expand the opportunities of students to deepen into subjects they are being taught, and also to get in touch with a number of Greek and foreign scientists. The seminars are offered according to the available resources of the School and are declared as a free electives, without grade but with ECTS credits.
6. Contact Information

The mailing address of the School is:

Technical University of Crete  
School of Production Engineering and Management (PEM)  
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The School acronym is: **PEM**

<table>
<thead>
<tr>
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<th><a href="https://www.pem.tuc.gr">https://www.pem.tuc.gr</a></th>
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# Laboratories and Laboratory Assistants

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15. **Matter Structure and Laser Physics Laboratory**  
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